Serap Kurbanoğlu · Joumana Boustany
Sonja Špiranec · Esther Grassian
Diane Mizrachi · Loriene Roy
Tolga Çakmak (Eds.)

Information Literacy: Key to an Inclusive Society

4th European Conference, ECIL 2016
Prague, Czech Republic, October 10–13, 2016
Revised Selected Papers

Springer

Communications in Computer and Information Science 676

Commenced Publication in 2007
Founding and Former Series Editors:
Alfredo Cuzzocrea, Dominik Ślęzak, and Xiaokang Yang

Editorial Board

Serap Kurbanoğlu · Joumana Boustany
Sonja Špiranec · Esther Grassian
Diane Mizrachi · Loriene Roy
Tolga Çakmak (Eds.)

Information Literacy:
Key to an Inclusive
Society

4th European Conference, ECIL 2016
Prague, Czech Republic, October 10–13, 2016
Revised Selected Papers

Springer

Editors
Serap Kurbanoğlu
Hacettepe University
Beytepe, Ankara
Turkey

Joumana Boustany
Université Paris Descartes
Paris
France

Sonja Špiranec
University of Zagreb
Zagreb
Croatia

Esther Grassian
University of California (UCLA)
Los Angeles, CA
USA

Diane Mizrachi
University of California (UCLA)
Los Angeles, CA
USA

Loriene Roy
University of Texas
Austin, TX
USA

Tolga Çakmak
Hacettepe University
Beytepe, Ankara
Turkey

Preface

The 4th European Conference on Information Literacy (ECIL) was co-organized by the Department of Information Management of Hacettepe University, Turkey, the Department of Information and Communication Sciences of Zagreb University, Croatia, and the Association of Libraries of Czech Universities – ALCU, Czech Republic. Inclusive society being the main theme, ECIL 2016 aimed to bring together researchers, information professionals, media specialists, educators, policy-makers and all related parties from around the world to exchange knowledge and experience and to discuss current issues and recent developments.

The main theme of the fourth conference was "Information Literacy in the Inclusive Society." In all, 259 papers were submitted to the conference. Contributions came from 50 different countries (Albania, Australia, Austria, Belgium, Botswana, Brazil, Bulgaria, Canada, China, Croatia, Czech Republic, Estonia, Finland, France, Germany, Ghana, Greece, Hungary, Iceland, Iran, Italy, Japan, Latvia, Lithuania, Malta, Mexico, Moldova, The Netherlands, New Zealand, Norway, Pakistan, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Taiwan, Turkey, UK, Ukraine, United Arab Emirates, USA).

All submissions were subjected to a double-blind review process. This book consists of a total of 71 papers addressing many different issues.

Starting with the host organization, the Association of Libraries of Czech Universities, we are grateful to several other organizations for their support. We would like to express our deep gratitude to all sponsors for their generous support. Our special thanks go to UNESCO and IFLA, two major organizations that contributed tremendously to the development of information literacy, for providing their patronage.

We would like to take this opportunity to thank the conference keynote speakers Tara Brabazon and Jan A.G.M. van Dijk; the invited speakers Annemaree Lloyd, Ola Pilerot and Vít Šisler; the authors and presenters of papers, best practices, PechaKuchas, posters, and workshops; and the session chairs. We would like to thank and acknowledge the hard work of the members of the Standing and Program Committees, who invested their time generously to make this event happen.

Our editorial team should also be acknowledged here. Special thanks to Joumana Boustany, Esther Grassian, Diane Mizrachi, Loriene Roy, and Tolga Çakmak for their hard work and valuable editorial contributions.

Last but not least, we would like to thank the local Organizing Committee.

December 2016

Serap Kurbanoğlu
Sonja Špiranec
Hana Landová

Organization

The European Conference on Information Literacy (ECIL) was co-organized by the Department of Information Management of Hacettepe University, the Department of Information and Communication Sciences of Zagreb University, and the Association of Libraries of Czech Universities – ALCU.

Standing Committee

Paul G. Zurkowski	USA (Honorary Chair)
Serap Kurbanoğlu	Hacettepe University, Turkey (General Co-chair)
Sonja Špiranec	University of Zagreb, Croatia (General Co-chair)
Hana Landová	Association of Libraries of Czech Universities, Czech Republic (Co-chair for ECIL 2016)
Szarina Abdullah	MARA Technology University, Malaysia
Buket Akkoyunlu	Hacettepe University, Turkey
Susie Andretta	London Metropolitan University, UK
Aharon Aviram	Ben-Gurion University, Israel
George Awad	UNESCO Regional Office, Lebanon
Rafael Ball	University of Regensburg, Germany
Tomaz Bartol	University of Ljubljana, Slovenia
Athina Basha	Albanian Library Association, Albania
David Bawden	City University, UK
Dilara Begum	East West University, Bangladesh
Albert K. Boekhorst	University of Pretoria, South Africa
Alexander Botte	German Institute for International Educational Research, Germany
Joumana Boustany	University of Paris Descartes, France
Patricia Senn Breivik	National Forum of Information Literacy, USA
Christine Bruce	Queensland University of Technology, Australia
Mersini Moreleli-Cacouris	Alexander Technological Educational Institute of Thessaloniki, Greece
Maria Carme Torras Calvo	Bergen University, Norway
Toni Carbo	Drexel University, USA
Paola De Castro	National Institute of Health, Italy
Ralph Catts	University of Stirling, UK
Jerald Cavanagh	Limerick Institute of Technology, Ireland
Kunjilika Chaima	University of Montreal, Canada
Samuel Kai Wah Chu	University of Hong Kong, SAR China
Ioannis Clapsopoulos	University of Thessaly, Greece
John Crawford	Independent Information Professional, UK
Gülçin Cribb	Singapore Management University, Singapore
Lenka Danevska	Central Medical Library, Republic of Macedonia

Lourense H. Das   ENSIL Foundation, The Netherlands
Senada Dizdar   University of Sarajevo, Bosnia and Herzegovina
Noraida Dominguez   University of Puerto Rico, Puerto Rico
Elisabeth Adriana Dudziak University of Sao Paulo, Brazil
Michael B. Eisenberg   University of Washington, USA
Susana Finquelievich   University of Buenos Aires, Argentina
Almuth Gastinger   University of Science and Technology Trondheim,
                            Norway
Natalia Gendina   Kemerovo State University of Culture and Arts, Russia
Nieves González   University of Seville, Spain
Esther Grassian   University of California, Los Angeles, USA
Eystein Gullbekk   Oslo University, Norway
Chow Wun Han   National Library, Singapore
Thomas Hapke   Hamburg University of Technology, Germany
Päivi Helminen   Helsinki University, Finland
Jos van Helvoort   The Hague University, The Netherlands
Kees Hopstaken   Utrecht University, The Netherlands
Forest Woody Horton   International Library and Information Consultant, USA
Teo Jye Ling Jaclyn   National Library, Singapore
László Z. Karvalics   University of Szeged, Hungary
Irmgarda   Knowledge Societies Division, UNESCO
   Kasinskaite-Buddeberg
Anthi Katsirikou   University of Piraeus, Greece
Padraig Kirby   Limerick Institute of Technology, Ireland
Tibor Koltay   Szent István University, Hungary
Rumyana Koycheva   Global Libraries, Bulgaria
Carol C. Kuhlthau   Rutgers University, USA
Claudio Laferlac   University of Malta, Malta
Piotr Lapo   Belarusian State University Library, Belarus
Jesús Lau   Veracruzana University, Mexico
Anne Lehmans   University of Bordeaux, France
Louise Limberg   University of Borås, Sweden
Vincent Liquete   University of Bordeaux, France
Annemaree Lloyd   Charles Sturt University, Australia
Szu-chia Scarlett Lo   National Chung-hsing University, Taiwan
Randi Lundvall   Løkeberg Primary School, Norway
Latifa Mammadova   Ministry of Culture and Tourism,
                            Republic of Azerbaijan
Luisa Marquardt   Roma Tre University, Italy
Vanessa Middleton   Petroleum Institute, United Arab Emirates
Muhammad Sajid Mirza   International Islamic University, Pakistan
Theophilus E. Mlaki   Consultant ICT for Development, Tanzania
Intan Azura Mokhtar   Nanyang Technological University, Singapore
María Pinto Molina   Granada University, Spain
Camilla Moring   University of Copenhagen, Denmark
Rajen Munoo   National Library Board NLB Academy, Singapore

Mitsuhiro Oda	Aoyama Gakuin University, Japan
Anna Onkovich	National Academy of Pedagogical Sciences, Ukraine
Chido Onumah	African Centre for Media Literacy, Nigeria
Heike vom Orde	International Central Institute for Youth and Educational TV, Germany
Judith Peacock	Queensland University of Technology, Australia
Zdravka Pejova	Library and Information Consultant, Republic of Macedonia
Manuel Pinto	University of Minho, Portugal
Gloria Ponjuan	University of Havana, Cuba
Maria Próchnicka	Jagiellonian University, Poland
Viviana Quinones	National Library, France
Mircea Regneala	University of Bucharest, Romania
Angela Repanovici	Transilvania University of Brasov, Romania
Laurie Ortiz Rivera	University of Puerto Rico, Puerto Rico
Manuela Rohrmoser	Vienna University, Austria
Jurgita Rudzioniene	Vilnius University, Lithuania
Philip Russell	Institute of Technology Tallaght, Ireland
Ramza Jaber Saad	Lebanese National Commision of UNESCO, Lebanon
Jarmo Saarti	University of Eastern Finland, Finland
Chutima Sacchanand	Sukhothai Thammathirat Open University, Thailand
Armando Malheiro da Silva	University of Porto, Portugal
Diljit Singh	University of Malaya, Malaysia
Jagtar Singh	Punjabi University, India
Kaisa Sinikara	Helsinki University Library, Finland
Eero Sormunen	University of Tampere, Finland
Philipp Stalder	University of Zurich, Switzerland
Jela Steinerova	Comenius University, Slovakia
Gordana Stokić Simončić	Belgrade University, Serbia
Paul Sturges	University of Pretoria, South Africa
Olof Sundin	Lund University, Sweden
Samy Tayie	Cairo University, Egypt
Ellen R. Tise	Stellenbosch University, South Africa
Ross J. Todd	The State University of New Jersey, USA
Ramon R. Tuazon	Asian Institute of Journalism and Communication, Philippines
Anne Sissel Vedvik Tonning	University of Bergen, Norway
José Manuel Pérez Tornero	University of Barcelona, Spain
Jordi Torrent	United Nations Department of Education, USA
Isabelle Turmaine	International Association of Universities, France
Peter Underwood	University of Cape Town, Republic of South Africa
Cristóbal Pasadas Ureña	University of Granada, Spain
Alejandro Uribe Tirado	University of Antioquia, Colombia
Egbert John Sanchez Vanderkast	National Autonomous University of Mexico, Mexico

Tapio Varis	UNESCO Chair, University of Tampere, Finland
Aurora de la Vega	Catholic University of Peru, Peru
Jose de Jesus Cortes Vera	Autonomous University of Ciudad Juárez, Mexico
Henri A. Verhaaren	Ghent University, Belgium
Sirje Virkus	Tallinn University, Estonia
Li Wang	University of Auckland, New Zealand
Sheila Webber	University of Sheffield, UK
Sharon A. Weiner	National Forum of Information Literacy, USA
Barbro Wigell-Ryynanen	Ministry of Education and Culture, Finland
Pradeepa Wijetunge	University of Colombo, Sri Lanka
Carolyn Wilson	University of Toronto, Canada
Tom Wilson	University of Sheffield, UK
Andrew Whitworth	University of Manchester, UK
Michaela Zemanek	Vienna University, Austria
Julia Zhang Xiaojuan	Wuhan University, China

Program Committee

Maryam S. AlOshan	Imam Muhammed bin Saud Univesity, Saudi Arabia
Ines Amaral	Autonomous University of Lisbon, Portugal
Kanwal Ameen	University of the Punjab, Lahore, Pakistan
Tatjana Aparac-Jelusic	University of Zadar, Croatia
Mihaela Banek Zorica	University of Zagreb, Croatia
Tomaz Bartol	University of Ljubljana, Slovenia
Glória Maria Lourenço Bastos	Universidade Aberta/Portuguese Open University, CEMRI, Portugal
David Bawden	City University, UK
Bojana Boh	University of Ljubljana, Slovenia
Joumana Boustany	University of Paris Descartes, France
Saskia Brand-Gruwel	Open University of the Netherlands, The Netherlands
Sabina Cisek	Jagiellonian University, Poland
Ioannis Clapsopoulos	University of Thessaly, Greece
John Crawford	Independent Information Professional, UK
Tolga Çakmak	Hacettepe University, Turkey
Patricia Dawson	Rider University, USA
Anneke Dirkx	Leiden University, The Netherlands
Mary Jean Tecce DeCarlo	Drexel University, USA
Heidi Enwald	Oulu University, Finland
Helena Francke	University of Borås, Sweden
Fabian Franke	University of Bamberg, Germany
Emmanouel Garoufallou	Alexander Technological Educational Institute of Thessaloniki, Greece
Almuth Gastinger	University of Science and Technology Trondheim, Norway
Carmen Gómez-Camarero	Univesity of Málaga, Spain

José Antonio Gómez-Hernández	University of Murcia, Spain
Nieves González	University of Seville, Spain
Allen Grant	Drexel University, USA
Stacey Greenwell	University of Kentucky, USA
Vincas Grigas	Vilnius University, Lithuania
Eystein Gullbekk	Oslo University, Norway
Gaby Haddow	Curtin University, Australia
Lejla Hajdarpasic	University of Sarajevo, Bosnia & Herzegovina
Jos van Helvoort	The Hague University, The Netherlands
Ma Lei Hsieh	Rider University, USA
Baiba Holma	University of Latvia, Latvia
Maija-Leena Huotari	University of Oulu, Finland
Martina Dragija Ivanovic	University of Zadar, Croatia
Zhang Jiuzhen	Peking University, China
Veronica Johansson	University of Borås, Sweden
Bill Johnston	University of Strathclyde, UK
Christina Kanaki	Panteion University of Social and Economic Sciences, Greece
Paulette Kerr	University of West Indies, Jamaica
Tibor Koltay	Szent István University, Hungary
Pavla Kovarova	Masaryk University, Czeck Republic
Liga Krumina	University of Latvia, Latvia
Serap Kurbanoğlu	Hacettepe University, Turkey
Hana Landova	Information Education and IL WG, Czech Republic
Jesús Lau	Veracruzana University, Mexico
Vera J. Lee	Drexel University, USA
Anne Lehmans	University of Bordeaux, France
Louise Limberg	University of Borås, Sweden
Annemaree Lloyd	Charles Sturt University, Australia
Mandy Lupton	Queensland University of Technology, Australia
Afrodite Malliari	DataScouting, Greece
Viviana Fernández Marcial	University of La Coruña, Spain
Yolande Maury	Artois University, France
Camilla Moring	University of Copenhagen, Denmark
Danuta Nitecki	Drexel University, USA
Ágústa Pálsdóttir	University of Iceland, Iceland
Helen Partridge	Queensland University of Technology, Australia
Rosaura Fernández Pascual	University of Granada, Spain
Ola Pilerot	University of Borås, Sweden
Ewa Rozkosz	University of Lower Silesia, Poland
Jurgita Rudzioniene	Vilnius University, Lithuania
Jarmo Saarti	University of Eastern Finland, Finland
Dragana Sabovljev	Zarko Zrenjanin Public Library, Serbia
Chutima Sacchanand	Sukhothai Thammathirat Open University, Thailand
Dora Sales	Jaume University, Spain

Tatiana Sanches	Lisbon University, Portugal
Laura Saunders	Simmons College, USA
Jane Secker	London School of Economics, UK
Foo Shou Boon Schubert	Technological University, Singapore
Eero Sormunen	University of Tampere, Finland
Sonja Špiranec	University of Zagreb, Croatia
Jela Steinerova	Comenius University, Slovakia
Karmen Stopar	University of Ljubljana, Slovenia
Gordana Stokić Simončić	Belgrade University, Serbia
Ivanka Stricevic	University of Zadar, Croatia
Paul Sturges	University of Pretoria, South Africa
Ana Lúcia Terra	Oporto Polytechnic Institute, Portugal
Ross J. Todd	Rutgers University, USA
Tania Y. Todorova	SULSIT, Bulgaria
Nevena Tomic	Belgrade University, Serbia
Anne Sissel Vedvik Tonning	University of Bergen, Norway
Tereza Trencheva	SULSIT, Bulgaria
Yurdagül Ünal	Hacettepe University, Turkey
Sirje Virkus	University of Tallinn, Estonia
Li Wang	University of Auckland, New Zealand
Sheila Webber	University of Sheffield, UK
Gunilla Widén	Abo Akademi University, Finland
Mary Wilkinson	Simmons College, USA
Andrew Whitworth	University of Manchester, UK
Zuza Wiorogorska	University of Warsaw, Poland
Iwan Wopereis	Saskias Research Group, The Netherlands
Mei-Mei Wu	National Taiwan University, Taiwan
Sharon Yang	Rider University, USA
Pan Yantao	Sun Yat-Sen University, China
Ladislava Zbiejczuk Suchá	Masaryk University, Czech Republic
Sandy Zinn	University of the Western Cape, South Africa

Local Organizing Committee

Hana Landová	Association of Libraries of Czech Universities (Chair), Czech Republic
Tereza Bártová	Czech Technical University in Prague, Czech Republic
Lenka Bělohoubková	University of Economics, Prague, Czech Republic
Alena Doláková	University of Economics, Prague, Czech Republic
Hana Janečková	Brno University of Technology, Czech Republic
Pavla Kovářová	Masaryk University, Czech Republic
Pavlína Mazáčová	Masaryk University, Czech Republic
Kristýna Paulová	Czech University of Life Sciences in Prague, Czech Republic

Contents

Various Literacies

Reading Preference: Print vs Electronic

Theoretical Aspects

Higher Education

Discipline Based Studies

Research Methods

Children and Youth

Country Based Studies

Academic Libraries

Librarians

Teaching Methods and Instruction

Inclusive Society and Democracy

Student Teachers' Perceptions of an Inclusive Future

Ivana Batarelo Kokić[1(✉)], Terri L. Kurz[2], and Višnja Novosel[3]

[1] Faculty of Humanities and Social Sciences, University of Split, Split, Croatia
batarelo@ffst.hr
[2] Arizona State University, Tempe, AZ, USA
terri.kurz@asu.edu
[3] Faculty of Humanities and Social Sciences Library, University of Zagreb, Zagreb, Croatia
vnovosel@ffzg.hr

Abstract. The relationship of student teachers' attitudes towards disability, social inclusion and technology's role in that process was investigated in this study. Results are situated in the context of current literature on social inclusion in the modern technological society, emphasizing people's ability to use technology in order to engage in meaningful social practices. The student teachers' attitudes towards social inclusion, perceived information literacy, self-efficacy, and perceived attributes of information and communication technologies (ICT) usage were the focus of this survey study. The questionnaire was administered to 300 future teachers studying at the graduate level in Croatia's university system (University of Zagreb and University of Split). The data collected from the representative sample indicated a high correlation between student teachers' attitudes towards disability and social inclusion, the self-assessment of information literacy and perceived attributes of ICT access and usage.

Keywords: Student teachers · Social inclusion attitudes · Information literacy self-efficacy · Perceived attributes of ICT usage

1 Introduction

Building an inclusive future is a complex endeavor that involves multiple segments of society. However, education (and especially teacher education) has one of the most important roles in changing societies as it actually trains individuals who are transferring knowledge, values, principles, attitudes, philosophies and even ideologies to younger generations. Creating an inclusive society is recognized as important to addressing the challenges faced by contemporary societies. According to the European Commission [1, p.1], "reducing inequalities and social exclusion in Europe are crucial challenges for the future of Europe." Since, an inclusive society is based on involving all citizens in all components of society and its decision-making processes, education can play a role not just in "instilling values of respect and appreciation of diversity but also in empowering those who are marginalized or excluded from participating in discussions and decision-making" [2, p.10]. To ensure an inclusive future along with its values for all citizens, one of the components should be the development of a comprehensive education emphasizing embracing schools for all children. As emphasized by UNESCO [3, p.11] "in

focusing on the quality of education from a social inclusion perspective, it is important to consider the inputs, processes, and environments that surround and foster, or hamper, learning, in order to ensure that the various components of education are sensitive to social inclusion and to each key group in each context." In order to achieve quality education in societies permeated by information and communication technologies (ICT) it is necessary to diversify learning through delivery. Altering delivery might include the use of student-centered approaches to teaching and learning, expanding part-time provisions, modularizing programs and distance learning through the use of ICT, and open educational resource development [4]. Thus, teacher education should prepare and empower future teachers as information literate citizens; an authentic, inclusive society requires active participation and committed purpose from teachers [5, 6]. Contemporary societies are characterized by stronger connections and influences between different cultures, opinions, and ways of seeing the world. Due to the recent migrant crisis affecting Europe, diversity among the population is rapidly expanding, and social inclusion is more critical than ever. In Europe's changing society, future teachers need to be prepared to meet the needs of diverse students as well as openly addressing the challenges that this diversity generates.

2   Background to Research

This research was situated in the context of current literature on social inclusion in the modern technological society, emphasizing people's ability to use technology to engage in meaningful social practices. Social inclusion is influenced by the ability to access, adapt, and create knowledge using ICT [6]. One of the roles of teacher preparation programs is to develop and nurture preservice teachers' perceptions of technology to improve its use in the inclusive classroom. Our study centers on student teachers' perceptions; student teachers are defined as students enrolled in a university who are learning how to teach both in theory (through methodology studies) and practice (through classroom student teaching) [7]. Since education is taking place in both physical and virtual environments, student teachers need preparation in using ICT [8, 9]. Learning how to use ICT should reduce the information gap now permeating the population and excluding some citizens from completely participating in society. Park [10] explained that information poverty in the digital era is becoming an important indicator of social exclusion. The conceptualization of the digital divide is gradually changing towards a multidimensional model accounting for differences in levels of usage and perspectives [11]. The promotion of social inclusion involves various factors, such as physical, digital, human, and social resources [12]. Technology helps information-literate teachers meet students' needs in many ways including through content input, learning activities, and opportunities to demonstrate comprehension [13].

3   Objectives

The primary objective of this research was to investigate the relationship between student teachers' attitudes toward disability and social inclusion, information literacy

self-efficacy, and perceived attributes of ICT usage. Within the research agenda in mind, the following questions were explored:

1. What are the attitudes towards disability and social inclusion of student teachers?
2. What is the level of perceived information literacy self-efficacy of student teachers?
3. What are the perceived attributes of ICT usage of student teachers?
4. Is there a relationship between attitudes toward disability and social inclusion, perceived information literacy self-efficacy, and perceived attributes of ICT usage of student teachers?

4 Review of Related Literature

As emphasized by Warschauer [6], the digital divide is commonly the starting point in exploring ICT. Nevertheless, meaningful access to ICT involves much more than simply providing computers and internet connections. ICT may play an important role in teacher education for social inclusion. Student teachers' attitudes and self-assessment related to emerging issues including inclusive education and the use of ICT in the classrooms considerably influences their teaching practice [14, 15]. According to the Shoffner study [14], ICT serve as tools for reflection allowing increased questioning and dialogue among future teachers while supporting the collaborative meaning-making of shared reflections.

There are a number of research studies centered on teacher education students' attitudes towards disability and social inclusion [16–18], still, research studies exploring future teachers' attitudes towards inclusion in the information technology rich environment are less common [8]. Several studies researched the ways in which it is possible to impact student teachers' attitudes and beliefs about inclusive education, while facilitating the change in future teachers' understanding regarding the importance of meeting their students' educational needs [19, 20]. Some studies attempt to determine ways in which educational ICT support learning and empower diverse learners [21, 22]. Other studies present ways in which structured ICT intervention can reduce bias and ethnic prejudice among prospective teachers [23]. According to Hoter [23], teacher education students who are not exposed to social inclusion issues tend to perpetuate their own stereotypical views on students in their classroom. While using technological tools that allow teachers to have an in-depth acquaintance with other cultures and develop an understanding of universal values of each culture, teacher education programs can be a major agent of social change.

Several research studies concentrated on determining information literacy self-efficacy among students in higher education [24, 25]. Kurbanoglu, Akkoyunlu and Umay [25] developed instruments for measuring the impact of information literacy on different aspects of life, and in particular on lifelong learning including key skills like self-regulated learning and information literacy. Some related studies highlighted students' information literacy positioned within the university system in Croatia [26, 27]. According to Batarelo Kokić and Novosel [26], student teachers' perceived information literacy self-efficacy differs in relation to the level of information literacy competence. Only self-trusting individuals with critical thinking, problem solving and information finding skills

can be active citizens with an ability to understand values of "others." Considering the role of future teachers, an elevated information literacy self-efficacy level should be an educational goal.

5   Overview of Methodology

5.1   Participants

The student teachers' attitudes towards social inclusion, perceived attributes of ICT usage and perceived information literacy self-efficacy was the emphasis for this study. The survey included 300 prospective teachers enrolled in teacher preparation programs in humanities and social sciences at two universities in Croatia. The selected teacher preparation programs are similar in structure but differ in relation to the number and type of elective courses. According to the data displayed in the syllabi of these two distinct teacher preparation programs [28, 29], students were provided with an opportunity to gain information literacy and social inclusion related competencies through coursework.

In order to receive a teaching authorization in Croatia, students must complete under-graduate studies as well as acquire at least 60 credits at the Master's level through courses focusing on the development of teacher competencies [30]. In the 2015–2016 academic year, there were approximately 320 students enrolled at the teacher preparation programs at the Faculty of Humanities and Social Sciences at University of Zagreb and around 250 students enrolled at teacher preparation program at the Faculty of Humanities and Social Sciences at University of Split. A majority of the students were enrolled in teacher prepara-tion programs at the Master's level. The selection process ensured representativeness of the sample. As seen in Table 1, the sample included both first and second year students.

Table 1. Study participants' demographics.

University	N	%
University of Split	151	50.3
University of Zagreb	149	49.7
Master's study	N	%
1st year	188	62.7
2nd year	112	37.3

5.2   Instruments

In order to understand the attitudes of student teachers towards social inclusion and tech-nology's role in that process, we used three validated scales, with strong metric properties: Attitudes toward disability and social inclusion scale (ATDSI), Information literacy self-efficacy scale (ILSE) and Perceived attributes of ICT usage scale (PAICT). The selection of the scales was based on satisfactory metric properties and dimensional structure of the scales. The scales were aligned with the targeted population and research questions of our study.

ATDSI Scale. The ATDSI scale was developed by Novo-Corti [18]. The scale evaluates student teachers' attitudes towards inclusion, social norm, perceived control and intention. The original scale has a 4-factor structure including the following factors: attitude towards inclusion with 3-items and Cronbach alpha −.294; social norm with 9-items and Cronbach Alpha .822; perceived control with 4-items and Cronbach Alpha .848 and intention with 5-items and Cronbach Alpha .786.

For the purpose of this study, the scale was translated into Croatian based on the back translation method and revised using exploratory and confirmatory factor analysis. The principal component factor analysis supported a 19-item scale with unifactorial structure explaining 42.04% of the variance, with Cronbach Alpha .934.

ILSE Scale. The ILSE scale developed by Kurbanoglu, Akkoyunlu, and Umay [25] is considered to be highly reliable with Cronbach's Alpha .92 for the Turkish version and .91 for the English version. The scale has a three factor structure based on the complexity level and may be used to guide the design of information literacy instruction programs. The Croatian version of the scale was translated by the back-forward technique and used in an earlier study [26] has been shown to be highly reliable with Cronbach's Alpha .924. As in the earlier study conducted in Croatia, the principal component analysis implemented for the purpose of this study yielded a three-factorial structure. The scale structure in this study explained 50.38% of the variance. The high reliability of the scale is confirmed by Cronbach's Alpha .939, while the reliability coefficients of the subsections were: .884 for basic information literacy skills, .887 for intermediate information literacy skills, and .882 for advanced information literacy skills. The division of items among subsections of the scale somewhat differed from the 2014 research study results. The difference in item division could be explained by different populations, while the 2014 study included both undergraduate and graduate students, our study solely examined graduate students enrolled in the teacher training program.

PAICT Scale. The PAICT scale was developed by Usluel, Askar, and Bas [31]; it consists of 10 items exploring ICT use in higher education. Nominally, the scale includes relative advantage, compatibility, complexity/ease of use, observability and trialability attributes. The original scale had high reliability coefficients whereas Cronbach's alpha coefficients of the subsections were: .93 for the relative advantage, .86 for compatibility, .92 for complexity/ease of use, .74 for observability, and .81 for trialability. The original version of the scale was first translated from English into Croatian and then back-translated into English in order to assure that the translation was accurate. The translated scale was then revised through both exploratory and confirmatory factor analysis. The principal component factor analysis supported a robust 2-factor structure explaining 56.57% of the variance, with Cronbach's Alpha of .882 for the entire scale. The first subsection dealing with advantage and compatibility of ICT use has 6 items and Cronbach's Alpha .862, the second subsection dealing with trialability and observability of ICT use has 4 items and Cronbach's Alpha .829.

5.3   Data Analysis

On a descriptive level, data were analyzed using measures such as frequency, mean per-item score and standard deviation. To determine the correlation between information literacy self-efficacy, attitudes toward disability and social inclusion and attributes of ICT usage, Pearson coefficient of correlation was used on the $p < .01$ level.

6   Findings and Discussion

The ATDSI scale was measured on a 5-point Likert scale. The analysis of the mean per-item score showed a high level of positive attitudes towards disability and social inclusion ($M = 4.14$, $SD = .61$) (see Table 2).

Table 2.   Descriptive statistics of ATDSI, and ILSE and PAICT subsections.

	Number of items	Mean per-item	SD
ATDSI	19	4.14	.61
	Number of items	Mean per-item	SD
ILSE	28		
Basic	8	4.41	.57
Intermediate	13	4.07	.57
Advanced	7	4.07	.60
	Number of items	Mean per-item	SD
PAICT	10		
Advantage and compatibility	6	4.2	0.65
Trialability and observability	4	3.8	0.77

Furthermore, the study participants had an above average level of information literacy self-efficacy. ILSE was measured on a 5-point Likert scale. The analysis of the mean per-item score for the subsections of ILSE showed that the highest level of self-efficacy was related to the basic levels of information literacy ($M = 4.41$, $SD = .57$) and somewhat lower level of self-efficacy was related to the intermediate ($M = 4.07$, $SD = .57$) and advanced levels of information literacy ($M = 4.07$, $SD = .60$).

The results for the PAICT scale indicated that respondents perceived ICT usage in higher education as desirable, while commonly perceiving that ICT has advantageous and compatibility attributes ($M = 4.20$, $SD = .65$) and trialability and observability attributes ($M = 3.80$, $SD = .77$).

The inter-correlations between ATDSI scale, ILSE scale, and PAICT scale and their subsections are presented in Table 3. The unifactorial ATDSI scale was strongly correlated

to all three factors of the ILSE scale: basic ILSE and ATDSI, r(300) = .250, p < .001; intermediate ILSE and ATDSI, r(300) = .418, p < .001; and advanced ILS and ATDSI, r(300) = .264, p < .001.

Table 3. Inter-correlations between ATDSI, and ILSE and PAICT subsections.

	1	2	3	4	5
ATDSI (1)					
ILSE					
Basic (2)	,250**				
Intermediate (3)	,418**	,733**			
Advanced (4)	,264**	,487**	,734**		
PAICT					
Advantage and compatibility (5)	,199**	,326**	,421**	,323**	
Triability and observability (6)	,359**	,327**	,511**	,266**	,558**

**Correlation is significant at p < .001

Furthermore, the ATDSI scale was highly correlated with both factors of the PAICT scale. Pearson correlation coefficient indicated correlation between perception of advantage and compatibility of ICT use and ATDSI, r(300) = .199, p < .001; and perception of trialability and observability of ICT use and ATDSI, r(300) = .359, p < .001.

In addition, all subsections of the ILSE and PAICT scales were highly correlated amongst each other: basic ILSE and perception of advantage and compatibility of ICT use r(300) = .326, p < .001; basic ILSE and perception of trialability and observability of ICT use r(300) = .327, p < .001; intermediate ILSE and perception of advantage and compatibility of ICT use r(300) = .421, p < .001; intermediate ILSE and perception of trialability and observability of ICT use r(300) = .511, p < .001; advanced ILSE and perception of advantage and compatibility of ICT use r(300) = .323, p < .001; advanced ILSE and perception of trialability and observability of ICT use r(300) = .266, p < .001.

In relation to the posed research questions, the statistical results indicated that student teachers had an above average positive attitude toward disability and social inclusion. Also, the level of perceived information literacy self-efficacy of student teachers was above average for all three subscales, with the highest results for the perceived self-efficacy in the area of basic information literacy. The perceived attributes of ICT usage of student teachers were above average with a somewhat higher perception of advantages and compatibility and a lower perception of the triability and observability. Finally, there was a highly significant positive correlation between attitudes toward disability and social inclusion, perceived information literacy self-efficacy, and perceived attributes of ICT usage of student teachers.

7   Recommendations and Conclusions

This research study provided insight into the posed research questions. The data collected from a representative sample of students attending teacher education programs at both

universities showed a high correlation between attitudes towards disability and social inclusion, the self-assessment of information literacy and perceived attributes of ICT access and usage.

The study findings indicated that teacher education programs in Croatia ensure the development of different aspects of information literacy, ICT use and competencies needed to work in inclusive schools in a technology-rich environment. These findings are important in that they indicate that information-literate teacher education students with access to technology show a high level of support towards students with disabilities and social inclusion.

Although a positive attitude was demonstrated, it is important to continue supporting the development of more inclusive schools in order to ensure that each child has an opportunity to reach his/her fullest potential. Additional research should explore the issue of future teachers' knowledge and readiness to work with diverse students, highlighting the use of ICT in order to facilitate learning of all students. Having a goal of improving the knowledgebase and attitudes regarding disability and social inclusion, it is necessary to research future teachers' ability to use technology to engage in meaningful social practices. With the use of modern, innovative technology, prospective teachers can engage in reflective practices across teacher education programs yielding greater preparation in meeting the needs of all students in the inclusive classroom.

References

1. European Commission: Europe in a Changing World - Inclusive, Innovative and Reflective Societies. https://ec.europa.eu/programmes/horizon2020/en/h2020-section/europe-changing-world-inclusive-innovative-and-reflective-societies
2. United Nations: Creating an Inclusive Society: Practical Strategies to Promote Social Integration. http://www.un.org/esa/socdev/egms/docs/2009/Ghana/inclusive-society.pdf
3. UNESCO: International Conference of Education. 47th meeting. Workshop 2: Quality Education and Social Inclusion. http://www.ibe.unesco.org/International/ICE47/English/Organisation/Workshops/Workshop2CompENG.pdf
4. European Council: Council Conclusions on the Social Dimension of Higher Education. Official Journal of the European Union, 2013/C 168/02. http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52013XG0614%2801%29&from=EN
5. Dudziak, E.A.: Information Literacy as an Emancipatory Process Directed to Social Inclusion in a Knowledge Society. In: World Library and Information Congress: 72nd IFLA General Conference and Council, Seoul, Korea, pp. 20–24 (2006)
6. Warschauer, M.: Technology and Social Inclusion: Rethinking the Digital Divide. MIT Press, Cambridge (2004)
7. Student Teacher [Def. 1]: Merriam Webster Online. http://www.merriam-webster.com/dictionary/student%20teacher
8. Beacham, N., McIntosh, K.: Student teacher attitudes and beliefs towards using ICT as part of inclusive practice: a 2008–2009 pilot survey. Teach. Adv. Netw. J. **4**, 2 (2012)
9. Florian, L., Hegarty, J.: ICT and Special Educational Needs: A Tool for Inclusion. McGraw-Hill Education, UK (2004)
10. Park, S.: Dimensions of digital media literacy and the relationship with social exclusion. Media Int. Aust. **142**(1), 87–100 (2012)

11. Ferro, E., Helbig, N.C., Gil-Garcia, J.R.: The role of IT literacy in defining digital divide policy needs. Gov. Inf. Q. **28**(1), 3–10 (2011)
12. Zheng, Y., Walsham, G.: Inequality of what? Social exclusion in the e-society as capability deprivation. Inf. Technol. People **21**(3), 222–243 (2008)
13. Hobgood, B., Ormsby, L.: Inclusion in the 21st century classroom: differentiating with technology. UNC, Chapel Hill, Learn (2010)
14. Shoffner, M.: Personal attitudes and technology: implications for preservice teacher reflective practice. Teach. Educ. Q. **36**(2), 143–161 (2009)
15. Lancaster, J., Bain, A.: The design of inclusive education courses and the self-efficacy of preservice teacher education students. Int. J. Disabil. Dev. Educ. **54**(2), 245–256 (2007)
16. McHatton, P.A., Parker, A.: Purposeful preparation: longitudinally exploring inclusion attitudes of general and special education pre-service teachers. Teach. Educ. Spec. Educ. **36**, 186–203 (2013)
17. Malinen, O.P., Savolainen, H., Xu, J.: Beijing in-service teachers' self-efficacy and attitudes towards inclusive education. Teach. Teach. Educ. **28**(4), 526–534 (2012)
18. Novo-Corti, I.: Attitudes toward disability and social inclusion: an exploratory analysis. Eur. Res. Stud. J. **13**(3), 83–107 (2010)
19. Swain, K.D., Nordness, P.D., Leader-Janssen, E.M.: Changes in preservice teacher attitudes toward inclusion. Preventing Sch. Fail. Altern. Educ. Child. Youth **56**(2), 75–81 (2012)
20. Garmon, M.A.: Changing preservice teachers' attitudes/beliefs about diversity what are the critical factors? J. Teach. Educ. **55**(3), 201–213 (2004)
21. Heemskerk, I., Volman, M., Admiraal, W., ten Dam, G.: Inclusiveness of ICT in secondary education: students' appreciation of ICT tools. Int. J. Inclusive Educ. **16**(2), 155–170 (2012)
22. Kingsley, K.V.: Empower diverse learners with educational technology and digital media. Interv. Sch. Clin. **43**(1), 52 (2007)
23. Hoter, E., Shonfeld, M., Ganayim, A.: Information and communication technology (ICT) in the service of multiculturalism. Int. Rev. Res. Open Distrib. Learn. **10**, 2 (2009)
24. Demiralay, R., Karadeniz, Ş.: The effect of use of information and communication technologies on elementary student teachers' perceived information literacy self-efficacy. Educ. Sci. Theory Pract. **10**(2), 841–850 (2010)
25. Kurbanoglu, S.S., Akkoyunlu, B., Umay, A.: Developing the information literacy self-efficacy scale. J. Documentation **62**(6), 730–743 (2006)
26. Batarelo Kokić, I., Novosel, V.: The ball is in your court: information literacy self-efficacy and information literacy competence relation. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 512–520. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_54
27. Lasić-Lazić, J., Špiranec, S., Banek Zorica, M.: Izgubljeni u novim obrazovnim okruženjima–pronađeni u informacijskom opismenjivanju. Medijska istraživanja **18**(1), 125–142 (2012)
28. Filozofski fakultet Sveučilišta u Splitu: Diplomski studiji. http://www.ffst.unist.hr/studiji/diplomski
29. Filozofski fakultet Sveučilišta u Zagrebu: Redoviti studij - Studijski program. http://czon.ffzg.hr/redoviti-studij
30. Narodne novine: Zakon o odgoju i obrazovanju u osnovnoj i srednjoj školi (čl. 105, NN br. 87/08). http://narodne-novine.nn.hr/clanci/sluzbeni/340388.html
31. Usluel, Y.K., Askar, P., Bas, T.: A structural equation model for ICT usage in higher education. Educ. Technol. Soc. **11**(2), 262–273 (2008)

Gender Differences in ICT Use and Information Literacy in Public Libraries: A Study in a Rio de Janeiro Public Library

Aline Gonçalves da Silva[1] and Gilda Olinto[2(✉)]

[1] Oswaldo Cruz Foundation, Rio de Janeiro, Brazil
`linegonsi@yahoo.com.br`
[2] Brazilian Institute of Information on Science and Technology, Rio de Janeiro, Brazil
`gildaolinto@gmail.com`

Abstract. We approached gender differences in information and communication technology (ICT) use and appropriation and other aspects of information literacy in this study that focused on users of a large and modern public library located in a poor neighborhood in Rio de Janeiro. We took into account the literature and research evidence that considered the importance of the public library as a place for ICT and information literacy development. We also took into account the literature and evidence on gender differences in ICT use that tend to emphasize that women show lower interest in ICT and lower levels of ICT literacy. We obtained the empirical data through a study carried out in a new experience called "park library". As a whole, the data suggested that these public library experiences do not seem to represent a major contribution to the development of information literacy of this user group.

Keywords: ICT and gender · Information literacy · ICT literacy · Public library and society

1 Introduction

In this study we focus on social and gender aspects of information and communication technology (ICT) use and appropriation, considering a study carried out in a large public library located in a poor neighborhood in the city of Rio de Janeiro. Besides being a conventional library, with a large collection of books, it also has a sophisticated ICT infrastructure for its users. We deemed, therefore, that this study was a very special opportunity to examine how this public library ambiance promotes information literacy and effective ICT use among a socially underprivileged group. At the same time, this study was an opportunity to analyze how gendered characteristics and behavior can affect ICT appropriation.

We approach here the literature that considers the importance of the public library as a place for information literacy development, especially work that shows empirical evidence of the positive impact of ICT access and use in these institutions by poor groups

and communities. We also take into account the literature that stresses the gender-associated disadvantages regarding ICT, discussing how some aspects of this technology tend to alienate women and ultimately restrict the impact of these public library programs.

The main results shown here come from a questionnaire applied to 81 library users during a month, in different periods of the day. Data collected describe socio-demographic characteristics of users and aspects of their library and ICT use. Analyses presented here try to bring about evidence of differences between male and female users in regard to ICT use.

2   Discussion

2.1   ICT and Public Libraries

The ongoing expansion of the internet and of other ICT resources tends to reveal the strong impact that social factors seem to have upon aspects of ICT appropriation and effective use. Computer and internet resources, especially those that can bring about advantages to individuals and groups, are not evenly distributed among the population. Individuals from a higher socioeconomic status seem to accumulate advantages of access and use of this constantly changing technology, notably in underdeveloped and developing countries.

Although different kinds of efforts are constantly being made to overcome the amount of social inequality associated with ICT, such as the use of public institutions for digital inclusion, these efforts seem to have limited results and are often under criticism by analysts. According to empirical studies, the amount of education is what counts for the attainment of internet skills. Just using the media does not contribute to those skills, as is the case of the number of hours of use; mistakes or limited results will be constantly repeated if there is no one around for guidance [1]. In Brazil, analyses based on the Bureau of Census data show that education and income are strongly related to internet use and several use purposes [2]. The possibility that ICT, even being accessed, contributes to the increase of social inequality is still a serious concern. To be effective, ICT introduction requires careful planning, as pointed out by Kleine [3]. Information science literature has for some time emphasized that the contemporary public library is an institution that, providing ICT infrastructure and other library programs, has a promising role in contributing to social integration, ICT familiarization, and to information literacy in general. This role is considered as especially relevant in poor communities and among socially underprivileged groups, such as immigrants and other marginal groups. Contemporary public libraries seem to be facing a paradox. Their role as a major institution for providing access to certain types of information sources might be declining. On the other hand, the role of public libraries as a welcoming "physical" place where ICT can be used for the promotion of information literacy, social capital formation and community development among the above mentioned groups seems to become stronger [4, 5].

Attention to ICT in public libraries as a democratizing resource has brought about other types of concerns and has motivated empirical studies. Having become an essential

service of public libraries in general, analysts point out that ICT needs to be available to everyone and the adequate conditions in which all users are capable to make a rational and qualified use of it must be assured. The sustainability of these resources and services, through adequate financing and qualified personnel, also needs to be taken into account [6].

The integration of ICT resources and comprehensive library planning involving the integration of these services to other library programs and actions, including, specifically, information literacy programs is also considered as a necessary step. But this does not seem to characterize some developing countries' experiences, as is the case of Brazilian initiatives in general. A recent study carried out in Brazil has shown that ICT resources in public libraries of several different regions of the country tend to function independently and not integrated to other library activities. Libraries are seen and used as places of internet access, functioning as a LAN house (internet café) [7]. Other studies tend to support these findings showing that, even in large and modern public libraries, ICT and internet use does not seem to be a qualified one, and is usually concentrated on leisure and entertainment, without professional assistance [8, 9].

Associated with the limited contribution of public libraries to information literacy development in Brazil and other developing countries, there is their restricted role in citizenship and social capital development, which, as already mentioned, is part of the new role intended to be an outstanding one in the contemporary public library [10]. Some exceptions, however, should be mentioned, as is the case of the Park Libraries created in the Colombian cities of Bogota and Medellin, and recently in the city of Rio de Janeiro, as described below.

2.2 ICT and Gender

The fact that women face disadvantages in science and technology (S&T) has been well supported by studies. Although women tend to attain higher educational levels than men and to form a majority of university students in several countries, they are still concentrated in some S&T areas and have fewer chances of career development and leadership. Gender imbalance in the profession of information technologist is another aspect brought about by some studies: in Brazil, as well as in other countries, only about 20% of women choose this field of study, a percentage that does not seem to change over time. Cultural and discriminatory processes seem to contribute to these gender differences and to perpetuate what has been called another great divide that could limit women's participation in the knowledge society [11, 12].

It is very early in life that girls, although having an equivalent or better school performance than boys, are inclined to choose feminine professions and turn their backs to the so called hard sciences, including information technology [13]. According to Wajcman [14], women have always been alienated from technology and technological processes, considered a masculine domain, where the content and shaping of technological artifacts are a male privilege. As a consequence, women do not tend to see technology as an inviting subject or a perspective for career purposes.

When the concern of research is on ICT use and appropriation, evidences seem to suggest that internet access is reaching gender parity but that some aspects of internet

use seem to show a gendered pattern – women tend to be more task-oriented and to show a more focused use of the internet for educational and communication purposes, whereas men tend to show a more diversified internet use, a more intense use for leisure, and to be more acquainted with the technological aspects of ICT media. Distinguishing between media related skills and content related skills, the suggestion is that women would be less interested and less involved in ICT media and more interested and involved with skills related to content [6, 15].

The above-mentioned concerns about different use and appropriation of ICT by men and women can be brought about when information literacy and digital information literacy are the focus of research. These concepts have many dimensions and have been approached from different perspectives, as well as applied to different types of information users, as pointed out in a very consistent review presented by Khatun et al. [16]. The concept of "digital information literacy", for example, can be defined, according to the above-mentioned authors, as the "ability to access, evaluate, use, manage, communicate, and share digital information and sources in an effective and efficient way" [16]. The mastery of these abilities, however, requires that aspects of the more comprehensive concept of "information literacy" be met, aspects that are also a concern in gender studies of technology, as is the case of autonomous or "self-directed learning" that prepare the individual to become a "lifelong learner", a key dimension of information literacy. The literature suggests that women would be less self-directed and autonomous in ICT use.

The public library has been considered a very adequate institution to promote informal information training considered necessary for lifelong learning. The public library has also been considered a "safe place to go", notably for members of poor and often violent communities and would be valued by women, especially young women, who would feel less welcome in other places like LAN Houses. Brazilian data seem to confirm the fact that girls use the internet more for formal educational activities and that boys use it in a more diversified and autonomous way and are also much more assiduous in LAN Houses [17]. We lack, however, studies about differences in participation in public libraries by gender.

3   Data and Methodology

The Manguinhos Park library, in which the study was carried out, is a new model of public library. It received financial support from federal government programs and it is inspired by the Colombian park libraries, built in the cities of Bogotá and Medellin. This model of public library proposes to bring together sophisticated cultural resources, ICT access, as well as citizenship and community development in localities characterized by a very low level of human development indexes (HDI) and also by high violence indicators. Some analysts considered that these libraries significantly contributed to community building and the reduction of violence in the surrounding areas in the Colombian cities where they were created [6].

Three Park Libraries were recently created in the State of Rio de Janeiro, and the Manguinhos Park Library, under study here, was the first one. It is intended to serve 16 communities of approximately 100 thousands inhabitants. It is a sumptuous and modern

building contrasting with the local reality of extreme poverty and violence. What can be seen inside the building is also impressive: a new and sophisticated collection of documents, attractive and comfortable furniture, spaces designed for specific activities – a room for young children, a room for the community, and others. Around 40 computers are available for users and integrated to the reading room where free access to books is guaranteed.

The study, carried out in 2012, involved the use of observation, of interviews with librarians and administrators, as well as the application of a questionnaire to 81 library users.

The observation period and interviews showed us that the library was being used by a very young group of adolescents and young adults who were frequently competing to use the computers for playing games. Professional librarians' main task was, in their own words, "teaching civilized manners to users" – a role they considered as that of "socio-educators", which they proudly assumed. The control of the time each user could work with the computer and resolving disputes between them seemed to be the main tasks of librarians.

The content of the questionnaire took into account the information obtained during the observation period suggesting very limited diversification of computer usage, despite its popularity. The apparent socio-demographic homogeneity of users coming from the surrounding poor neighborhoods was also taken into consideration in the elaboration of the questionnaire. Questions formulated involved indicators of library and ICT use and appropriation, trying to detect dimensions of the broader concept of information literacy and digital information literacy, as well as some general information about the socio-demographic characteristics of users.

A small research team sought to apply the questionnaire to all users that fit the minimum age of 11 years old. A total of 81 questionnaires were applied in different periods of the day during a month. We were aware that we were not using a representative sample of library users. Data was processed using the IBM/SPSS software.

Previous analyses carried out with the data focused on users' motivations to attend the library, on aspects of their library use, and on activities suggested to the library. Results revealed that they have interest in ICT instruction as well as in several artistic and musical activities. Their answer to the question formulated to identify their idea of the impact of the library on the community indicated that they seem to consider the library as a governmental initiative for youngsters in order to keep them away from criminality. These previous analyses also described the socio-demographic profile of respondents. These were typically youngsters, from 14 to 19 years old, still going to elementary or secondary school and coming from homes where parents have only elementary school level. The great majority (80 percent) defined themselves as belonging to black or mulato racial groups, a racial composition characteristic of the city's low income neighborhoods. The majority of respondents – 49 or 60.5% - were from the male group and 32 or 39.5% from the female group [9].

4   Results

Data presented here attempt to detect gender differences in library and computer use and aspects of ICT competence in this specific group of young people aiming at finding out if a kind of "gender divide" is present and being a second layer of disadvantages to girls belonging to this user group.

Table 1, below, reveals the activity that the user mentioned he/she was doing at the moment of the interview.

Table 1.   Activity at moment of interview [8]

Activity	Gender	
	Female	Male
Using or waiting for the computer	67.8%	78%
Reading	32.1%	17.1%
Other	0.0%	4.9%
Total (N)	100% (28)	100% (41)

Source: Silva [16]. Microdata.

Using the computer or waiting for it is the main activity absorbing the interest of both male and female library users. Boys, however, show it more intensely. It is also noteworthy in Table 1 that girls indicate greater interest in reading activities.

Table 2 describes, gender-controlled, two variables that try to detect characteristics of library use: a measure of attendance and a dimension of autonomy (the habit of going to the library by him/herself).

Table 2.   Two characteristics of library use by sex [8]

Library use	Gender		Total (N)
	Female	Male	
Goes everyday	15.6%	26.5%	22.2% (81)
Goes by himself/herself	35.5%	62.5%	51.9% (79)

Source: Silva [16]. Microdata

From the results above, we might interpret that boys use the library more frequently than girls and can do it by themselves in a much higher proportion. This aspect of autonomy, although not directly applied to information literacy, can be a significant contribution to this type of competence, since self-directedness is a key aspect of information literacy. As a possible explanation for these gender differences in autonomous use of the library, we should consider the possibility that girls might be forbidden to go to the library due to the dangerous environment in which they live. Another possible explanation is that girls are more involved in household tasks and, therefore, less available to go to the library.

The next Table 3 shows responses to closed questions in which users were asked to mark –yes or no - if they do the following activities when using the computer in the library: sending e-mails, accessing social network sites and playing games, reading the news, downloading software and Google searching.

Table 3. Types of computer activities in the library [8]

"Mark the activities that you do in the library computer"	Gender	
	Female (% affirmative answers)	Male (% affirmative answers)
Send E-mail	65.6%	77%
Social network sites	65.6%	51%
Playing games	21.8%	38,7%
Reading the news	25%	63%
Downloading	15.6%	34,6%
Google searching	81.2%	85,7%

Source: Silva and Olinto [17]. N = 73 (in all variables synthesized in this table)

Some results in Table 3 show high participation and do not suggest any strong gender pattern. These seem to be activities that are already generalized on the internet as is the case of Google searching, e-mail sending and social network use. Other activities, however, indicate a very strong gender pattern. Playing games, reading the news, and downloading software are chosen in a much larger proportion by boys. Among these activities, downloading, specifically, suggests greater autonomy or more familiarity with ICT. Looking for information is an activity that has been associated with the masculine ICT culture, as well as the interest in games.

The next table brings information about the environment where respondents learned to use the computer. It is a measure that tries to compare the importance of formal versus informal environment for computer learning.

Data in Table 4 indicate that girls do their computer learning at home and in formal places, including computer courses in specific institutions or school. For boys, on the other hand, learning in informal places, as LAN houses and in the work environment, is more common, although they also learn in similar percentages in formal places. Learning at the library is a marginal occurrence for both boys and girls.

Table 4. Place for computer learning by sex [8]

Where did you learn how to use the computer?	Gender	
	Female	Male
At home or with relatives	30.7%	16.2%
Informal places outside home	19.2%	35.1%
Formal places outside home	46.1%	40.5%
At the library	3.8%	5.4%

Source: Silva [16]. N = 63

The variable that tried to detect self-evaluation of computer knowledge, involving the option "I can do it by myself" also showed some amount of difference between boys and girls, indicating that girls consider that they need help in higher percentages (46.9 percent) than boys (34.7 percent).

5 Concluding Remarks

All conclusions made here have to take into account the specific characteristics of the library taken as a study field as well as its ambiance. We are dealing with a new experience, in a particular neighborhood of the city of Rio de Janeiro. We must also point out again that data come from a small group of users that do not represent, from a statistical point of view, the population of library users. On the other hand, we are dealing with a very especial opportunity to observe ICT appropriation as a result of the availability of a large ICT infrastructure to a socially underprivileged group and, at the same time, consider gender issues related to ICT.

Data as a whole allow us to conclude that there is a general interest in computer use by this group of young people. Library attendance and types of computer activities also indicate a clear gendered pattern: boys and girls seem to show different preferences and behavior. Interest in general information – reading the news, involvement with games, and downloading are clearly more frequent among boys. Some of these activities suggest their greater familiarity with ICT technology, which is expected by the literature considered on the subject.

Although not directly dealing with information literacy measures, some facts, brought about by the analyses presented, also indicate that boys have a more diversified and autonomous relationship with ICT. Having more autonomy to go to the library, learning ICT in informal places, as in LAN Houses, and feeling able to learn to use the computer by themselves is higher among boys.

The analyses presented here can be considered as initial approaches to more comprehensive studies and at the same time they can be incentives for the promotion of public library programs aiming at reducing gender differences in ICT, notably among socially underprivileged groups and communities.

References

1. van Deursen, A., van Dijk, J.A.G.M., van e Peters, O.: Rethinking internet skills: the contribution of gender, age, education, internet experience, and hours online to medium- and content-related internet skills. Poetics **39**, 125–144 (2011)
2. Olinto, G.: Internet access and use in Brazil: concepts, measures, and public libraries as social facilitators. In: Katsirikou, A., Skiadas, C.H. (Org.) Qualitative and Quantitative Methods in Libraries: Theory and Applications. World Scientific Publishing, London (2010)

3. Kleine, D., et al.: Children, ICT and Development: Capturing the Potential, Meeting the Challenges. UNICEF, Florence (2014)
4. Audunson, R.: Public library as a meeting-place in a multicultural and digital context: the necessity of low-intensive meeting-places. J. Documentation **63**(3), 429–441 (2005)
5. Cox, E., et al.: A safe place to go: libraries and social capital. The State Library of New South Wales (2000). http://www.sl.nsw.gov.au/services/public_libraries/docs/safe_place.pdf
6. Berlot, J.C.: Public access technology in public libraries: effects and implications. Inf. Technol. Libr. **28**(2), 81–92 (2009)
7. Voelker, M.: Uso de Tecnologias de Informação e Comunicação em Bibliotecas Públicas no Brasil. S.l: Fundação Pensamento Digital (2013). http://www.academia.edu/4082849/Estudo_sobre_o_uso_de_tecnologias_da_informa%C3%A7%C3%A3o_e_comunica%C3%A7%C3%A3o_em_bibliotecas_p%C3%BAblicas_no_Brasil
8. da Silva, A.G.: A Biblioteca Pública Como Fator de Inclusão Social e Digital: Um Estudo da Biblioteca Parque de Manguinhos. Unpublished Master's Thesis. Instituto Brasileiro de Informação em Ciência e Tecnologia/Universidade Federal do Rio de Janeiro, Rio de Janeiro (2012)
9. da Silva, A.G., Olinto, G.: Tecnologías de la Información y Comunicación, Competência en Información e Inclusão Social en la Biblioteca Pública: Un Estudio en la Biblioteca Parque de Manguinhos. Rev. Interam. Bibliot. Medellín (Colombia) **38**(3), 201–212 (2015)
10. Medeiros, A.L.S.: Desconhecida pela Comunidade e Desprezada Pelas Autoridades: A Biblioteca Pública no Brasil na Opinião de Atores Políticos e Pesquisadores. Unpublished Doctoral Dissertation. Insitituto Brasileiro de Informação em Ciência e Tecnologia/Universidade Federal do Rio de Janeiro, Rio de Janeiro (2015)
11. Epstein, C.: Great divides: the cultural, cognitive, and social bases of the global subordination of women. Am. Sociol. Rev. **12**, 1–25 (2007)
12. OECD: Gender equality in education, employment and entrepreneurship: final report do the MCM (2012). http://www.oecd.org/education/48111145.pdf
13. OECD: Education at Glance 2012: OECD Indicators (2012). http://dx.doi.org/10.1787/eag-2012-en
14. Wajcman, J.: Feminist theories of technology. Camb. J. Econ. **34**, 143–152 (2010)
15. Primo, N.: Gender Issues in the Information Society UNESCO, Paris (2003). http://portal.unesco.org/ci/en/file_download.php/250561f24133814c18284feedc30bb5egender_issues.pdf
16. Khatun, M., Virkus, S., Jakaria Rahman, A.I.M.: Digital information literacy: a case study in Oslo public library. In: European Conference on Information Literacy, Tallinn, Estonia (2015). http://ecil2015.ilconf.org/documents/ecil2015_abstracts.pdf
17. CGI - Comitê Gestor da Internet no Brasil Pesquisa Sobre uso das Tecnologias de Informação e Comunicaçao no Brasil (2009). http://www.cetic.br/tic/2006/indicadores-2009.pdf

The Searching Circle: Library Instruction for Tribal College Students

Loriene Roy[(✉)], Jain Orr, and Laura Gienger

School of Information, The University of Texas at Austin, Austin, TX, USA
loriene@ischool.utexas.edu, jain.orr@utexas.edu,
laura.gienger@austin.utexas.edu

Abstract. In spring 2016, students enrolled in a face-to-face graduate "Library Instruction and Information Literacy" (LIIL) class in the School of Information (iSchool) at the University of Texas at Austin created a suite of instructional videos for librarians at TCUs to use with their students. Over the past twenty years, librarians at the TCUs have attended a five-day Tribal College Librarians Professional Development Institute (TCLPDI), usually held on the campus of Montana State University in Bozeman, Montana. The iSchool students presented their work at the TCLPDI in June 2016, inviting feedback from patrons including projections on how the videos might be used at TCUs.

Keywords: American Indians · Digital inclusion · Information literacy instruction · Learning styles · Reflection · LIS students · Tribal colleges and universities

1 Introduction

There are 567 tribal nations recognized by the U.S. federal government and an additional 64 tribes that are recognized by a state government but not the federal government [1]. Approximately one-third of the 5.2 million American Indian population resides on homeland areas such as reservations. People living in these areas may be limited to only one option for post-secondary education: a tribal college or university (TCU). The first TCU was established in 1968. There are now at least 37 TCUs in fourteen states offering students the option to complete diplomas, certificates, two-year, and four-year degrees [2].

Our objectives in this paper are to:

- Introduce background on TCUs, Native students, and Native education to the ECIL audience;
- Describe what we are calling the Searching Circle, an information seeking cycle based on Cajete's [3] orientation process of leading a fulfilled life as an indigenous person. Steps in the Searching Circle are based on the actions of being, asking, seeking, making, understanding, sharing, and celebrating;
- Compare the Searching Circle with the Association of College & Research Libraries' (ACRL) "Framework for Information Literacy for Higher Education" [4];

● Introduce original instruction videos designed for TCU students by iSchool graduate
  students.

2   Background on TCUs, Native Students, and Native Education

The American Indian Higher Education Consortium (AIHEC) explains the origin of
TCUs: "Tribal colleges were created in response to the higher education needs of Amer-
ican Indians and generally serve geographically isolated populations that have no other
means of access to higher education." [2] The first TCU was established in 1968 as
Navajo Community College, renamed Diné College in 1997. Currently there are 37
AIHEC TCUs in North America with 32 located within the boundaries of the United
States and five in Canada. While a few TCUs are located in Michigan, Wisconsin, or
eastern Minnesota, the majority are located west of the Mississippi River. Most are on
tribal homeland areas such as reservations. With seven TCUs, the U.S. state with the
largest number is Montana. As AIHEC notes, "tribal identity is the core of every TCU,
and they all share the mission of tribal self-determination and service to their respective
communities" [2].

   While TCUs serve members of tribal nations, they are open to all people. In some
cases the library serves members of more than one tribal nation. It is likely that some
students are of mixed cultural heritage and are descendants of more than one tribal group.
The most recent data on admissions show that 18,881 students were enrolled at tribally
controlled institutions of higher education in fall 2011. Of those, 14,765 or 78.2 percent
were American Indian or Alaska Natives. Of these native students, 14,714 or 99.7
percent were undergraduate students. When examining degrees conferred, in
2011-2012, there were 1,360 associate's or two year degrees awarded to American
Indian or Alaska Native students and 253 bachelor's or four year degrees [5]. Although
academic disciplinary areas vary from TCU to TCU, all tend to award a diploma, certif-
icate, or two-year degree in American Indian Studies and/or in the local indigenous
language. TCUs may also award associate of arts degrees in subjects like early childhood
education or criminal justice; associate of applied science degrees in automotive tech-
nology, carpentry, construction, geographical information systems and visualization, or
welding; or certificates in areas such as casino gaming or tribal management. Some
TCUs offer General Education Development (GED) testing that grants the equivalent
of a high school or secondary diploma.

   The libraries at TCUs may not only function as academic libraries but in some cases
also function as school and public libraries for their tribal communities. This is reflected
in TCU library mission statements. For example, the mission of the United Tribes Tech-
nical College (UTTC) in Bismarck, North Dakota is to provide: "social skills in a
culturally-relevant setting, with an emphasis on children and families" [6].

   And the mission of the Tohono O'odham Community College is: "to enhance our
unique Tohono O'odham Himdag [culture, way of life, and values] by strengthening
individuals, families, and communities through holistic, quality higher education serv-
ices. These services will include research opportunities and programs that address
academic, life, and development skills" [7].

3   The Searching Circle

The Searching Circle is a culturally based information seeking behavior model that overlays indigenous life skills with seeking information in any format for any purpose, especially to serve academic needs. One way to understand the Searching Circle is to compare the actions it describes with those mentioned in other approaches or systems. We engaged with the Searching Circle based on a reflective and interpretive process of conceptual analysis. This has involved close readings of the professional literature in Indigenous studies; years of conversations between Dr. Roy and librarians working at TCUs; and Dr. Roy's personal cultural affiliation as an Anishinabe (Ojibwe) woman. This methodology follows a similar process of those described by Smith [8]; they are both qualitative and multidimensional, building on both formal publications and lived experiences.

The Searching Circle might be included in discussions of constructivist theories of learning. Like Kuhlthau's Information Search Process (ISP) it is attentive to the individual learner and less linear [9]. The acknowledgement of students' affective response must be considered within the tribal cultural context. Views of the ISP often focus on the individual and his or her interaction with a resource or information service. Learning and inquiry in tribal settings are often group processes resulting in a product that benefits and is accepted by the group.

Kuhlthau's "Zones of Intervention" address the flexibility needed by information professionals in responding to the varying needs of the student within the search process; flexibility tempered by cultural awareness is embedded in the Searching Circle. [9] Kuhlthau describes the Guided Inquiry (GI) process as "an integrated unit of inquiry, planned and guided by an instructional team" [10, p. 1]. Such an approach might be perceived by tribal students as too rigid, imposed upon them, Western in orientation, and dismissive of their everyday experiences and cultural context. While GI involves an organized team of librarians and educators leading students through a process of instruction geared towards individual learning, tribal college settings are often minimally staffed so that instruction is still one-on-one. In some cases, the librarian also serves as the instructor of record. TCU library instruction typically focuses on introducing a student to basic skills like typing, mathematical skills, and introduction to sources including oral and written tribal histories, the cultural knowledge held by elders, and historical and current biography of tribal members and other Native peoples. As in GI, tribal college students need assistance in becoming aware of the wide range of sources available to them in order to start the academic study of a topic or the process to follow in answering a question. Unlike other students in non-tribal settings, TCU students, educators and their librarians might need to vet these sources through tribal protocol. For example, access to some content may be restricted by gender (e.g., women's work or men's work), season (e.g., winter storytelling), or by status (e.g., clan). Protocol impacts mode of conversation such that some topics may not be addressed (e.g., names of the deceased) or some relationships are strictly defined (e.g., mother-in-law and son-in-law).

We chose the Searching Circle based on Cajete's work as a theoretical framework of the study for several reasons. Cajete's writing was built on a career of developing

innovative teaching models based on indigenous worldview rather than western notions of structure and linearity. Cajete's work is respected and accepted in Indian Country though little known within the fields of library and information science including the study, practice, and theory of information literacy (IL) and library instruction [3].

4 Comparison Between the Searching Circle and the ACRL Framework

The 2015 Framework for Information Literacy for Higher Education from the ACRL, a division of the American Library Association (ALA), identifies six frames, the first of which is the context of authority. [4] This and the other frames—process, value, inquiry, conversation, and exploration—can be translated and, to some extent, accepted or unaccepted in work with tribal students [4]. While it is best not to generalize, TCU librarians described their students as shy and explained that this might be why their students were reluctant to ask for assistance. While they are quick learners, students were less likely to ask for help or to publicly acknowledge that they lack knowledge about a topic. They may prefer to collaborate with peers than work independently, and are quick to help each other. A number may be non-traditional older students returning to higher education or starting it later in life while others are enrolled part-time and likely to attend the TCU for some time. Many TCU students did not receive LI when attending their elementary or high schools so the library at their TCU may be their first library experience. While the students might not be low level achievers, their library experience and LI skills might be at a low level.

Tribal histories of boarding school (residential schools in Canada) experiences have resulted in a natural distrust of formal education as tribal members experience generational trauma. Those involved in education with tribal students seek culturally-centered approaches to help students acquire academic skills while not reinforcing the strict boundaries of Western knowledge structures and compounding intergenerational wounds.

5 Methodology in the Creation of Instruction Videos for Students Attending TCUs

With the Searching Circle as the foundation for their work, iSchool students created instructional videos through a method of reading, reflection, skills-testing, and production. Over the course of fourteen weeks, that began on Monday, 25 January 2016 and ended on Monday, 2 May 2016, students created text pathfinders and LibGuides, designed active learning activities related to the ACRL Framework, conducted interviews of tribal college librarians, and reflected on what they learned to develop an instruction video. As such, they tested the Searching Circle process.

5.1   Being

The students began by connecting library resources with their audiences' needs by creating pathfinders and LibGuides for each other on topics such as indigenous children's literature; indigenous fiction for adult readers; tribal colleges; indigenous film; the Inupiat culture of northern Alaska; indigenous language recovery; indigenous worldview; gender in indigenous cultures; and engaging the Native reluctant reader.

The pathfinders and LibGuides helped the students become aware of reference sources on indigenous topics, but the students also needed to build a foundation on the history and theory of LI. In addition to class readings, lectures, and discussions, students delved more deeply into understanding the ACRL Framework. In pairs, students taught each other components of the Framework through the development and creation of active learning activities, designed to engage all students in the instruction process. This served two purposes. It helped students become more acquainted to the development of instructional materials, while also familiarizing them with the content of the ACRL Framework. Students shared their LibGuides on a publicly accessible sandbox area hosted by Slideshare, the company that created LibGuides, and presented the content and organization of their LibGuides with each other.

5.2   Asking, Seeking

To prepare for the interviews, the students gathered and reviewed information on their interviewees, their tribal colleges, the tribal communities, and the locations where they lived and worked. They searched for published articles in databases, reviewed professional organization websites, and viewed the interviewee's institution website, personal website, and/or blog. Students then performed interviews of TCU librarians to learn about their experience providing library education. Their interviewees included both native and non-native librarians who worked at TCUs in Alaska, Oklahoma, Montana, Arizona, North Dakota, and Alberta, Canada. After the students recorded their interviews using technology such as the iPhone TapeACall application, they transcribed the interviews, wrote a reflective essay and connected the interview with class readings, discussion topics, and key documents, especially those developed by ACRL. In order to identify potential content areas for the videos, they shared their analysis of the interviews, noting especially any references to student needs, challenges, along with the librarians' reflections on their own work.

Through the interviews, students also learned about the types of instruction typically performed by tribal college librarians to meet student needs. The librarians reported that they gave orientation tours, taught classes, provided in-class instruction, offered technical assistance, and delivered instruction at point-of-need. They might teach LI credit courses such as a six-week library studies 101 class required for students working toward an associate's degree. They reported that they assisted students in improving their writing and mathematical skills. Library staff with tribal membership often taught courses on tribal art expressions such as basketry or pottery, or, hosted cultural activities in the library like beading and quill working classes. It was not uncommon for library staff with tribal membership to deliver services in their native language. One TCU

librarian used her community connections by translating instruction for computer skills into the language she and her patrons spoke. The librarians often worked on holidays and during school breaks, serving as the only location in the community open to serve patrons. TCU libraries had responsibilities beyond library instruction: they served as the TCU webmaster, or taught courses on topics outside of library instruction. Their job responsibilities often expanded to include a range of social services.

Librarians shared insights about some of the unique challenges they face in the TCU context, and the ways that they meet those challenges in order to provide access to community services. Tribal college librarians are often the only librarian on staff, and thus use a wide range of approaches for providing library instruction. Like other instruction librarians, TCU librarians spoke of the difficulty of getting faculty on board and to accept embedding instruction within formal courses. It is possible that the TCU environment might make collaboration between librarians and faculty more challenging in cases when courses are taught in indigenous languages, or when content heavily relies on traditional cultural expressions. Even if a LI session might not be taught in an indigenous language, the TCU librarian might open instruction with a greeting in one or more of the community languages. TCU librarians also might have to work around policies that impact library services. For example, TCU administration might restrict access to certain websites on campus, including sites such as YouTube that could also be used for instruction. This decision might be made based on perceived excessive use of sites by students and staff. Still, TCU patrons and staff might still be able to access such sites through their smartphones or other personal device.

Staff see their libraries as a place of power that can strengthen the community by providing both personal and academic assistance. Library staff are just as apt to help a patron complete a form to receive food assistance as they are to help a patron learn to use the online catalog. Adults who enter the TCU library to attend to coursework are often accompanied by their children, and tribal lands might have limited options for childcare and family support might not always be available. Thus, the TCU library might logically develop collections and other services for young patrons. One librarian described her approach to personalizing the library's services as "putting a face" to the library. The librarians interpret their work as a bridging activity: when they provide a story hour for a young child and his or her caregiver, they do so knowing that they will likely see that young person someday as a TCU student who has grown up with a favorable opinion of the library and its support. They also needed to be personable with their students, making extra efforts to appear friendly in any task.

TCU librarians advised flexibility by accommodating late arrivals to class and being available when needed without requiring that students set appointments. Some reported low attendance at customized training events but found that attendance increased when faculty gave students extra credit and/or if the library provided free food for those attending. And they relied on other TCU librarians for support and as resources. The annual TCLIPDI is a yearly expression of their willingness to support each other as an inter-tribal community of LI specialists. What follows is a description of our analysis based on these interviews, including how the interviews informed the video-making process. We considered advice from the TCU librarians to personalize the content on the videos and, if possible, make the tone humorous as well as engaging. We were

reminded that TCU students might have beginning LI skills and limited outside computer access, resulting in lower digital literacy skills.

5.3   Making

Based on what they learned, students collaborated in the development of a common mission statement: "Our mission this semester is to create original instruction materials for tribal college librarians to assist their library patrons in becoming more information literate." Through the content analysis of the interviews, we created a list of potential topics for the instructional videos. iSchool students chose to work either individually or in small groups to create instruction videos. In terms of delivery, one TCU librarian recommended that any training video provide step-by-step instructions to allow students to learn at their own pace. This gives beginning learners the option to slow down or repeat content, while still offering advanced learners the option to focus on the material they need the most help with. They also emphasized that training videos needed to be brief. Short instruction videos allowed students to attend to content for brief periods of time, skip content they are already familiar with, and focus on content they preferred to view more than once. Shorter videos would also be easier to stream in places with low or spotty connectivity, and can also be viewed on smartphones. One TCU librarian reported that it might take her twenty to twenty-five minutes to watch a three minute YouTube video due to low bandwidth. While they welcomed instruction videos, the iSchool students might need to make them available to TCU library staff on flash drives or DVDs.

Librarians more acquainted to the process of creating instructional videos cautioned the iSchool students that it can be a lengthy process, taking as long as eight hours to create a three-minute video. Once they selected their video topics, students shared drafts of their scripts through Canvas and hosted in-class critiques of preliminary versions of the videos. Students estimated that it took them from ten to 16 h to create their videos including time to draft and refine their scripts, learn the needed software, record their screencasts and audio, and edit.

5.4   Understanding, Sharing

The TCU librarians stressed that the videos the students created be culturally appropriate. Throughout the semester we discussed the place of culturally appropriate imagery and content. While it is tempting to incorporate images and design elements such as color that are associated with tribal cultures, we felt that this was not appropriate for tutorials created for use in a number of TCU settings. For example, while we might associate the coral and turquoise colors with Native peoples of the American southwest, other tribal members may view this as over-generalization if the colors are applied to resources intended for them as well. Similarly, students took care with their imagery. While it is tempting to overlay cultural values on an instructional resource, it is best to avoid use of spiritual language or imagery. Early in the class, students explored basing their script and images using the metaphor of a Medicine Wheel. They came to realize that this approach would work best if the product resulted from a collaborative effort

with members of a specific nation who would give tribally specific interpretations of the cardinal directions, colors and guardian animals/dodems associated with them, and skills or attributes affiliated with each direction. Thus, materials that respect traditional forms of knowledge do not have to appropriate cultural expressions.

Working together enabled students to recount their own learning styles based on the Kolb [11] model. The resultant videos provided students with an opportunity to create original content for underserved library patrons. Videos ranged in length from two minutes, 32 s to six minutes, 9 s. Students used PowerPoint to create slides, GoogleDrive to share documents, GoogleSlides to search for slide templates, and iMovie to reduce background noise on the audio. One team of students used three iPad applications: Explain Everything, Videoscribe Anywhere, and Chatterpix. Students completed the semester by writing a cumulative reflective essay with details on the technologies they used, and posted the videos on a YouTube playlist.

6 Results: The Creation of Instruction Videos for Students Attending TCUs

The purpose of this assignment was for iSchool students to create a series of videos that will assist tribal librarians in their work to provide LI. Students strived to make the videos respectful of indigenous values and worldviews. Each of the five resulting videos are introduced, below.

- Types of Information (three minutes, twelve seconds): The goal of this video was to introduce TCU students to different formats of information including types of sources (e.g., research databases, encyclopedias, dictionaries, handbooks, and atlases) as well as human sources such as elders. This resource was unique in that it not only provided an overview of traditional reference sources, it also promoted cultural diversity by including traditional knowledge as a valid source of reference information. Conventional discussions of types of information usually do not mention human sources and, especially, tribal members as culture keepers and sources of information unto themselves. In the video, the iSchool student defined reference sources and explains their use in school work or projects. She categorized sources as either formal or informal. Informal sources included traditional knowledge collected over generations that could be found in agriculture, science, ecology, and medicine. She defined formal sources as knowledge made available through publication that are not designed to be read from beginning to end. Subject experts examine content in formal sources to ensure accuracy. The student introduced each type of source and described its potential use. For example, she explained that dictionaries provide a word's meaning, pronunciation and origin while handbooks provide information on citations, travel advice, or world records. Finally, the student reminded viewers to ask their local librarian for assistance.
- Effective Searching (six minutes, nine seconds): The goal of this video was to assist TCU students in gaining experience in using Boolean operators to broaden or narrow a search illustrated using Venn diagrams. The iSchool students used the scenario of searching for information about smartphones to illustrate the use of OR, AND, and

NOT. They chose this topic based on information that, while the TCU students might not have laptops or desktop computers, they were more likely to have smartphones. After an animated welcome from George Boole, students explained that using Boolean operators will help TCU students be more efficient when they searched for information through search engines like Google or when searching within a database. In addition, they demonstrated the impact of using quotation marks to search for phrases and parentheses to nest search terms when conducting a Boolean search.

- Guidelines for Evaluating Information Sources (five minutes, nineteen seconds): Through this video, viewers are introduced to the skills needed to assess sources of information based on their scope, audience, authority, quality, and currency. The video creators started with an explanation of the importance of evaluating sources, reminding their audience that online information is not always accurate or appropriate for use in school assignments. They added that using appropriate sources would help students improve the quality and accuracy of their work, resulting in better grades. They introduced each topic with definitions and additional explanations. For example, the video illustrated how to determine scope by reviewing the table of contents or index in a book and the headings or links on the homepage of a website. Explanations of common terms like peer review were included as well. The use of VideoScribe provided animation throughout the video.

- Letter Writing (two minute, thirty-nine seconds): This video was designed to assist TCU students in effectively communicating through formal letter writing. The video creator introduced the six elements of a letter—address, date, salutation, body, closing, and signature—using a sample letter. The video also described the differences between a formal letter, such as a thank you letter to a professor or a cover letter, and an informal letter, like a letter to a parent or friend. Inspiration for this video came from a TCU librarian who mentioned that library patrons requested her assistance each time they needed to write a letter.

- Online Safety (three minute, twenty-eight seconds): One TCU librarian reported that she observed that her patrons considered any content found online to be safe and accurate. The goal of video was to introduce strategies TCU students might use to evaluate and protect their online identities. The video delivers content in two areas: safety tips for social media and safety tips for online shopping. For social media, the video outlines how to adjust your privacy settings and describes how the information posted in forums such as Facebook is not necessarily gone once it is deleted. For online shopping, viewers learn how to evaluate a website to ensure that it is safe to input credit card and other personal information. For example, it is never safe to transmit personal financial information via Email.

7   Summary

The instruction videos illustrate work resulting from a service-learning collaboration between librarians in Indian Country and iSchool masters students. The students' work and reflections illustrate their acquisition of skills and abilities to include TCU students in instruction efforts. Students selected content for the videos based on interviews with

tribal college librarians. Librarians suggested content on understanding sources of information, basic searching including Boolean operators, an introduction to general communication, and online safety. Students developed scripts and assisted each other in peer editing prior to using technology such as Camtasia to create the video to accompany audio recording of scripts.

While numerous instructional resources are available on these topics, these instructional videos are unique for their inclusion of cultural context that is more in line with indigenous worldview. They rehearsed presenting the products in preparation for their formal presentation to tribal college librarians at their annual institute in Bozeman, Montana. iSchool students offered these recommendations to others interested in collaborating with TCU libraries in creating instruction videos:

- Allow time for revision and to acquaint yourself with the technology you need. Gather background on the technologies available to you.
- Review similar instruction resources such as those available through ACRL's Peer-Reviewed Instructional Material Online (PRIMO) Committee. [12]
- Select a strong focus in order to maintain a clear and concise point of view and keep your final video brief.
- Develop a rough draft of the script you plan to record. Share the draft widely and revise. Invite reviewers from your cultural community to review your text.
- Locate a sound proof area for the audio recording. Try to eliminate background noise. Rehearse with your equipment, especially the microphone, to reduce distracting noise.
- Speak more slowly than normal when recording, and use a conversational tone with clear and concise sentences. Listen to radio news broadcasters to compare your reading voice with theirs.
- Reduce disfluencies, iteratives (e.g., um or ah), audio puffs, and verbal stumbles by rehearsing and recording one short segment at a time.
- Produce the sharpest images possible. View your instructional video on laptop, desktop computers, PCs, and Macs. Adjust the resolution and view on full screen as well as reduced screen. If you have time, create sample videos with more than one product.
- Work to time your audio and images.
- Keep the cultural perspective of your audience in mind. Evaluate your selected images to make sure that images of people include those from cultural communities. Avoid stereotypical images.

7.1   Understanding, Sharing

One student reflected on what she learned:

> I have to admit I had been a little uncertain as to how to blend library instruction and literacy with Native cultures, and this couldn't have been a better illustration of the concept. Our ability to relate over our shared experiences of helping students made me feel connected to a grand tradition of library instruction in a way. I hope I will figure out a way to apply a similar theme in my own methods of academic library instruction.

The TCU librarians provide LI as they would provide any library service, but they imbue it with the local cultural values. All point to helping individuals achieve a personal level of balance that is connected with the past, present, and future of their indigenous communities. Students shared their videos with the TCU librarians, inviting them to link to the videos on their library websites, install them on their in-house public access computers, and/or share them with patrons through USB drives. We look forward to hearing how the TCU librarians might have made use of the videos and the responses they observe among their patrons.

The unique learning settings of TCUs require complex and respectful instruction responses. This seemingly simple experiment resulted in two broad outcomes: (a) the tangible products that enabled iSchool graduate students with experience in addressing selective needs of students attending TCUs and (b) the iSchool students' experiences in sharing their work with librarians at the TCUs. Half of the iSchool students attended annual TCLPDI, held in Bozeman, Montana over five days in early June 2016. There, librarians at TCUs viewed the students' videos and offered suggestions and critiques. The students learned that their instructional products clearly interpreted instructional skills but did so from their own process of socializing into the disciplinary perspectives of librarian/information specialists. In other words, while designed for tribal students, the videos framed information largely from the worldview of the emerging librarian. The iSchool students experienced the Searching Circle alone and with their peers as a series of actions: being, asking, seeking, making, understanding, sharing, and celebrating. The Searching Circle can now be expanded to include TCU librarians and the students they serve in creating local, customized interpretations of information literacy products. These second generation instruction videos might, for example, incorporate tribal community languages, local examples of information sources, approved tribal imagery, and narration by local TCU students. As with other Circles, the iSchool student's work launched discussion, illustrated the students' interpretations, and stands ready for more refinement and use at the TCUs.

References

1. National Conference of State Legislatures: Federal and State Recognized Tribes. http://www.ncsl.org/research/state-tribal-institute/list-of-federal-and-staterecognized-tribes.aspx
2. AIHEC: Tribal Colleges: Educating, Engaging, Innovating, Sustaining. aihec.org
3. Cajete, G.: Look to the Mountain: An Ecology of Indigenous Education. Kivaki Press, Skyland (1997)
4. ACRL: Framework for IL for Higher Education. http://www.ala.org/acrl/standards/ilframework
5. NCES: Table 312.50. Fall Enrollment and Degrees Conferred in Degree-Granting Tribally Controlled Postsecondary Institutions, by State and Institution: Selected Years, Fall 2000 through Fall 2012, and 2010-11 and 2011-12. https://nces.ed.gov/programs/digest/d15/tables/dt15_312.50.asp
6. UTTC: About Us. United Tribes Technical College. http://www.uttc.edu/about-uttc
7. TOOC: Our Mission. http://www.tocc.edu/mission-vision-goals
8. Smith, L.T.: Decolonizing Methodologies: Research and Indigenous Peoples. Zed Books, London (2003)

9. Kuhlthau, C.C.: Students and the information search process: zones of intervention for librarians. In: Godden, I. (ed.) Advances in Librarianship, pp. 57–72. Academic Press, New York (1994)
10. Kuhlthau, C.C., Maniotes, L.K., Caspari, A.K.: Guided Inquiry: Learning in the 21st Century. Libraries Unlimited, Santa Barbara (2007)
11. Kolb, D.A.: Experiential learning: Experience as the Source of Learning and Development. Prentice-Hall, Englewood Cliffs (1984)
12. ACRL: PRIMO; Peer-Reviewed Instructional Material. http://www.ala.org/acrl/aboutacrl/directoryofleadership/sections/is/iswebsite/projpubs/primo

Information Literacy, Participatory Projects and the Development of Political Roles for Librarians

Raphaëlle Bats[1,2(✉)]

1 Univ Lyon, Centre Gabriel Naudé, Enssib, Lyon, France
`raphaelle.bats@enssib.fr`
2 Univ Paris, LCSP, Paris Diderot, Paris, France

Abstract. This paper reports on information retrieved by a team of librarians of the public library of Lyon as part of their preparation for their involvement in a participatory project. I based the quantitative and qualitative analyses on a theoretical framework built on philosophy and information science concepts. My results shows that taking part in political action seems to be in conflict with some traditional values of libraries like neutrality, democratization, and emancipation through culture rather than through action. Finally my study lets us drawn the portrait of a new generation of librarians who accept their political role.

Keywords: Participation · Public libraries · Political culture · Expertise · Librarianship

1   Introduction

For more than 20 years, in France, the public has regularly experimented in participating in urban renewal projects. For the past five years, cultural policies have expressed interest in similar efforts. Libraries in particular have begun to embrace this new dynamic on their own initiative, on the initiative of elected officials, or, in rarer cases, on the initiative of associations. Municipal and national libraries have been especially eager to launched participatory projects in many fields such as acquisitions, heritage, event organization, and records correction. While participation seems to be legitimate in libraries, both philosophically and politically [1], librarians still are learning to view their services as new approaches in political action and agency. They are still beginning to consider their role as an emancipatory service in a public space. The first reason is that participatory projects[1] required equality between the public and the institution. Libraries are more used to an approach where they provide guidance in support of a top down education. The second reason is that participatory projects are an opportunity to practice democracy. This would require libraries to adopt a critical approach to the actual democracy, a critical position that is not in the habits of cultural institutions that claim neutrality.

---

[1] I define a participatory project as a project where the patrons are actors and not only passive or consumers. We can measure participatory projects using Sherry Arnstein's [29] spectrum from non-participation, tokenism, and citizen control.

The Bibliothèque Municipale de Lyon (BML) is the second largest public library in France after the Bibliothèque Nationale de France. It employs a staff of 500 and serves 14 branches and one central library. As early as 2014, the BML was envisioning a large cultural project on democracy. After the terrorist attacks in January 2015, the project took a more participatory dimension. In Spring 2015, the "Démocratie 2017" project was officially launched and I joined it in Fall 2015 as a PhD student invited to the steering committee of this cultural project, which will take place from November 2016 to March 2017. During this project we experienced that participatory projects are particularly demanding in terms of knowledge and skills. It required that we gain knowledge in participative animation's tools and in the political stakes of participation. Librarians took part to acquire new skills and worked on information retrieval using the bookmark tools Diigo. Information retrieval led by librarians seemed to be perfect situation to observe how librarians trained themselves to acquire new knowledge. This project will serve as my thesis which will focus on the link between knowledge and political action.

I make the hypothesis that, when studying the information retrieval process of librarians engaged in such projects, it will be possible to observe their information literacy as well as its impact on the participatory project of a public cultural establishment. To validate these assumptions, I used a theoretical framework, built on philosophy and information sciences including the "archéologie des savoirs" de Foucault [2], the concept of information literacy of Pawley [3], and the concept of "culture informationnelle". This is about Le Deuff [4], to analyze the statistical treatment of information retrieval made by employees of the BML. Prior to detailing the methodology and the results of this study, it is essential to conduct a literature review, beginning with the matter of knowledge in participatory projects and then exploring the matter of librarians' informational skills. I will end the article with a discussion on the political role of libraries and the engagement of librarians in a public service for which neutrality is a central value [5].

2 Literature Review

Participatory projects have a multifaceted relationship with knowledge. Participation is often approached as a citizens/elected officials/technicians triothat, although it shows some shortcomings [6]), in particular due to excessive categorization, still allows to distinguish between various forms of knowledge gathered by the participants. Because of the entanglement of the roles between citizens and technician [7, 8], participatory projects also result in the development of new knowledge related to the context, to the territory, or to participation itself, both in theoretical and practical terms. We can even expect to see a professionalization of this participation [9] that might drive it away from the field of engagement [10]. So, while citizens and technicians assemble knowledge, they also generate new ones. But there is no research done on the conditions of these learnings. In this article I will attempt to fill this void by studying the specific case of librarians.

There is an abundant literature analyzing the training dispensed by librarians to their publics to achieve information literacy and political literacy. Henri Maitles [11] noted

that if political education has no conclusive effects, the political literacy provided by librarians should focus on skills to participation to politics and to political knowledge, more than on the working of political institution, to be more effective. For Elmborg [12], librarians had to focus not on transfer of information but on acquiring a critical conscience. For Smith [13], the critical literacy lead to a political agency in moving from individual point of view to a social one, and in requiring a assumed responsibility. Political action seems to required a political look on information. In this paper I will try to observe it.

On rarer occasions, that literature offered analyses on librarianship trainings aimed at teaching instructing skills [14]. Yet there is surprisingly sparse literature on how librarians wield their own information literacy while engaged in their professional activities. Education and information sciences focus on the training of students and children but rarely on the proficiency of the teachers and librarians themselves [15]. I would like to fill this silence in the literature is something with this study.

3 Methodology

3.1 Theoretical Framework

My research relied first on a philosophical approach to determine the type of political discourse of French libraries. The "archéologie des savoirs" of Michel Foucault [2], gave us a framework to study the sources that inform the political action of librarians, which include: key texts of French libraries including a Manifesto and classical texts; the orientation plan of the public library of Lyon; and, finally the information retrieval of librarians involved in the "Démocratie 2017" project. I will just focus on this last point ior this paper. Second, my research stood on two political approaches of information literacy (IL): the critics of IL from Pawley [3], and the concept of culture of information of Le Deuff [4]. I used these approaches to build a theoretical framework for this specific case.

1. According to Le Deuff, culture of information is eminently political and civic [16]. It "takes into account the necessity for the citizen to have pertinent resources available, so that they can form an opinion." [4, p. 105]. For Pawley, information literacy requires the ability to put information on a political context. I wanted to measure in this information retrieval study whether librarians had a political agenda and/or librarianship agenda.
2. According to Le Deuff, "[communicational culture] is closer to critical literacy and requires resistance capacities. There is a political and philosophical dimension centered more on the individual than on the citizen." [4, p. 106]. Each individual gathers knowledge that allowed them to form an individual and critical analysis of the information they found. For Pawley, information literacy lead everyone to engage himself or herself [3]. Information looked for, selected, and absorbed reflected choices and values. My information retrieval analysis will show if the tastes and interests of the individual take precedence over the collective values of the librarians as criteria for evaluation of information.

3. The phrase "culture of information" was inspired by the work of Major R. Owens and how he linked the matter of responsibility to information literacy. According to him, information retrieval committed us to act. Christine Pawley also used this notion of action around the concept of consumers-producers [3]. The trainer should not perceive the one intended to acquire information literacy as passive, but as able to create their own information. Both these theories of information literacy gave an important place to action made possible by information. I therefore, tried to find out to what extent the information retrieval done by the group revealed an active dimension.

3.2   Statistical Study

The steering committee of the "Démocratie 2017" project conducted information retrieval work on the topic of the event. My article looks precisely into this information retrieval process, which is stored and compiled in a Diigo project. It is freely accessible and is also a weekly selection using Scoop.it.

My study relied on a statistical treatment of the Diigo project to identify:

- Quantitatively: items, sources, type of sources, and form of items
- Qualitatively: topics related to the project, intellectual ou academic field of authors, and topics of the items.

I knew that this research had a bias inducted by the them a of the project itself. The action of librarians working on participatory projects and new democratic forms as well as the information they seek related to these projects was necessarily very political and very closed to some alternatives movements.

4   Results and Discussion

The Diigo of the Démocratie 2017 project added 125 items in eleven months. I studied the content of this information retrieval process from June 2015 to April 2016. Twelve participants contributed to the Diigo, including the eleven persons of the steering committee and myself. I published 4 out of the 125 items. Two members of the steering committee did not sign up. Three of the participants did not entered items, six participants entered fewer than the. The three agents who initiated the project entered 20 items, 30 items, and almost 60 items respectively. Those three agents began their data gathering work in June 2015 while all the others began during fall. However, the time they started their participation was not the only explanation for their higher participation. These three agents worked in the "Society and Civilizations" department of the central library and political matters were at the core of their daily activities, as opposed to other members of the group who might have been working on more distant topics.

4.1 Objective Based Approach

Instead of showing a desire to prepare as a librarian, the Diigo data reveals that librarians involved in the project? desired to develop a unique view of the topic extending beyond the framework of the library.

Examining the 125 items by subject fields showed only 5 items from Library and Information Sciences (LIS). Three addressed new topics in librarianship: the common good of knowledge. Two others talked about political questions in libraries: burned libraries in the first example and participatory projects for the second. LIS seemed to be considered as another academic field, like the performing arts, medias studies, psychology, and anthropology. LIS is a potential source for this project, but not the main source (Fig. 1).
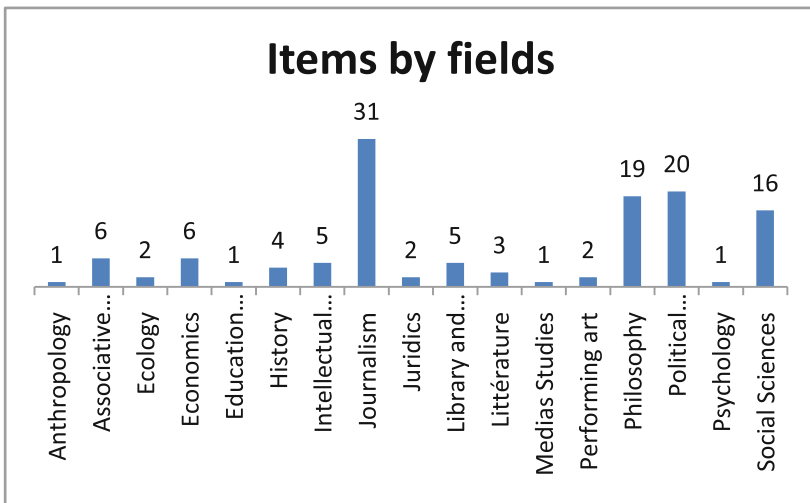
Fig. 1. Items by fields

The main field of the items was, in fact, journalism (31 items or 25% out of 125). By journalism, I mean that the author of the item was a journalist who wrote with a journalistic orientation. There were 88 (90%) items in all other academic fields. The final six items were about associative activism or texts written to serve or present the activist project of an association. In the 88 items written with academic orientations, 19 (15%) were in philosophy, 20 (16%) were in political sciences, and 16 (13%) were in social sciences. The two last fields were not surprising since the political and social sciences were related to the topic of the project and to the library acquisitions areas of the leaders of the project. At first, the presence of items in philosophy could be seen as strange, but those items were essentially in political philosophy.

The 125 items come from 79 different sources. Sixty-three (80%) of these sources were mentioned only once but 15 (12%) were mentioned more than once, in particular *France Culture* (17 items) and *Médiapart* (8 items). The other sources were mentioned fewer than four times with the exception of the catalogue of BML, whose use is described

in the paragraph below. *France Culture* is a very high-level national public radio station where a lot of academics speak. This radio station leans more towards intellectuals than culture even though the latter is still largely represented. Médiapart is an online independent journal that aims to revive the tradition of journalistic investigation, calls for participation among its readers, and frequently organizes debates.

These data show that LIS and/or technical questions were not central in this information retrieval. The main use of this information retrieval was to train collaborators on this topic so that they can grasp the concepts in a more general sense and not solely in the context of libraries. Six items used the catalogue of the BML as their source which pointed out that some of the useful documents were already in the collection. It process also allowed the team to identify potential participants. The list of lecturer invited to talk during the future events (November 2016 to March 2017) was totally symmetrical to the list of authors identified in the information retrieval. Some are mentioned numerous time such as Rancière and Fraser in philosophy, Wahnich and Rosenvallon in history, and Coriat in economy.

This lead me to think that, for the librarians doing this information retrieval, the point was not to find data allowing them to simply do their job but to do their work differently. Likewise, they did not simply question today's democracy; they also questioned the potential for an emerging democracy. As such, the Diigo project showed a civic rather than a technical informational culture. In fact, if the project called into question what libraries usually stand for, then the information retrieval process largely went beyond a technical objective. It allowed librarians to question their role in society, facing social and civic practices they were not familiar with. It revealed the possible emergence of a new kind of librarian. French librarians have long been accused of being "Télérama", that is to say that, despite being left-leaning they had an elitist discourse on the democratization of culture. In other words, it was OK to watch TV but only if you watched good movies. Entertainment was only acceptable as long as you picked and chose. This type of discourse had long been relayed by librarians in the way they selected documents they deemed good and of appropriate cultural level for their public [17]. Yet there is a complete absence of any reference to Télérama on the Diigo platform. In fact, Télérama may have been replaced by *France Culture* as a new cultural reference served as an indicator to the importance of the academic fields we observed. While the objective for librarians here was not to develop their librarianship skills, they clearly tried to identify experts in democracy and participation that were almost exclusively academics. It showed a certain position of humility with librarians clearly stating that they were not experts as opposed to the Télérama librarians. In opposition, if they are not experts, they had the keys to contextualize, to point out the stakes, and to build and help to build a political discourse. This was a first step to moving a cultural action into a political action.

4.2   Value-Based Approach

The items in the Diigo project leaned heavily on the left or sometimes far left side of the political spectrum. As it allowed, on one hand, the training of agents and, on the other end, the creation of a list of potential participants, the whole project was characterized by this left-leaning tendency. Most of the items were critical of democracy and

representation and called for an increased participation in the political field and for more empowerment for each and every person from a collective point of view. These were signs of a drifting away from the usual political parties as well as an interest for radical democracy. Facing the difficulty of distinguishing between the nuances of the left, I focused on the identification of items from the right or neutral. I considered the institutions as neutral if they offered services by the state. If they did not, I assigned them to the political party in power at the time of creation of the content or to the stance of the participants taking part. So, a radio show on *France Culture* could not be considered as neutral when only left or far left academics took part. While I was able to find four neutral items, I could not find one expressing a right-wing stance. As I said earlier, this result was not very surprising due to the them a of the project. However, this result was not in complete opposition with the generally left-leaning tendencies of French libraries and with the values of librarians. In an article of the activism of librarians, Camille Hubert expressed a real difficulty in identifying right-leaning librarians and the only person who accepted her invitation to talk to her asked to do so anonymously [18].

To go further in the analysis of the content of the items, I looked at how they fit or did not fit in the four majors topics of the project as defined by the steering committee: democracy, participation, empowerment, and commons (Fig. 2).
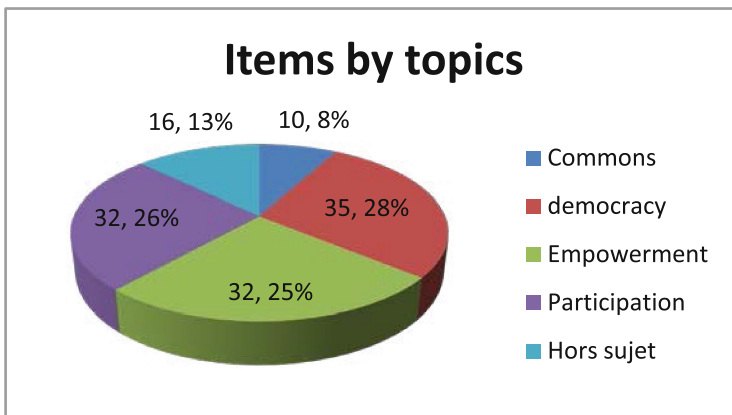
Fig. 2. Items by topics

There was an almost perfect equality between three topics: democracy, empowerment, and participation. The topic of Commons was weaker compared to the others but the specialization of this topic, its novelty, and the low number of people working on this explained it. What was really surprising was that 13% of items did not fit into one of the major topics. All these items were related to political questions and, specifically, to critics of today politics including critics of political parties, governmentality, and use of algorithms in politics. This 13% of items showed that this information retrieval was also a place for more activist positions and global thoughts about the society.

The items by type of sources also showed a ambivalent place for institutions. Only seven items had a cultural or political institution, such as a museum, governmental

website, or governmental agency, as a source. I also could have considered academic journals and research centers are institutions because universities are public in France and the national radio *France Culture*, could be considered a national institution. If these sources are included, then 47% of the items were cultural or political institutions (Fig. 3).
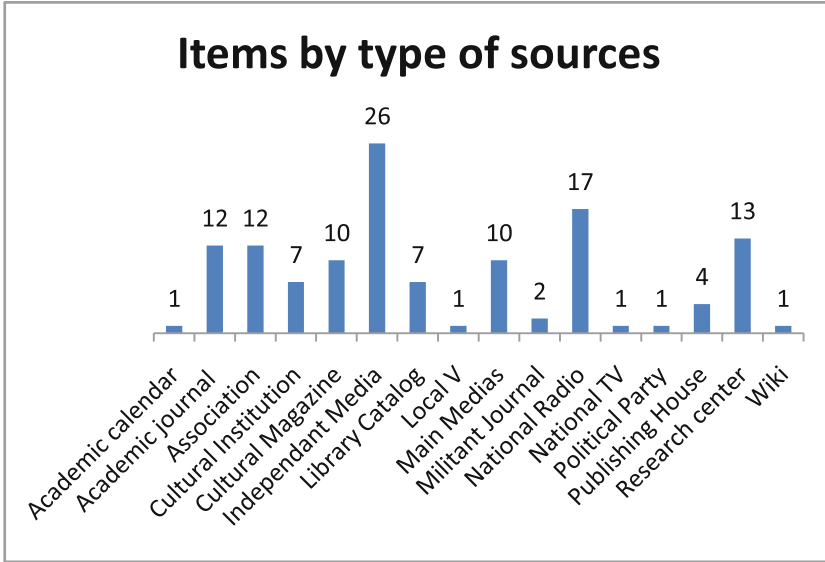
Fig. 3. Items by type of sources

Yet, most of the researchers and well as those affiliated with *France Culture*, independent media, and even major media were more apt to express a critical and political thought than an institutional speech. I could say that the tradition of involvement of intellectuals who speak publicly has been to call others to concrete actions and participate with activists in the field. Adding to this, 32% of the items clearly sources clearly identified as activist sources such as associations, independent media, and militant journals. The militant position was far away central to this information retrieval.

This reflects the problem of neutrality in French institution workers, including librarians [19]. Civil servants are not supposed to let the politicians dominate? aloud the political discourse. This does not mean that libraries' actions do not have a political influence or stance but this has not to be presented as political. Despite this, the study of the types of sources shows an emphasis on clear stands. In other words, while the selection shows a drifting away from the value of neutrality, it shows maybe a closer proximity to some other collective value for French librarians. The first collective value could be the rejection of right and far-right opinions. More interesting is another collective value related to the role of libraries in the society. If, in 2005, D. Lahary [20] defined that the new generation of librarians were de-politized, maybe this generation is only approaching the political role of libraries from another angle that we still have to define. The neutrality of the library does not have to be a principle but the consequence of its assumed political role [21]. In the end, the information retrieval process revealed a

critical approach through a questioning of the notion of neutrality, preferring a refo-cusing on the missions of libraries and their responsibilities.

4.3 Action-Based Approach

As we saw earlier, studying the sources of items by type also showed the importance of the academic environment; 27 items were research centers and academic journals: 27 items. I also studied the content of these items depending on their form. Unsurprisingly considering the previous results, I noticed a strong predominance of academic papers and podcasts. This result could even be increased, if we considered that 90% of the participants in the radio shows were academics. Librarians seemed to be hiding their actions behind those of academics (Fig. 4).
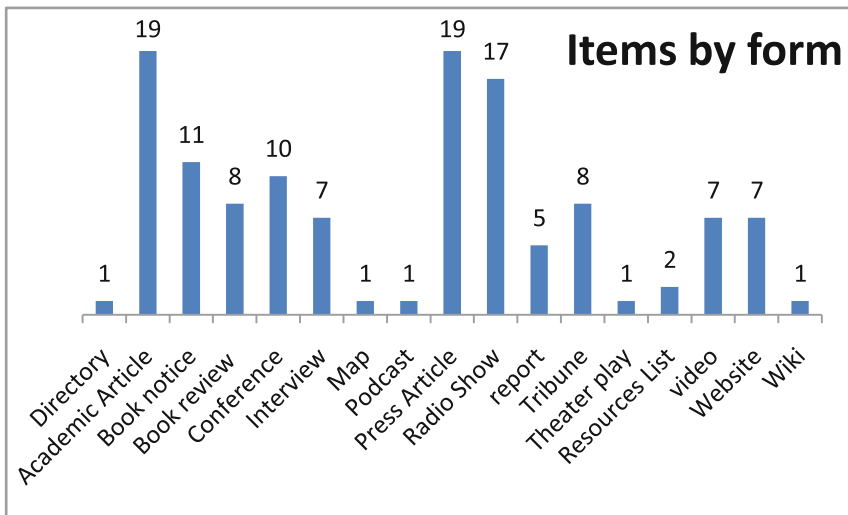
Fig. 4.   Items by form

By proclaiming their non-specialist status, librarians remained behind the scened of political action and, in doing so, partly withdrew from it. Indeed, political actors put themselves forward and take responsibility [22].

On the other hand, the information gathered with Diigo was transformed in several ways: (1) into a Scoop.it; (2) into potential participants; and, (3) into information sheets on the topics, for the agents but also later for the public, in particular through the work done with schools and teachers. In this regard, I could say that the steering committee was a consumer-producer [3]. Likewise, some of the selected tools and practices showed the librarians' desired to try different relations with the public and to question the library's capacity for being truly participatory. Facets of the work got close to the way John Dewey analyzed democratic renewal through participation [23]. I saw this in the notion of experimentation, the projection into a future that librarians will be part of, and

in the criteria for the selection of the items.. I could note a desire "to be situated in the political action and not solely focused on the transmission of knowledge" [24].

Topics like emancipation or empowerment were very present in the information gathered, so it was important not to dismiss them as anecdotal. Indeed, although French libraries lacked any law clearly defining their missions, they agreed to say that their function was to contribute to the emancipation of citizens. Democratization was key in this emancipation, but is largely being questioned nowadays [25]. This information retrieval traced the contours of a different reflection on emancipation, less top-down and more experimental. Librarians seemed to embrace their role not as pillars of democracy, but as active agents. This action tooks different forms:

- having new democratic forms experienced through participation emancipation inspired by John Dewey [23];
- convincing the public of their ability to act through equality in the intellectual debate through a definition of emancipation closer to the one thought by Jacques Rancière [26])
- Offering a new way to think about goods as common goods, thus a emancipation more based on digital citizenship and texts by philosophers Dardot and Laval [27].

The agents of the BML regretted not being part of a true debate event and saw the Démocratie 2017 project as a way to fill this void. The point was not just to propose debates but to embrace the intensity or even the possible conflicts of the debates. Accepting this agitation was one of the new orientations that the information retrieval performed by the group seems to be showing, hence the choice of items, strongly oriented towards change, reform, and a renewal of democracy. The knowledge assembled was revelatory of a desire for action, of a will to think the library as a political actor in its capacity to offer places for debate. In other words, to be a true Habermasian public space [28].

5   Conclusion

In a project such as the one undertaken by the BML, the information retrieval done by the organizing team revealed a new approach to the political role of libraries. It showed us the portrait of a new generation of librarians who accepted their political role as civil servants/citizens, moving further away from librarianship techniques, but moving closer than ever to the assertion of a responsibility towards society. However, this desire to take part in political action seemed to be in conflict with the values of libraries that correspond to another way of thinking the role of public cultural institutions: neutrality, democratization and emancipation through culture rather than through action. This difficult convergence between two representations of libraries does not seem to result from a lack of training of the librarians in terms of informational skills, but rather from a lack of political culture. By this I mean that librarians nowadays had trouble identifying French librarianship thinkers, to position themselves in a tendency, a history, to feel at one with it, while being able to make it their own and criticize it, and adapt it to their current problems, and in a way rekindle their vocation. The tendency in Anglo-Saxon

countries toward the development of a critical library science lets us see promising possibilities in the domain of the political action of librarians.

References

1. Bats, R.: Les enjeux et les limites de la participation: le rôle des bibliothèques. In: Construire des Pratiques Participatives dans les Bibliothèques, pp. 58–65. Presses de l'Enssib, Villeurbanne, France (2015)
2. Foucault, M.: L'archéologie des Savoirs. Gallimard, Paris (1969)
3. Pawley, C.: Information literacy: a contradictory coupling? Libr. Q. **73**(4), 422–452 (2003)
4. Le Deuff, O.: La Culture de l'information: Quelles "Littératies"pour Quelles Conceptions de l'information? In: Presented at the VI.ème Colloque International du Chapitre Français de l'ISKO, Toulouse, France (2007)
5. Bats, R.: Post Charlie Hebdo: The French Libraries Between Freedom of Expression and Neutrality of the Cultural Institutions. Presented at the Bobcatsss 2016, Lyon, France 2016
6. Mazeaud, A.: Citoyen/Élu/Technicien. In: Casillo, I., et al. (eds): Dictionnaire Critique et Interdisciplinaire de la Participation. GIS Démocratie et Participation, Paris (2013). http://www.participation-et-democratie.fr/es/dico/citoyenelutechnicien
7. Nez, H.: Savoir d'usage. In: Casillo, I., et al. (eds.) Dictionnaire Critique et Interdisciplinaire de la Participation. GIS Démocratie et Participation, Paris (2013). http://www.participation-et-democratie.fr/es/dico/savoir-dusage
8. Leclerc, O.: Expert. In: Casillo, I., et al. (eds.) Dictionnaire Critique et Interdisciplinaire de la Participation. GIS Démocratie et Participation, Paris (2013). http://www.participation-et-democratie.fr/es/dico/savoir-dusage
9. Mazeaud, A., Nonjon, M.: Professionnel. In: Casillo, I., et al. (eds.) Dictionnaire Critique et Interdisciplinaire de la Participation. GIS Démocratie et Participation, Paris (2013). http://www.participation-et-democratie.fr/es/dico/savoir-dusage
10. Blondiaux, L., Fourniau, J.-M.: Un Bilan des Recherches sur la Participation du Public en Démocratie: Beaucoup de Bruit pour Rien? Participations **1**(1), 8 (2011)
11. Maitles, H.: Teaching political literacy. In: Scottish Educational Research Association Annual Conference (1997)
12. Elmborg, J.: Critical information literacy: implications for instructional practice. J. Acad. Librarianship **32**(2), 192–199 (2006)
13. Smith, L.: Critical information literacy instruction for the development of political agency. J. Inf. Literacy **7**(2) (2013)
14. White, K.L., Gilliland, A.J.: promoting reflexivity and inclusivity in archival education, research, and practice. Libr. Q. **80**(3), 231–248 (2010)
15. Martins, F.: Information literacy in areas of cognitive science and information science. In: Presented at the Conference Enssib, France (2016). http://www.enssib.fr/conference-fernanda-martins
16. Deuff, O.L.: Penser la conception citoyenne de la culture de l'information. Les Cahiers du Numérique **5**(3), 39–49 (2010)
17. Calenge, B.: Entre le Lecteur et la Lecture, Quelle Bibliothèque? Bertrand Calenge: Carnet de Notes (2012). https://bccn.wordpress.com/2012/02/27/entre-le-lecteur-et-la-lecture-quelle-bibliotheque/
18. Hubert, C.: Bibliothécaires et Militantisme: Neutralité et Pratiques Professionnelles, Villeurbanne, Rhône, France (2013)
19. Bats, R.: Libraries After Charlie: From Neutrality to Action. Library Trends (2016, in press)

20. Lahary, D.: Le Fossé des Générations. Bulletin des Bibliothèques de France, vol. 3 (2005). http://bbf.enssib.fr/consulter/bbf-2005-03-0030-005
21. Jaeger, P.T., Gorham, U., Bertot, J.C., Sarin, L.C.: Democracy, neutrality, and value demonstration in the age of austerity. Libr. Q. Inf. Commun. Policy **83**(4), 368–382 (2013)
22. Tassin, É.: Ce Que l'action Fait à l'acteur. Tumultes **42**, 41–54 (2014)
23. Dewey, J.: Le Public et ses Problèmes (J. P. Zask, Trans.), vol. 1. Gallimard, Paris, France (2010)
24. Bertrand, A.-M.: Les Bibliothèques sont Filles des Lumières. Quoique…. Bulletin Des Bibliothèques de France, vol. 5 (2015). http://bbf.enssib.fr/consulter/bbf-2015-05-0044-005
25. Cousin-Rossignol, G.: Les Bibliothèques Face à "l'échec de la Démocratisation Culturelle", Villeurbanne, Rhône, France (2013)
26. Rancière, J.: Le Maître Ignorant: Cinq Leçons sur l'émancipation Intellectuelle, Fayard, Paris, France (2009)
27. Dardot, P., Laval, C.: Commun: Essai sur la Révolution au XXIe Siècle, la Découverte, Paris, France (2015)
28. Habermas, J.: L'espace Public: Archéologie de la Publicité Comme Dimension Constitutive de la Société Bourgeoise (M. Buhot de Launay, Trans.), vol. 1. Payot, Paris, France (1993)
29. Arstein, S.: A ladder of citizen participation. JAIP **35**(4), 216–224 (1969)

Enhancing Financial Information Literacy in Italian Public Libraries: A Preliminary Study

Laura Ballestra[✉] and Piero Cavaleri[✉]

Carlo Cattaneo University LIUC, Castellanza, Italy
{lballestra,pcavaleri}@liuc.it

Abstract. High rates of financial illiteracy among households represent a serious problem not only for the individuals but for the entire community. Public libraries could be proactive in community financial education and financial information education. For the first time, Italian public librarians were surveyed on whether their libraries were involved in offering financial literacy education programmes or financial information services. We also investigated the self-confidence and real competence of public librarians in basic finance and financial information. Respondents represented was 1.5% of Italian public librarians. Findings suggest that Italian public libraries are not perceived by patrons as suppliers of financial information and that only few courses have been offered to patrons about basic finance and financial information in Italian public libraries. Librarians are not confident about their competence in finance and financial information. Moreover, confidence in these fields is higher among male librarians that in female librarians. Study levels and formal economic studies have no influence on levels of confidence and proactivity. The only factor that appears to influence libraries' activities is the participation of librarians to specialized vocational courses. We recommend that Italian public libraries, professional associations and other national organizations organize courses of financial information and basic finance for Italian public librarians.

Keywords: Information literacy · Financial literacy · Financial information · Public libraries · Italy

1 Introduction

As financial markets become ever-more complex and integrated and financial processes are computerized, individuals and their family have to face decisions that could influence their future in an irreversible way with the risk of committing grievous financial errors.

Financial education is described as "[…] the process by which individuals improve their understanding of financial products and concepts; and through *information* [emphasis added by the author], instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being and protection" [1, p. 26].

Economists suggest that financial literacy (FL) enables citizens to make more accurate decisions about some specific topics: retirement, credit and mortgages, stock market

investments, and savings [2]. Sometimes the term FL is used as an umbrella term that refers also to employment or unemployment, taxes, and anything that regards money.

In this article we considered the meaning of FL in a more restrictive way following the approach of economists.

Various metrics have been developed to measure FL in the various areas in the world [3]. According to those metrics, financial illiteracy is common in many developed countries such as the US, Germany, Sweden, Italy, Japan, with gender, age, and education differences influencing the level of literacy [4].

While FL just recently became a very common concept because of the global financial and economic crisis, it also had a dramatic relevance for individuals before the crisis[1].

What the crisis of recent years demonstrated is that inaccurate or wrong decisions carry substantial costs not only for individuals but for the entire community, reinforcing the idea that national strategies of FL education must be implemented [5].

As stated in the definition of financial education cited above, economists consider that there is a specific relevance of information in financial decisions. This is the reason why national strategies for FL include the creation of authoritative free information sources including guides, reference materials, and web sites, produced by governmental agencies for citizens and initiatives of dissemination in which libraries have been historically involved.

In LIS disciplines neither the conceptual correlation between FL and information literacy has been entirely systematized [6, p. 276], nor has a consensus about the independence, interdependence, intersections, or overlapping of the two concepts been reached [7, p. 54], [8, p. 12].

Nevertheless, in our research we considered that libraries can contribute to improve citizens' competences and knowledge related to their financial decisions. Libraries can follow two distinct but indivisible different pathways. First, they can improve the basic financial knowledge of patrons through offering reference services and courses. Second, they can improve the financial information literacy (FIL) of patrons through offering reference services and courses. The first pathway requires libraries to use the consolidated methods of teaching basic finance while financial *information* education uses methods of information literacy education in the context of finance. The second pathway has to be based on a vision of information literacy according to which "information literacy cannot be learned without engaging in discipline specific subject matter" [9, p. 60], a vision that contextualizes it "within the structures and modes of thought of particular disciplines" [10, p. 202] or within a context [11].

2   Background of the Research

2.1   Public Libraries, FL, and FIL

Throughout different kind of libraries, research literature affirms that an important role in FL education and FIL diffusion can be expected for public libraries, both in terms of

---

[1] For example, in the US the Financial Literacy and Education Commission was established under the Fair and Accurate Credit Transactions Act of 2003 to develop a national strategy on financial literacy.

supplying financial information to patrons and offering financial and financial information educational programmes [6, 12, 13].

Public libraries are neutral parts of community life. They have a tradition in managing vocational courses for citizens and they are part of the government information transfer cycle. Historically, public libraries have been involved in adult education in different subject areas. Business reference services and specialized librarians are present in many public libraries all over the world. They are trusted for their roles in source evaluation, and this is a very relevant point for financial information that is complex and fragmented.

Nevertheless, there is sparse empirical research on FL education in public libraries [13, p. 302] and the number of public library initiatives in this field is still quite limited. FL is addressed in a "patchwork manner" by many and *also* by libraries [8, p. 18].

Furthermore, at this moment it is unclear to what extent public libraries are prepared to fulfil the aim of promoting FL among their communities and if they consider it a priority.

International organizations, including all IFLA, call strongly for the role of public libraries in educating citizens especially through information and information literacy education in all fields, disciplines, and contexts [14]. Professional organizations, such as ALA, underline the importance of public libraries as key players in the provision of government information, including financial information, to citizens. ALA's Reference and User Association's guidelines, *Financial literacy education in libraries,* are a good example of professional instructions to help public libraries to organize FL courses for adult education [12].

Librarian associations are also facilitators or promotors for organizing courses of FL education in libraries, in partnership with relevant national programmes or institutions, such as, in the US, "MoneySmart" or "Smart investing at your library".

Still, it has been said that most librarians (81%) did not receive specialized training in order to respond to finance-related inquiries or offer FL workshops [15, p. 49], suggesting that poor financial skills of librarians could be responsible of poor attention to FL in public libraries. While librarians as a whole perceive themselves as information literate, it would be valuable, to consider the self-perceived and real FL of librarians and their information literacy in financial matters, their FIL.

Considering the case of Italy, financial illiteracy for the whole Italian population is extremely wide spread and much higher than the average of OECD countries. Italy performed the worst among the countries reporting results on the FL PISA test [16].

Although Italy has not yet developed a strategy for FL education, the Italian Central Bank, Banca d'Italia, offers some programmes in FL education to school students in agreement with MIUR, the Ministry of Education and University. Since most of the governmental initiatives involve students, there is a vacuum of adult activities. Public libraries could really play in an important role for adults in Italy. While the Italian Public Agency for Digital Development (AGID) considers public libraries to be a key network to spread the use of the Internet and e-government services and information [17], the AGID does not emphasize FL. Nevertheless, at the moment these central agencies have not involved libraries in their initiatives.

Unlike of the case of the US, the Italian Library Association (AIB), the main Italian professional association, has not developed a strategy for FL education in libraries. Italian public libraries traditionally did not offer specific business or financial information services for their adult communities and they do not have business reference units.

It is generally assumed, but not tested, that:

- only a few reference questions have been received by Italian public libraries regarding finance;
- that economic and business collections are quite poor compared to other disciplines such as art, literature, and history; and,
- that FL education courses are not offered by public libraries. The extent to which Italian public librarians offer support for both FL and FIL of has never been researched.

3 Research Questions

Our study is the first *quantitative* evaluation of the actual diffusion of FL and FIL activities in Italian public libraries. In this exploratory study we used survey questionnaires administrated to a sample of Italian public librarians to understand:

RQ1 The percentage of reference librarians who have received questions about financial problems;

RQ2 The presence of courses or workshops related to FL and FIL in public libraries;

RQ3 The percentage of reference librarians who have received specific education and training about finance and/or financial information sources;

RQ4 The percentage of reference librarians in the sample who had at least a basic financial competence;

RQ5 The self-perceived level of FL and FIL competence of the reference librarians in the sample; and,

RQ6 The opinion of the reference librarians on the adequacy of library collections in finance to respond to user questions.

We searched for relationships between:

- variables referring to the librarians': self-confidence and real competence in finance and financial information; gender; level of education, and courses attended during professional career; and,
- public libraries' activity in financial education.

4 Research Methods

We conducted the research through a web survey made of sixteen questions addressed to public librarians. We divided these questions into three main areas of interest: personal information on the respondents (6 questions: sex, age, education level, background in economic studies, vocational education, library size); FIL of librarians and their use of financial information in reference services (8 questions); and FL competence of

librarians (2 questions). In nine of these questions we asked respondents to select an answer from a list of choices.

The respondents did not identify the library they worked for since, in Italy, public librarians are often *solo* librarians. This was so we could maintain the librarians' confidentiality and not to identify them as individuals.

We developed the questions through a literature review and pre-tested the survey with 20 public librarians, to improve the question clarity. Through interviews with these librarians, we also gathered suggestions and evaluated the librarians' comments.

We sent an invitation to complete the survey to all 6,200 members of the most representative mailing list of the Italian librarians and information specialists, AIB-Cur [18]. It was not possible for us to send the message only to public librarians because the system did not allow us to filter but the invitation e-mail explained that only public librarians were addressed. It was not possible for us to send reminders because of the list policy about re-submission. We sent a second invitation to complete the survey through a mailing list of 500 public librarians. Librarians had one month to return a completed questionnaire, starting at the beginning of April 2016.

We received 196 responses. Because 30% (n = 59) of respondents started the survey but only provided some answers without completing the set, we received only 137 completed questionnaires were suitable for analysis.

The final sample represented 1.5% of the estimated number of Italian public librarians[2].

The final set of respondents was purposeful and self-selected. We considered the results significant for the population of Italian public librarians because the public librarians on the mailing lists included all kind of public librarians, regardless of previous experiences, roles, or interest in financial or business reference and information.

5   Findings

We found the respondents were mostly older than forty years old (75%, n = 102) and female (83%, n = 114) [Questions 1 and 2]. These data corresponded to the national demographics (estimated) from the Italian Library Association for Italian librarians (female: 77.2%; average age: 41–55 years old). Among respondents, 29 librarians worked for libraries of big municipalities with more than one library, 78 worked for municipalities with a unique library, 30 respondents worked in other kinds of public libraries [Question 5].

---

[2] Official statistics do not offer a complete information regarding librarians working in public libraries. The Italian Library Association Secretariat estimates that Italian public librarians are about 9,000. The ICCU database, *Anagrafe delle Biblioteche italiane*, records 7003 Italian public libraries.

5.1 Financial Literacy Activities in Public Libraries (RQ1 and RQ2)

No more than 25% (n = 34) of the reference librarians indicated that they had received questions about financial problems. The low percentage showed that only few users asked librarians to address these issues.

Among the questions received, the librarians reported that patrons expressed significant interest in equities, bonds and derivatives (25%, n = 34) and online bank accounts (18%, n = 24) (Fig. 1).
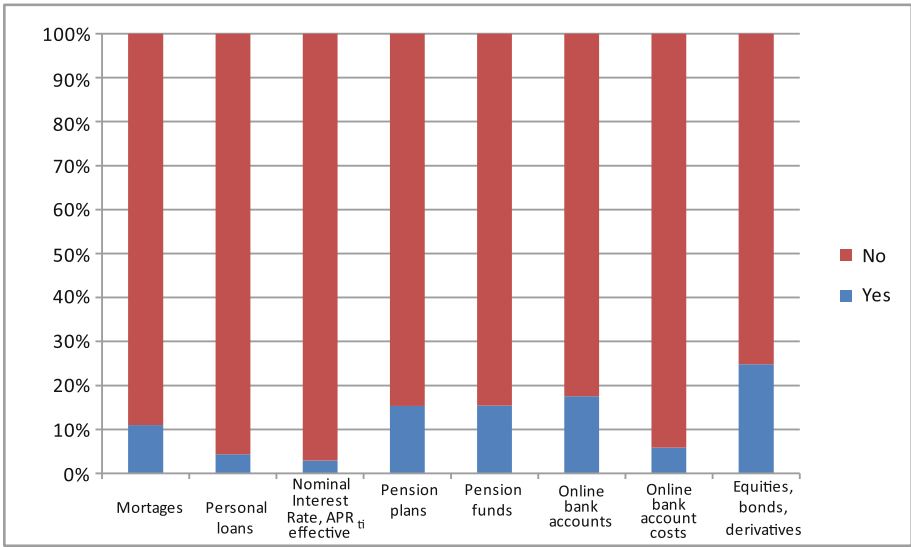
Fig. 1. Financial questions received from patrons (Questions 7, 8, 9)

We asked the respondents if their libraries offered courses or workshops related to FL and financial information to their users in the previous five years. Most respondents' libraries (91%, n = 125) did not offer any kind of FL programmes [Question 14].

Table 1. Librarians attended FL courses

		Librarians attended FL courses	
Libraries offered courses of FL to patrons		Yes	No
	Yes	20%	8%
	No	80%	92%

While we found that that few financial education programmes were offered in Italian libraries have proven to be sparse, we observed that libraries whose librarians attended some vocational courses of FL or FIL show higher percentages of FL or FIL courses offered to their patrons. When librarians attended vocational FL courses, 20% (n = 2) of their libraries offered FL courses to patrons. On the other hand, when librarians had *not* attended vocational FL courses, only 8% (n = 10) of libraries offered FL programmes (Table 1).

The relation becomes more evident in the case of librarians attending FIL courses. When librarians had attended vocational FIL courses, 27% (n = 3) of libraries offered courses to their patrons, versus only 7% (n = 9) of libraries whose librarians did *not* attend FIL courses (Table 2).

Table 2. Librarians attended FIL courses

		Librarians attended FIL courses	
Libraries offered courses of FL to patrons		Yes	No
	Yes	27%	7%
	No	73%	93%

We consider that it would be interesting to study the reason of these findings. At least two hypotheses could be considered for future studies: when libraries want to organize FL or FIL courses for their patrons, they organize training for their librarians; or, on the other hand, when librarians attended FL or FIL courses, their libraries are more apt to organize FL courses for their patrons.

5.2 Education and Financial Background of Librarians (RQ3)

A large number of respondents had academic degrees. Seventy-eight percent (n = 107) of respondents had a Bachelors degree or Masters degree, 22% (n = 30) had a high school diploma [Question 3].

Regarding their competence in finance, we had to consider that it was not usual for librarians in Italy to have a background in economic studies and LIS students usually do not include finance or financial information. In fact, only 9% (n = 13) of the sample studied economics in high school or in university [Question 4]. The percentage of respondents that had an economic background was higher among individuals with only a high school certificate.

We asked librarians if, during their professional career, they attended vocational courses of finance or financial information. In both cases, only 8% of librarians (n = 11) did [Question 6].

5.3 The Self-perceived and Proven FL and FIL of the Reference Librarians in the Sample (RQ 4 and 5)

Librarians had very low self confidence in terms of financial knowledge. We asked librarians if they were confident about loans, savings, and pension plans. More than 90% of the sample was convinced they were not competent enough to help patrons. Four percent of respondents (n = 6) answered that thought they were knowledgeable about loans, 6% of respondents (n = 8) thought the same about savings, finally only 4% of respondents (n = 6) felt they were knowledgeable about retirement [Question 11].

Librarians expressed somewhat greater self confidence in terms of what they knew about financial information sources: 20% of respondents (n = 27) thought they knew

what sources to look for about loans; 26% of respondents (n = 35) knew sources about savings; and 26% (n = 35) were able to use sources about retirement. Thus, at least 74% of the librarians did not feel confident with FIL sources [Question 10].

Formal education in economics and finance did not help to improve self- confidence. All librarians (n = 13) who had formal education in the field answered that they did not have enough competence in finance to answer patrons' questions. Formal education was proven to be not relevant regarding FIL: among those with a formal economic education, the percentage of respondents who were self-confident in financial information was the same of that of the whole sample.

We tested real financial competence by asking two different questions. [Questions 15, 16]. The first question asked if respondents knew the meaning of (a) the nominal interest rate and (b) the actual annual percentage rate. Most of the respondents were not able to answer. Seventy-one individuals answered "No" to (a) while 59 answered "Yes". For (b), 117 individuals answered "No", 13 individuals answered "Yes". Seven individuals did not answer in both cases.

We asked the second question to check if all the answers about self-perceived financial competences were correct. This question is often used in national surveys to prove financial competences of citizens [2, p. 81]. Only 31% of respondents (n = 41) were able to give a correct answer when asked if 100 Euro after 5 years with an interest of 2% were more or less or equal than 110 Euro. Also those librarians who attended courses in finance had a high percentage of errors (80%).

We tested also the hypothesis of a gender gap in FL with this question [19]. Our sample was composed of 83% (n = 114) females and 17% (n = 23) males. Among the females, only 26% (n = 30) responded correctly; on the contrary, 48% of males (n = 11) gave the right answer.

5.4   Adequacy of Library Collections and Use of Financial Information Sources by Reference Librarians (RQ 6)

People in our sample thought that their collections in economy and finance were not sufficient to answer to patrons' questions about finance: 73% of respondents (n = 100) answered that their collections were not adequate, 25% (n = 34) thought that they were sufficient, 1.5% (n = 2) answered that they were very good and 0.5% (n = 1) did not answer [Question 13]. We asked librarians about what sources Italian public librarians used in reference assistance about finance. Forty-six percent (n = 63) of the sample used reference books, meaning that more than half of public librarians did not use them [Question 12].

We asked librarians which governmental web sites they used in reference services. We cited these websites in the questionnaire:

- Normattiva: official website for in-force legislation
- Banca d'Italia: Italian Central Bank
- Consob: Italian Exchange and Securities Commission
- IVASS: Authority for Insurance Control
- COVIP: Authority for Private Pension Funds Control
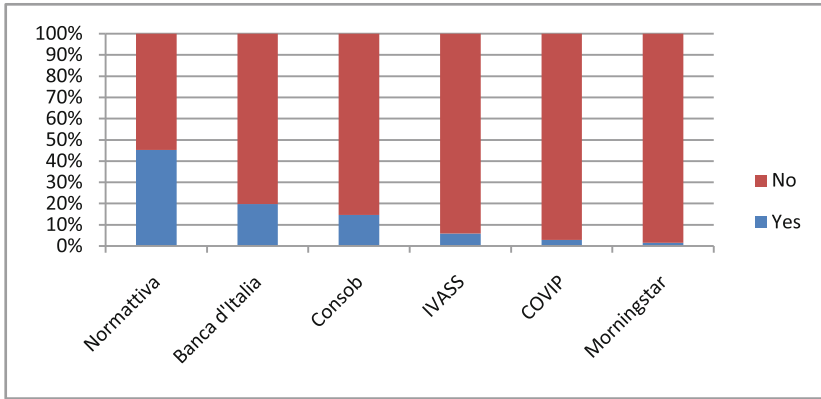
Fig. 2. Use of online information relevant for finance [Question 12]

We also added an important private source about financial: Morningstar.

The only online source that was used often was Normattiva, a legal, not a financial one (Fig. 2).

The Banca d'Italia website was used by 20% of respondents, but unfortunately, while it is very rich in raw data or information about economic trends and banking statistics, it is not very useful in helping non-professional users search information about personal finances because it offers just a few guides and reference materials.

We found an interesting relation with the self-perceived financial information competence. We discovered that respondents that declared a competence in financial information used financial online sources in reference services more than the others.

For example, only 15% of librarians that *did not* consider themselves financial information literate used the Bank of Italy website. On the contrary, 37% of those that considered themselves financial information literate used the Bank of Italy website.

6   Conclusion

Our main conclusion in this phase of the research was that Italian public libraries were rarely perceived from their patrons as a source of information and reference for financial issues. No more than 25% of respondents had ever received a question about one of the financial issues we considered. We also found that very few libraries, no more than 9%, offered financial courses or financial information courses to their patrons.

We demonstrated that the self confidence in both finance and financial information was very low for the Italian public librarians: 90% of respondents did not feel competent to help patrons with finance and 74% said they were not competent with financial information.

Basic competence in finance was found to be low, even if it was higher than the respondents' perceived confidence, with 70% of respondents unable to demonstrate their financial competence.

Financial information was rarely used in reference services, even free governmental websites and most Italian librarians considered their library collections inadequate to answer to users' questions in finance.

The gender gap in FL was confirmed in the sample. The high presence of women in Italian libraries in general suggested the need of future studies about teaching FL for women in library staff.

We demonstrated that neither completion of a Bachelors or a Masters degree nor formal economic education represented an advantage in terms of a stronger self-confidence and real competence in finance and financial information. This last finding was quite counterintuitive and future studies should try to understand the reason why it happened.

Even if the number of public libraries that offered FL courses was very limited in Italy, compared with other countries' libraries, we observed that libraries whose librarians attended some vocational courses of FL or FIL showed higher percentages of FL or FIL courses offered to patrons.

We conclude that, for Italy, organizing financial and financial information educational programmes for public librarians is a priority in order to improve the self-confidence and the real knowledge of finance and financial information and enhance the activities in libraries for patrons in these fields.

For future research, since FL courses offered by libraries was so limited, it would be not productive to study the factors that motivated libraries to offer courses. On the contrary, it would be more interesting to identify and study all cases when some librarians attended vocational courses of FL and FIL, to understand if *this coursework* influenced their organizations to organize FL and FIL programs for patrons or, whether librarians attended these courses *because* of their organization's FL projects.

Finally, we suggest the necessity of investing in having updated and rich financial collections in public libraries.

References

1. OECD: Improving Financial Literacy: Analysis of Issues and Policies. OECD Publishing, Paris (2005)
2. Mitchell, O., Lusardi, A. (eds.): Financial Literacy: Implications for Retirement Security and the Financial Marketplace. OUP, Oxford (2011)
3. Atkinson, A., Messy, F.: Measuring Financial Literacy: Results of the OECD International Network on Financial Education (INFE) Pilot Study. OECD WP on Finance, Insurance and Private Pensions, no. 15. OECD Publishing, Paris (2012)
4. Lusardi, A., Mitchell, O.: Financial Literacy Around the World: An Overview. NBER Working Papers, no. 17107, June 2011
5. OECD: Advancing National Strategy for Financial Education. OECD, Paris (2013)
6. Spiranec, S., Banek Zorica, S., Stoki'c Simon, G.: Libraries and financial literacy. J. Bus. Financ. Librarianship **17**, 262–278 (2012)
7. Gass, S., Garczynski, G.: Information has value: financial literacy meets ınformation literacy. In: Smallwood, C. (ed.) The Library's Role in Supporting Financial Literacy for Patrons, pp. 53–62. Rowman & Littlefield, Lanham (2016)

8. Faulkner, A.E.: A sistematic review of financial literacy as a termed concept: more questions than answers. J. Bus. Financ. Librarianship **20**, 7–26 (2015)
9. Bruce, C.: Seven Faces of İnformation Literacy. Auslib Press, Adelaide (1997)
10. Grafstein, A.: A discipline-based approach to ınformation literacy. J. Acad. Librarianship **28**, 197–204 (2002)
11. Lloyd, A., Williamson, K.: Towards an understanding of ınformation literacy in context. Implications for research. J. Librarinaship Inf. Sci. **40**, 3–12 (2008)
12. ALA-RUSA: Financial Literacy Education in Libraries. RUSA, Washington (2014)
13. Smith, A.C., Eshenfelder, K.: Public libraries in the age of financial complexity: toward enhancing community financial literacy. Libr. Q. Inf. Commun. Policy **83**(4), 299–320 (2013)
14. Koontz, C., Gubbin, B. (eds.): IFLA Public Library Service Guidelines. De Gruyter Saur, Berlin (2010)
15. Keller, K., et al.: Meeting the need for library-based financial literacy education. Ref. User Serv. Q. **54**(3), 47–51 (2015)
16. OECD, PISA Results. Students and Money: Financial Literacy Skills for the 21st Century. OECD, Paris (2012)
17. AGID. Programma Nazionale per la Cultura, la Formazione e le Competenze Digitali. Linee Guida. AGID, Roma (2014)
18. AIB-CUR. Wikipedia. https://it.wikipedia.org/wiki/AIB-CUR
19. Lusardi, A., et al.: How Financially Literate are Women? An Overview and New Insights. NBER Working Paper no. 20793, December 2014

Re-Framing Information Literacy for Social Justice

Laura Saunders[(✉)]

School of Library and Information Science, Simmons College, Boston, MA, USA
`laura.saunders@simmons.edu`

Abstract. Currently in the United States, debate ranges over the purpose of higher education, and whether colleges should focus on job skills and preparing a workforce, or the extent to which they are responsible for developing citizens prepared to fully participate in a democratic society. The New ACRL Information Literacy Framework provides a conceptual approach to teaching and learning information literacy in higher education. The frames outline broad ideas and knowledge areas, many of which lend themselves to social justice interpretations, which could align with a socially responsible curriculum. This paper examines the development of the *Framework* and analyzes each frame from a social justice perspective, ending with a proposal for a new frame on information social justice.

Keywords: Information literacy · Academic libraries · Social justice

1 Introduction

Libraries in the United States have a long, although not uncomplicated, history of social justice. The American Library Association has issued a number of policy documents that underscore the profession's support for access to information and education, intellectual freedom, diversity, and resistance to censorship. ALA's Code of Ethics [1], and the Library Bill of Rights [2], both originally adopted in 1939, stress the importance of equity of services, of not discriminating against patrons for any reason, and of providing materials representing diverse points of view and not censoring materials due to the background of the author or because of partisan or doctrinal disapproval of content. Similarly, social responsibility, including responding to problems within society and being willing to take a stand on those problems, is considered a core professional value by ALA [3]. Jaeger, Greene Taylor and Gorham [4] outline the actual and potential ways that American libraries advance social justice and support the human rights of their communities.

The authors also note that most of the discussion and work around social justice in libraries centers on information access, ignoring or glossing over the fact that simply having access to information or the technology through which much information is delivered is not the same as being able to understand, evaluate, and use that information, skills generally associated with information literacy. Librarians have long championed information literacy, implementing programs and services to facilitate the development of information literacy skills in their patrons. Nevertheless, information literacy is rarely discussed within the framework of social justice and human rights, especially within the

arena of academic libraries. This article seeks to further the conversation by examining how information literacy relates to social justice and how librarians can further promote social justice through library instruction using the new Association of College & Research Libraries (ACRL) *Framework for information literacy for higher education* [5] as a lens.

Information literacy is widely recognized as a crucial set of skills for success in school, work, and personal life, as evidenced by its incorporation into accreditation standards [6], and other policy documents like the *Degree qualifications profile* [7] and the Association of American Colleges and Universities' *Essential learning outcomes* (AAC&U) [8]. With regard to social justice, ALA underscores the importance of information literacy for full participation in a democratic society and indicates that information literacy skills could be integral in "addressing many long-standing social and economic inequities" [9]. Sturges and Gastinger [10] build on the United Nations' Alexandria Proclamation and related documents from nations around the world to build a case that information literacy—not just access to information—is a human right, contending that there is "enormous, unexploited scope for professional activity in the area of Information Literacy and a clear map for such activity can be derived from a line of reasoning that begins with the idea of an information right" (p. 202).

2 Development of the Framework and Relation to Social Justice

The Task Force that developed *the Framework for information literacy* acknowledges an interest within the library and information science community to address social justice within information literacy. Indeed, they report that an earlier draft version of the *Framework* included a "stronger stance" on social justice issues, but that ultimately they "felt that social justice was not its own frame and that social justice components were better served as pieces of other frames" [11]. The Task Force contends that the new frames provide scope for addressing these issues, and note that they specifically worked to integrate social justice components into the *Framework*.

Some stakeholders have expressed dissatisfaction with the Task Force's response to social justice in the *Framework*, even launching a petition highlighting their concerns [12] with about 130 signatories [13]. In particular, the group laments "that the new ACRL Framework for Information Literacy for Higher Education does little to incorporate and explicitly articulate important critical habits of mind of information literacy development such as civic engagement and addressing social justice issues," [12] and noting that "emphasizing social inclusion; cultural, historical, and socioeconomic contexts; access issues; critical awareness of the mechanisms of establishing authority, including academic authority; and civic and community engagement would strengthen the Framework. Furthermore it would recognize the growing community of librarians committed to social justice and civic engagement" [12]. A number of the petitioners expanded on their critique of the lack of social justice in the *Framework* in an article in *Communications in Information Literacy* in which they contend that "from a critical information literacy and social justice perspective, the opportunity to fully recognize

the political nature of the work of information professionals in higher education has been missed" [13].

At this point, it is worth considering why the Task Force chose not to include a separate frame on information literacy related to social justice. While acknowledging that he did not speak for the Task Force in his post, blogger and Task Force member Troy Swanson [14] offered two main reasons for rejecting a social justice information literacy frame. First, the frames for information literacy were originally developed around the idea of "threshold concepts," a theoretical approach which defines "thresholds" or particular concepts which students of the discipline must overcome in order to master understanding of that discipline. According to the theory, threshold concepts must meet five criteria:

- Transformative - cause the learner to experience a shift in perspective;
- Integrative - bring together separate concepts (often identified as learning objectives or competencies) into a unified whole;
- Irreversible - once grasped, cannot be un-grasped;
- Bounded - may help define the boundaries of a particular discipline, are perhaps unique to the discipline;
- Troublesome - usually difficult or counterintuitive ideas that can cause students to hit a roadblock in their learning [15].

Swanson [14] contends that information social justice as a frame was not "transformative … it is not clear that one must cross this threshold in order to grow toward information literacy" and as such did not meet the criteria for a threshold concept. He argues that it works better as an application within other frames rather than as a frame in its own right. Further, Swanson suggests that a frame centered on human rights and social justice would appear as a political statement or a values statement and as such did not fit the *Framework*.

Swanson's first point, that information social justice does not fit the requirements of a threshold concept, is difficult to address. Identifying and defining the six frames that are considered threshold concepts to information literacy was done primarily through a Delphi study, in which experts in the field engaged in an iterative cycle of feedback on proposed concepts in order to arrive at consensus on the final six. As is usual with Delphi studies, the participants are anonymous—they were selected by the Task Force but not identified to each other or to the public [In the interest of full disclosure, this author was part of that panel]. While it might be assumed that these experts would have insight into how people, and students in particular, interact with information, their actual background and expertise is unknown. Apparently, no research has been done to directly study how students interact with information as identified in the frame in order to test their adherence to threshold concept criteria. Since the *Framework* was filed in 2014, and adopted in 2016, there has been ongoing discussion about the importance of threshold concepts as an underpinning theory [16–18]. If threshold concepts continue to be foundational to the *Framework*, further research might be warranted to determine whether and how each frame, or new proposed frames, fit the criteria.

Swanson's second point, that a social justice frame might appear to be an unnecessary political statement, raises some interesting questions about higher education and the role

of academic libraries. Swanson does not elaborate on why a political statement from ACRL is unnecessary, but one interpretation is that it is not the place of academic libraries to take a political stand and/or that the presentation and instruction of information literacy skills should be "neutral." However, as noted above, ALA, which encompasses ACRL, promotes social responsibility as a core value of librarianship [3], and emphasizes many of the social justice aspects of information literacy [9]. At a broader level, fueled in part by student protests related to racism and diversity issues on campus, there has been much discussion about the place of social justice education in higher education, especially with regard to supporting democracy, civic engagement, and civil debate.

While it is outside the scope of this paper to undertake a thorough review of the literature on the role of higher education with regard to social justice issues, a number of writers make a compelling case of its importance, often drawing on the writings of Paolo Freire, Henry Giroux, and John Dewey. For example, Nagda, Gurin, and Lopez [19] discuss the tension between responding to the economic demands of the labor force to educate students for specific employment opportunities, and preparing students to recognize and contend with the social complexities that would enable them to actively participate in a democratic society. Freire notes the importance of teaching critical analysis in order to challenge established hegemonic structures and liberate people from oppression [20]. Giroux is particularly emphatic regarding the responsibility of higher education "to expand the pedagogical conditions necessary to sustain those modes of critical agency, dialogue, and social responsibility crucial to keeping democracies alive" [21]. He elaborates on the dangers of a neoliberal approach to higher education, which promotes market values over social justice issues, contending that it reinforces racist, classist, and sexist structures [22]. In an interview with Truthout, Giroux asserts that students are "now taught to ignore human suffering and to focus mainly on their own self-interests and by doing so they are being educated to exist in a political and moral vacuum" [23].

Such arguments are echoed by academic librarians. Battista, Ellenwood, Gregory, Higgins, Lilburn, Harker, and Sweet [13] propose that by avoiding a social justice stance the *Framework* is accepting the status quo of neoliberal education and its inherent perpetuation of racist, classist, and sexist structures, while Beatty [24] goes further to suggest that information literacy *Framework* documents and definitions actually embrace a neoliberal philosophy. Tewell [25] argues the importance of a social justice orientation for information literacy in order to empower students to critique and challenge these inherent power structures. These arguments offer a strong case for reconsidering the appropriateness of an information social justice frame. Indeed, it could be argued that by avoiding taking a specific political stance, ACRL is by default promoting the status quo.

3   Addressing Social Justice in the Framework

If one accepts that social justice should be addressed in some way within higher education generally, and information literacy specifically, the question remains: how best to address it. As noted above, the ACRL Task Force recognized the calls for social justice

within the *Framework*, and responded by attempting to weave attention to social justice issues into the knowledge practices and dispositions that contextualize each frame, and through the suggested activities and assignments that accompany the frames, rather than creating a separate frame. Swanson [14] suggests that two frames in particular—Information Has Value, and Scholarship as a Conversation—are areas that could benefit from a social justice lens. Battista, Ellenwood, Gregory, Higgins, Lilburn, Harker, and Sweet [13] also include Authority is Constructed and Contextual to this list, and detail specific ways in which each of these frames could be used to address social justice issues and questions. Thus, this section of the paper will briefly review existing suggestions for these frames, and then detail possible social justice approaches to the remaining frames, followed by the proposal of a new, additional frame on information social justice.

Evaluating information resources for authority is one area that lends itself well to social justice education. Too often, students are taught evaluation through a checklist approach, in which certain credentials such as a PhD or affiliation with a research organization and publishing norms such as peer-review are accepted as surrogates for authority. While these criteria might be a good starting point, it is unclear how students are encouraged to go further in their assessment and in fact students might not see any need to critique information sources if they meet these initial criteria. As currently written, the Authority is Constructed and Contextual frame does acknowledge that even standard sources and authorities might be questioned, encouraging students to "question traditional notions of granting authority and recognize the value of diverse ideas and worldviews" [5] and to identify and acknowledge their own bias when evaluating sources. In this way, the *Framework* seems to open the world of scholarly conversation to consider marginalized voices and non-traditional publishing formats that might be otherwise overlooked. Students could be pushed even further to examine the structures and standards by which academic authority is traditionally constructed and to critique the ways in which these tend to privilege certain voices [13].

The idea of authority can also be extended to discussions of Scholarship as Conversation, exploring issues of who is allowed or welcomed into the scholarly conversation. The *Framework* addresses this issue by encouraging students to recognize barriers to entering the conversation, including that "systems privilege authorities and that not having a fluency in the language and process of a discipline disempowers their ability to participate and engage" [5]. Further, the frame acknowledges that widely accepted or sanctioned arguments might not represent the only or the best information on a topic. Again, Battista, Ellenwood, Gregory, Higgins, Lilburn, Harker, and Sweet [13] expand the topic further by suggesting that the frame could also encourage people to consider scholars' motivations for publishing. For instance, for some academics, publishing is a requirement of the job and as such might influence them to choose certain publishing formats or outlets that are considered more prestigious. Further, scholars might also be motivated to pursue or dissuaded from pursuing certain research topics based on whether that topic is sanctioned or considered worthy of study by others in the field. Certainly, some research topics are more likely to receive grant funding or more likely to be published, which could influence scholars' choice of those topics to study [26].

When discussing the frame Information has Value, the emphasis tends to be on concepts of copyright and intellectual property, as well as related issues such as

plagiarism and citation. However, ACRL does note within the knowledge practices for this frame that students should be aware of barriers to accessing information and of the fact that current systems of information production and dissemination marginalize certain groups. The frame also encourages students to "examine their own information privilege" [5]. These issues can also connect back to the frames on authority and Scholarship as Conversation, since a lack of access to information, due to cost or copyright restrictions, could impact a person's ability to join in scholarly conversation. Lawson, Sanders, and Smith [26] challenge the conceptualization of information as a commodity rather than a public good, and examine open access as a way of equalizing access.

Information Creation as Process and Research as Inquiry both overlap with some of the frames above in terms of their social justice orientation. For example, Research as Inquiry focuses on formulating research questions and the iterative process of investigating a topic, but the frame supports considering multiple perspectives and keeping an open mind with regard to information and its sources. These knowledge practices and dispositions could dovetail with considering different and alternative constructions of authority and thus widening the circle of scholarly conversation. Similarly, Information Creation as Process entails understanding how the format and packaging of information can influence understanding. This frame could be coupled with Authority is Constructed and Contextual to examine how formats that are often dismissed as not scholarly, such as blog posts and op-eds, could be considered scholarly or authoritative depending on the authorship, which could again widen the scholarly conversation to include underrepresented voices. This frame could also be connected to Information has Value to encourage students to consider the economic structures needed to produce different formats of information, and how those structures impact other aspects of the information such as access, authority, and so on. Pushed further, this frame could support the examination of how marginalized voices and unsanctioned topics might have to find alternative formats to enter the conversation if they are systematically excluded from more traditional formats.

On its surface, Search as Strategic Exploration, appears to be the most skills- and process-based frame, with its emphasis on defining research needs and developing search strategies. The knowledge practices include brainstorming for relevant keywords and concepts, and using search language including subject headings and controlled vocabularies appropriately. However, this frame could be expanded beyond these skills to include critical reflection on the structures and practices of searching. For example, Drabinksi [27, 28] and Drabinski and Hann [29] discuss how classification systems can reinforce racist, sexist, and classist systems through the use of outdated or offensive language and dubious hierarchical structures. When teaching students how to navigate these systems, librarians could also encourage students to reflect critically on the language and systems and to consider how the terminology and hierarchies influence their understanding of the information they are retrieving.

4   Information Social Justice: Proposing a New Frame

Since the *Framework* has already been filed and adopted, and librarians have already begun developing assignments, activities, and rubrics and publishing guides and books based on the new frames, efforts to add a new frame might seem belated. However, ACRL documentation and at least some Task Force members suggest that the *Framework* is open to ongoing change. The introduction to the *Framework* states that the frames are "flexible options for implementation, rather than on a set of standards or learning outcomes, or any prescriptive enumeration of skills" [5] and further contends that "these lists should not be considered exhaustive." Likewise, Swanson [14] characterizes the *Framework* as a living document and challenges ACRL members to propose a new frame centered on social justice, asking how it would be defined, and what knowledge practices and dispositions it would entail.

Even with the invitation to propose new frames, however, the fact that social justice is or could be addressed in each of the existing frames begs the question of whether it is necessary to create a new frame focused on social justice. There are several reasons that support the addition of a new frame rather than integration throughout the *Framework*. First, while the *Framework* introduces some larger and more complex concepts including social justice issues, it is unclear the extent to which most library instructors actually teach to these concepts. To date, the majority of information literacy activity and writing seems to focus on task and process-based skills such as locating and accessing information or properly citing sources [30–32]. Further, attention to social justice is really concentrated in three frames—Authority is Constructed and Contextual, Information has Value, and Scholarship as Conversation—and even in those frames it is limited to a couple of knowledge practices or dispositions. In reality, social justice is not truly integrated throughout the *Framework*, but is somewhat minimally included in a few places. Burying issues like attention to marginalized voices and critique of traditional constructions of authority deep in the *Framework* makes it less likely that these concepts will be given attention in the classroom and seems to reinforce the "othering" and systematic suppression of these issues and voices. Finally, the attention to social justice as currently written into the *Framework* seems to be mostly passive or reflective. Students are encouraged to recognize barriers, question traditional construction of authority, and examine their information privilege, but there is no suggestion that they could do anything to challenge or alter the system. Ultimately, the current *Framework* would seem to promote the status quo.

Thus, this paper concludes with a proposition for a new frame—information social justice—that would make ethical and moral questions of information production and use more visible and which offers a somewhat more active set of knowledge practices and dispositions to contextualize its implementation.

5   Proposed Frame: Information Social Justice

Information is created within existing power structures, and those power structures can impact the production and dissemination of information as well as distort, suppress, or

misrepresent information. To understand and use information most effectively, users must be able to examine and interrogate the power structures that impact that information, and analyze the ways that information can be used both to inform and misinform.

Knowledge Practices. Learners who are developing their information literate ability:

- Analyze how each stage of the production, dissemination, organization, location, evaluation, and use of information can be impacted by power structures
- Identify and interrogate those power structures
- Analyze critically sources of information to go beyond basic checklist criteria such as author credentials, peer review, to include body of research, methodologies, funding sources, conflict of interest, personal bias etc.
- Identify how the commodification of information impacts access and availability
- Recognize when information is missing, incomplete, or inaccessible and recognize the absence of information as an indicator of possible power dynamics and bias
- Analyze how information- including both its absence and its presence, and how it is created, arranged, and accessed - informs opinions and beliefs about the people, ideas, or situations it represents or reflects
- Examine the ways that information can be used to persuade, promote, misinform, or coerce

Dispositions. Learners who are developing their information literate ability:

- Engage in informed skepticism when evaluating information and its sources
- Question traditional and alternative sources of knowledge and publishing venues
- Reflect critically on their own information behaviors and how they might reflect and perpetuate the status quo
- Question traditional constructions of authority
- Value information and sources from different perspectives
- Recognize the impact of the filter bubble/echo chamber and actively seek out diverse sources of information
- Are empowered to work for change in information structures.

This frame is only a draft. It is not meant as a definitive or comprehensive answer to integrating information social justice into library instruction generally or the *Framework* specifically. However, it could be a launching point for librarians to create local learning outcomes and integrate more examples and activities related to social justice in their teaching. It could also serve as a catalyst for more conversation about information social justice within the profession.

6   Conclusion

It can be argued that higher education is a public good and, as such, educators bear a social and political responsibility to prepare their students to be active citizens in a democracy. Information literacy offers academic librarians an opportunity to participate in the educational mission of their institutions, and the *Framework* specifically offers pathways to integrate attention to social justice into library instruction. Certainly, the

frames, as well as the knowledge practices and dispositions that elaborate them, incorporate social justice themes upon which librarians can build. However, these themes are somewhat buried within the *Framework*, and could potentially be lost or overlooked if librarians choose to focus on more traditional skills and competencies. This article proposes a potential new frame of information social justice, which would surface issues of information power, structural inequities, and challenges to the status quo in a more concentrated and specific way than the current six frames. It is hoped that this new frame, whether ever adopted formally into the ACRL *Framework*, might serve as a spark to further conversation and action to address issues of social justice within information literacy instruction, and discussion of the purpose and place of social justice within academic libraries and higher education.

References

1. American Library Association. http://www.ala.org/advocacy/proethics/codeofethics/codeethics
2. American Library Association. http://www.ala.org/advocacy/sites/ala.org.advocacy/files/content/intfreedom/librarybill/lbor.pdf
3. American Library Association. http://www.ala.org/advocacy/intfreedom/statementspols/corevalues
4. Jaeger, P.T., Greene Tayler, N., Gorham, U.: Libraries, Human Rights, and Social Justice. Rowman & Littlefield, Lanham (2015)
5. Association of College & Research Libraries. http://www.ala.org/acrl/standards/ilframework
6. Saunders, L.: Regional accreditation organizations' treatment of information literacy: definitions, collaboration, and assessment. J. Acad. Librarianship **33**, 317–326 (2007)
7. Lumina Foundation. http://degreeprofile.org/press_four/wp-content/uploads/2014/09/DQP-web-download.pdf
8. Association of American Colleges & Universities. https://www.aacu.org/leap/essential-learning-outcomes
9. American Library Association Presidential Committee on Information Literacy. http://www.ala.org/acrl/publications/whitepapers/presidential
10. Sturges, P., Gastinger, A.: Information Literacy as a Human Right. LIBRI: Int. J. Libr. Inf. Serv. **60**, 195–202 (2010)
11. Association of College & Research Libraries. http://acrl.ala.org/ilstandards/?page_id=201#16
12. National Forum on Information Literacy. http://infolit.org/social-justice-and-civic-engagement-in-the-new-acrl-framework-for-information-literacy-for-higher-educationhttp://infolit.org/social-justice-and-civic-engagement-in-the-new-acrl-framework-for-information-literacy-for-higher-educationhttp://infolit.org/social-justice-and-civic-engagement-in-the-new-acrl-framework-for-information-literacy-for-higher-educationhttp://infolit.org/social-justice-and-civic-engagement-in-the-new-acrl-framework-for-information-literacy-for-higher-education
13. Battista, A., Ellenwood, D., Gregory, L., Higgins, S., Lilburn, J., Harker, Y.S., Sweet, C.: Seeking social justice in the ACRL framework. Commun. Inf. Literacy **9**, 111–125 (2015)
14. Swanson, T.: http://tametheweb.com/2014/07/07/information-as-a-human-right-a-missing-threshold-concept-by-ttw-contributor-troy-swanson/
15. Meyer, J., Land, R.: Threshold Concepts and Troublesome Knowledge: Linkages to Ways of Thinking and Practising within the Disciplines (ETL Project Occasional Report 4). http://www.etl.tla.ed.ac.uk/docs/ETLreport4.pdf

16. Beilin, I.: http://www.inthelibrarywiththeleadpipe.org/2015/beyond-the-threshold-conformity-resistance-and-the-aclr-information-literacy-framework-for-higher-education/
17. Houtman, E.: ACRLog. http://acrlog.org/tag/information-literacy-standards/
18. Wilkinson, L.: https://senseandreference.wordpress.com/2014/06/19/the-problem-with-threshold-concepts/
19. Nagda, B.R.A., Gurin, P., Lopez, G.E.: Transformative pedagogy for a democratic society. Race, Ethn. Educ. **6**, 165–191 (2003)
20. Freire, P.: Pedagogy of the Oppressed. Bloomsbury, New York (2000)
21. Giroux, H.: On Critical Pedagogy. Bloomsbury, New York (2011)
22. Giroux, H.: Neoliberalism's War on Higher Education. Haymarket Books, Chicago (2014)
23. Harper, V., Giroux, H.: Neoliberalism, Democracy, and the University as a Public Sphere. Truthout. http://www.truth-out.org/opinion/item/23156-henry-a-giroux-neoliberalism-democracy-and-the-university-as-a-public-sphere
24. Beatty, J.: http://www.inthelibrarywiththeleadpipe.org/2014/locating-information-literacy-within-institutional-oppression/
25. Tewell, E.: A decade of critical ınformation literacy. Commun. Inf. Literacy **9**, 24–43 (2015)
26. Lawson, S., Sanders, K., Smith, L.: The commodification of the ınformation profession: a critique of higher education under neoliberalism. J. Librarianship Sch. Commun. **3**, ep1182 (2015)
27. Drabinski, E.: Teaching about class in the library. Radical Teach. **85**, 15 (2009)
28. Drabinski, E.: Queering the catalog: queer theory and the politics of correction. Libr. Q. **83**, 94–111 (2013)
29. Drabinski, E., Hann, M.: Gendered s(h)elves. Women Environ. Int. Mag. **80**(81), 16–43 (2009)
30. Morgan, P.K.: Information literacy learning as epistemological process. Ref. Serv. Rev. **42**, 403–413 (2014)
31. Saunders, L.: Culture and collaboration: fostering ıntegration of ınformation literacy by speaking the language of faculty. In: Proceedings of the ACRL National Conference on Imagine, Innovate, Inspire, pp. 137–147. ACRL, Chicago (2013)
32. Saunders, L.: The future of ınformation literacy: a delphi study. Portal: Libr. Acad. **9**, 99–114 (2009)
33. Saunders, L.: Reframing the Framework: Information literacy Frames through a Social Justice Lens [Powerpoint slides]. http://www.educause.edu/sites/default/files/library/presentations/NC16/SESS03/Nercomp_2016_Reframing%2Bthe%2BFramework.pdf

Ideological Views, Social Media Habits, and Information Literacy

Stjepan Lacković[(✉)]

University of Applied Sciences "Baltazar" Zaprešić, Zaprešić, Croatia
stjepanlackovic@yahoo.com

Abstract. According to liberal political theory, democracy can flourish only to the extent to which its citizenry have free access to information, are able to reason well, and, consequently, are able to make reasonable choices. The advent of Web 2.0 had opened up new ways to access, share and publish information about politics. Hence, many have argued how Web 2.0 represents the ultimate realization of participatory democracy. On the other hand, new information technologies have enabled consumers to filter and select content they want to be exposed to, thus making it possible for people to deprive themselves of "cross cutting" content. This could lead to group fragmentation and political polarization which is in contradiction with the republican ideal of deliberative democracy. By conducting a survey on social media habits on Facebook, the author tested this thesis about polarization in the case of Croatian students.

Keywords: Deliberative democracy · Ideological views · Information literacy · Political polarization · Social media habits

1 Introduction

According to liberal political theory, democracy can flourish only to the extent to which its citizenry have free access to information, are able to reason well, and, consequently, are able to make reasonable choices [1]. On the other hand, we live in a world where mass media dominate over public sphere and where content is controlled by a few large corporate entities. In order to fight this threat, liberals propose education for democracy that will foster critical thinking [2]. In this context, information literacy, understood also as a sociopolitical skill [3], perfectly fits to contribution to the? liberal normative demand of "rational citizenship". Hence, not few authors have seen a connection between information literacy and active citizenship [4, 5] that supports the idea that "voters with information resources are in a position to make more intelligent decisions than citizens who are information illiterates" [6, p. 243]. The advent of the Internet additionally fostered liberal optimism since it opened up new ways to access, share, and publish information about politics. Consequently, the Internet was also seen to undermine the power of large media to control the flow of news and information. Hence, many have argued how the Internet represents the ultimate realization of participatory democracy since it provides connectedness and informational empowerment of political audiences [7, 8]. As Mitchell et al. showed [9], social media users usually turned to social networks, especially Facebook, to fulfil different types of information

needs. An important distinctive feature of Facebook is that political news that the user sees is impacted by the user's choice of friends and his/her past behavior. Therefore, if a user regularly comes across political news incidentally, this opens a question of his/her ability to freely choose or control information sources. For example, it is possible that the way people get information about politics to a lesser degree depends on a free and informed choice and much more on their or their Facebook friends' ideological views. Hence, the power of filtering that is enabled by new technologies could narrow people's horizons and may lead to political fragmentation or group polarization. There is a trend among scholars in the US to see a potential source of deepening of public polarization in social media consumption habits and patterns [10, 11]. If this is the case, that means that a user's social media habits limit his or her scope of information sources and his or her ability for critical thinking in a sense that their information sources just perpetuate and strengthen their ideological views. The main objective of this paper is to test this "polarization thesis" in the Croatian context, i.e. to explore whether or not are social media habits and activities of Croatian students related to their ideological views. In order to get results, I conducted a survey questionnaire among Office Management students at the University of Applied Sciences "Baltazar" Zaprešić, (N: 103).

2 Deliberative Democracy and Internet Democracy

According to deliberative democratic theory, political order in and political decisions made in a liberal-democratic society gain legitimacy only if citizens perceive civil and legal institutions as public forums of self-rule where debate is inclusive and where citizens can freely and argumentatively discuss things of common interest. Hence, some political decisions are treated as legitimate only if they result from free and unconstrained discussion by all people who might be impacted by the decisions. Finally, this normative demand, in ideal situation, implies that citizens are fully informed and capable for delivering and scrutinizing arguments. In order to realize this normative demand, a well-functioning democratic society demands a well-functioning public sphere that has to fulfil two basic roles: (1) to provide citizens with reliable, relevant, and valid information and, (2) to serve as a platform for democratic participation, discussion, and decision making process.

In his influential book, Structural Transformation of the Public Sphere. An Inquiry into a Category of Bourgeois Society (1962), Habermas described the rise of the bourgeois public sphere of 17th and 18th century. This public sphere was made of private people whose common critical reasoning involved forming a public that had influence on politics and was materialized in the media of that time, i.e. the press [2]. For democratic theory, Habermasian public sphere represents democratic ideal of functioning public spheres. Due to the structure of contemporary democratic societies, mass media that took the role of the public sphere. As some authors claim, this dominance of mass media over public sphere has resulted with mediocracy [12] which implies that public opinion and democratic consent can be manufactured or manipulated by media [13]. For theorists of deliberative democracy, "public" is more than just a media audience. As Dahlgren shows, Habermas' publics "exist as discursive interactional processes; atomized individuals, consuming media in their homes, do not comprise a public" [14, p. 149]. Hence, a mass mediated political

communication that took the form of political spectacle presents a real problem for "real" democracy.

Since the advent of the Internet, and especially Web 2.0, vast number of scholars have showed an interest in the implications that social media? could have on political processes and, more concretely, on political communication. According to van Dijk, three claims have been made in favor of digital democracy[1] in the last 25 years [15]: (1) that it improves political information retrieval and exchange between all actors and institutions involved; (2) that it supports public debate, deliberation, and community formation; and, (3) that it enhances participation in political decision making by citizens. Initially, so called "cyber-enthusiasts" expressed the hope that the Internet will have a positive impact on democracy since it empowers citizens with respect to information access and it gives them the possibility to use diverse communication channels for civic interaction. As observed by Breindl, "early enthusiastic accounts considered the Internet as an incarnation of the Habermasian public sphere based on rational discourse" [16, p. 53]. High expectations and initial enthusiasm about the Internet were partly due to observed voter apathy and disappointment of citizens with conventional party politics in many Western democracies [17]. According to Putnam, television is "the prime suspect" for civic disengagement and destruction of social capital in contemporary America [18]. Hence, the Internet was seen as a medium that will bring significant change to political life, as a positively subversive force that will challenge established power structures and dominance of mass media. Basically, cyber-enthusiasts accepted the assumption "that a medium such as Internet is democratic itself" [15, p. 2].

According to Tilly and Tarrow, the Internet was beginning to transform contentious politics and "reaching people through the Internet has become a favored means of mobilization" [19, p. 55]. According to Breindl, the Internet "is perceived as a medium that empowers resource-poor actors who can constitute counter-publics in order to contest the mainstream publics" [16, p. 45]. However, it was exactly through the paradigm of social movements that many authors tried to show influence of the Internet on increased democratic participation. Hence, for cyber-enthusiasts, the Internet is a platform that could create informed information, active discussion and debate, and a participative and mobilized citizenry.

On the other hand, there are also "cyber-sceptics" who oppose utopian visions of cyber-enthusiasts. They focus their attention to those aspects of Internet democracy that could pose a threat to democracy, from a digital divide[2] [20] online polarization [10], or to surveillance by the state at the expense of civil rights [21]. However, despite the fact that there is so many research on the relationship between the Internet and democracy, it is still not clear whether or not "cyber transformation of the public sphere" [14] advances democracy. In this article I discuss a specific perspective that focuses on the fragmenting potential of new information and communication technologies [10, 11, 22, 23].

---

[1] Digital democracy can be defined as "the pursuit and the practice of democracy in whatever view using digital media in online and offline political communication" [15, p. 3].

[2] A gap between those "online and off line that falls along socioeconomic, ethnic, racial, and gender lines".

3   Internet Democracy and Online Polarization

A unique characteristic of the Internet is its Janus-faced nature regarding possible outcomes with respect to material to which people are exposed. On the one hand, the Internet has definitely allowed people to be exposed or to have access to content that otherwise would not be possible. As I already mentioned, reliable, relevant, and valid information is a precondition of a healthy democracy. On the other hand, new information technologies have enabled consumers to filter and select content they want to be exposed to, and make it possible for people to deprive themselves of "cross cutting" content[3]. The power of filtering causes selective exposure that may lead to political fragmentation or group polarization. Namely, polarization is "indicated by a gap between groups that is increasing over time" and is characterized by "a large number of people taking extreme opinions, and a small number of moderates" [23, p. 3].

In his influential book, Republic.com 2.0, (2001) Cas Sunstein advocated for a deliberative conception of democracy, arguing that polarization is in contradiction with the republican ideal of heterogeneity. Hotereogeneity is understood to be a creative force that improves deliberation and produces better outcomes [10, p. 35]. Sunstein claimed that, in a system where each person can "customize" his/her information sources, there is a danger that people will make decisions on partial information, i.e. they will deprive themselves of other important information. Hence, people will form their free choices after exposure to filtered information that will limit the range of options available [10, pp. 44–45]. Sunstein concluded that "it will be difficult for people armed with such opposing perspectives to reach anything like common ground or to make progress on the underlying questions" [10, p. 57].

There are also surveys were used to test a "polarization thesis" that resulted in different conclusions [24]. According to the 2004 survey conducted by the Pew Research Centre for The People & The Press, "the Internet contributes to a wider awareness of political arguments", and "internet users are not insulating themselves in information echo chambers. Instead, they are exposed to more political arguments than non-users" [26, p. i]. Authors of the survey concluded that "fears that the use of the Internet might hurt healthy democratic deliberation are not borne out by online behavior" [26, p. i].

The polarization thesis could be applied to the whole range of Web 2.0 applications that are based on social networking, collaborative creation, and sharing of content. Hence, there are studies dealing with polarization on blogs [22], on Twitter [27], and Facebook [25]. A survey conducted by Mitchell et al. shows, for the majority of young people in America, news on Facebook provided most of information upon which they based their judgments about political issues [28]. According to Pew Research [29], among Millennials in America, Facebook was by far the most common source for political news. Same research shows that 61% of Millennials get political news on Facebook and 37% from local TV. Among Baby Boomers, it is 39% from Facebook and 60% from local TV.

As with other social media, Facebook has the potential to expose individuals to diverse political or ideological views and attitudes, but it also has the potential to limit exposure to opposite views and "cross cutting" content. Hence, the question is whether or not Facebook

---

[3] Cross cutting content refers to "content with an ideological bent that is shared by, for example, a liberal, and then is consumed by a conservative, and vice versa" [24].

drives political polarization, i.e. drives users into "filter bubbles" and perpetuates "online homophily."[4] According to a 2014 Pew Research survey [30], polarization has increased relative to levels seen in recent decades in America. On the other hand, authors of recent research on online polarization on Facebook [31] concluded that much of what users see is algorithmically curated, but also that algorithms play a limited role in filtering political news. They claimed that individual choices or signals that users give to the algorithm have a larger role in limiting exposure to ideologically cross cutting content than intrinsic choices made by the filter. They concluded that the composition of our social networks is the most important factor that limits cross cutting of the content in social media [31]. Authors claimed that other forms of social media, such as blogs and Twitter, exhibit different patterns of online homophily because they base their ties primarily upon common topical interests. On the other hand, Facebook ties reflect many different offline social relations, like those originating from school, family, work, friends, and other social activities. These different social relations happen to be fertile ground for fostering exchange of cross-cutting content [31]. Hence, the point is that social networks (first offline and then online) shape our media exposure, which in the case of Facebook could go in favor of exposing individuals to diverse political news.

Another important aspect is that Millennials on Facebook tend to stumble upon political information rather than seek it out, both online and off-line [33] meaning that they more often come across political information when actually their intention was something else. Finally, another important aspect of this influence of social networks on our media exposure is the level of trust in media. According to Turcotte et al., "social media recommendations improve levels of trust, and also want to follow more news from the particular media outlet in the future" [34, p. 529]. Furthermore, these effects are amplified "when the real-life friend sharing the story on social media is perceived as an opinion leader". Hence, news shared by a Facebook friend is more trustworthy than news received directly from the media outlet [34, p. 529]. The same result appears from marketing researches. For example, Ipsos' study reveals that "millennials trust user generated content (UGC) just as much as professional reviews. User generated content is also 20% more influential when it comes to purchasing and 35% more memorable than other types of media" [35]. These news-sharing interactions hold important implications for information-searching habits and for levels of media credibility [34, p. 529].

A great amount of literature on this topic deals particularly with the US, where the political system is quite specific and quite different from many European countries. Namely, the whole political life of the US is initially divided between Democrats and Republicans. On the other hand, Croatia has a multi-party system, hence, it is impossible to talk about Croatia as a polarized society. On the other hand, in a last few years Croatia has been witnessing so called "conservative revolution". This revolution has caused a "culture war" which is a metaphor related to disputes about basic values of society that are usually related to topics such as gay marriage, abortion, and sex education. What characterizes culture wars is that

---

[4] The tendency of individuals with similar sociodemographic, behavioural and interpersonal characteristic to associate with one another. According to McPherson et al., "homophily limits people's social worlds in a way that has powerful implications for the information they receive, the attitudes they form, and the interactions they experience" [32, p. 415].

they almost always follow the Schmittian friend-foe principle in politics, in other words, they lead to dichotomization of the political spectrum (right/conservative versus left/liberal) and consequently hinder the possibility of democratic deliberation. Therefore, taking into consideration the presence of a culture war in Croatian society, I believe it is worth testing the polarization thesis on the Croatian example.

4   Survey

The aim of this survey is to explore the way students of Office Management at the University of Applied Sciences "Baltazar" Zaprešić, (N: 103) use Facebook to inform themselves about politics and discuss political issues. Furthermore, the goal is to explore whether their ideological views affect their social media habits. Facebook is chosen since it is the most popular social network in Croatia. It has 1,800 000 users (45% of the total population), compared to 50,000 users of Twitter. I conducted the survey on the 12th and 13th of May, 2016, and students were given questionnaires during the class. First, in order to define their ideological views, respondents were asked eleven questions related to their ideological worldviews. These questions covered a range of political values including attitudes towards homosexual marriage, abortion, sexual education, immigrants, and national minorities. Additionally, they were asked for which party they had voted on the last three elections (local, presidential and parliamentary). The extent to which respondents offered left/liberal or conservative/right views across these various dimension was used as an indicator of their ideological view. Secondly, the survey determined (1) the sources they turned to in search of political news; (2) to which extent information from these sources matched their ideological views; (3) the extent to which they trusted to sources they turned to. Thirdly, it determined students' behavior on Facebook and to which extent this behavior was related to their ideological views. I was aware of all the weaknesses of this survey. The survey is limited because respondents retrospectively reported on their online behavior, i.e. they reported on what they thought they were doing online. It is a very small sample and it can only be representative for students of University of Applied Sciences "Baltazar" Zaprešić. Out of 103 students, 61 were female (59%) and 42 were male (40.7%). 54% of them were less than 25 years old. Regarding their ideological views, 26 belonged to a liberal camp (73% female and 26.9% male) and 23 to conservative camp (52% female and 47.8% male). These results show that women dominated in a liberal camp, which is not surprising since a good deal of conservative revolution is about defending traditional gender roles and fighting against right to abortion. With respect to age, there were no differences in both groups comparing to the distribution in the whole sample.

The survey showed that students were heavy users of social media: 60.3% used Facebook, 43.1% YouTube, and 17.2% used Web portals every day. According to the survey, 82 students out of 103 had a Facebook account. The survey showed that students were not abandoning TV for the Internet: 31.9% watched NOVA TV (commercial), 37.9% watched RTL (commercial), and 9.5% watched HRT (public) every day. When it came to information about politics, they turned to TV (around 20%), Facebook (18.1%), Web portals (around 14%) and YouTube (6.9%). These results differed from those from the US that said that majority of Americans turned to Facebook in a search for information about politics [9, 29].

In my opinion, this was due to the fact that Croatian users still perceived Facebook primarily as a medium for entertainment. This explanation is also supported by following results: the use of Facebook (from Min: 1 totally disagree to Max: 5 totally agree) for political purposes, (Mean: 1,91, Std. Dev.: 1,245) is clearly minor compared with other purposes, such as entertainment (Mean: 3,26, Std. Dev.: 1,393), family (Mean: 3,42, Std. Dev.: 1,383), friends (Mean: 3,22, Std. Dev.: 1,343). Furthermore, a majority of respondents show quite strong distrust toward all media when it came to information about politics. However, they trusted TV channels (around 32%), Web portals (19%), YouTube (7.8%), while only 4.3% of respondents replied that they trusted political news on Facebook. This high level of distrust was in line with research that reported on the significant decline in public trust towards the news across media in Croatia [36]. However, low trust in Facebook as a source for political information showed another difference from the US, since surveys [34, 35] showed that Americans trusted more content that was shared on social networks. I believe this result again can be explained by the way students perceived Facebook as a medium for entertainment and not as a serious and credible source for information about politics. This explanation was also supported by following results: only 4.3% of liberals claimed that Facebook was the most important media through which they got political news, 21% claimed it was important, and 52.2% claimed it was not important at all; 0% of conservatives claimed that Facebook was the most important media through which they got political news, 16% claimed it was important, and 50% claimed it was not important at all. Hence, more liberals than conservatives said that Facebook was an important source for political news, but both percentages were pretty low.

As Table 1 shows, conservatives more often than liberals (for 8.1%) unfriended someone because of political attitudes expressed on Facebook, searched for political groups (for 7.9%), saw themselves as leaders in debates (for 20.7%), shared political articles (for 4.0%). On the other hand, liberals "liked" political articles more than conservatives at 4.7%. These results showed that conservatives were more active on Facebook regarding politics. I explain this by the fact that conservatives initiated the "conservative revolution" that caused the "culture wars" in Croatia and are at the moment more active on all fronts. These results also showed that conservatives better than liberals understand the power of Facebook for dissemination and propagation of their ideas. Furthermore, more (10%) liberals than conservatives say that they preferred seeing articles that shared their ideological views and fewer liberals than conservatives (10%) said that they read articles on Facebook that did not share their ideological views. These results showed that conservatives were slightly more liberal than liberals. Secondly, it was hard to conclude from these results that they lived in "filter bubbles" since interpretation in this case would resemble the question whether the glass is half full or half empty. Finally, only 8 to 9% of both camps claimed that their Facebook friends shared their ideological view which probably means only that this issue was not a focus of their interests [37]. As noted in Ilišin, this has been a permanent trend in Croatia since the beginning of transition [37]. Furthermore, results also showed that almost half of both conservatives and liberals tended to stumble upon political information on Facebook rather than seek it out, which means that they did not see Facebook as a primary source for political information.

Table 1. Student behavior on Facebook

Facebook behavior	Conservatives	Liberals
Unfriended someone because of ideological views expressed	25.5%	17.4%
I prefer seeing an article that shares my ideological view	16.6%	26.0%
Facebook friends share my ideological view	8.3%	8.7%
I search for political groups	16.6%	8.7%
I see myself as a leader in debates	25.0%	4.3%
I see political news when I am on Facebook for some other reason	41.0%	55.0%
I share political articles online	8.3%	4.3%
I "like" political articles	8.3%	13.0%
I read articles on Facebook that do not share my ideological view	66.6%	56.5%

5   Conclusion

Results of the survey showed that, although students at the University of Applied Sciences "Baltazar" Zaprešić were heavy users of social media, particularly Facebook and YouTube, they used it mainly for entertainment and quite rarely when they wanted to inform themselves about politics. Furthermore, results also showed a very low level of trust of news and information they got through Facebook. These findings were contrary to much research conducted in the US. When students wanted to inform themselves about politics, they still primarily used TV. Facebook was the second place but they showed great distrust of information on it. Hence, these students did not treat Facebook as a platform that could helped them become informed citizen, one of three important aspects of idealized Habermasian public sphere. There was also very low demonstration of the use of Facebook to achieve the second aspect of this ideal, discussion and debate. Only a few students led or participated in political discussions and few shared and liked articles or posted political comments. Hence, they did not perceive Facebook as a platform for political discussion and debate. I did not measure the third aspect of the public sphere, that of activation and mobilization, which was definitely a shortcoming in this study.

Secondly, considering the relationship between their ideological views and habits when on Facebook, it was hard to conclude that they lived in "ideological bubbles". Since their activity regarding commenting, sharing and liking political articles on Facebook was very low, it was hard to expect that their individual choices or signals they give to the algorithm would expose them strictly to content provided by like-minded friends. Hence, the polarization thesis was not proven primarily because of their low activity with respect to politics when on Facebook. To sum up, results showed that students predominantly used Facebook for entertainment, family and friends, and that news, especially political, was more incidental than a deliberate experience for them.

References

1. McNair, B.: An introduction to political communication. Fakultet političkih znanosti Sveučilišta u Zagrebu, Zagreb (2003)
2. Nussbaum, M.: Not for Profit: Why Democracy Needs the Humanities. AGM, Zagreb (2012)
3. Andersen, J.: The public sphere and discursive activities. Information literacy as sociopolitical skill. J. Documentation **62**(22), 213–228 (2006)
4. Correia, A.M.R.: Information literacy for an active and effective citizenship. https://www.researchgate.net/publication/228765129_Information_literacy_for_an_active_and_effective_citizenship
5. Jacobs, H., Berg, S.: Reconnecting information literacy policy with the core values librarianship. Libr. Trends **60**, 383–394 (2011)
6. Bawden, D.: Information and digital literacies: a review of concepts. J. Documentation **57**(2), 218–259 (2001)
7. Rheingold, H.: The Great Equalizer. Whole Earth Review, Summer (1991)
8. Dahl, R.A.: Democracy and its Critics. Politička Kultura, Zagreb (1999)
9. Mitchel, A., Gotfried, J., Killey, J., Matsa, K.E.: The role of news on Facebook. Common, yet Incidental. http://www.journalism.org/2014/10/21/section-2-social-media-political-news-and-ideology/
10. Sunstein, C.R.: Republic.com 2.0. Princeton University Press, Princeton and Oxford (2009)
11. Guerra, P.H.C., Wagner, M.J., Cardie, C., Kleinberg, R.A: Measure of polarization on social media networks based on community boundaries (2013). www.aaai.org
12. Meyer, T.: Media democracy: how the media colonize politics. Fakultet političkih znanosti Sveučilišta u Zagrebu, Zagreb (2003)
13. Herman, E.S., Chomsky, N.: Manufacturing consent: the political economy of the mass media. Pantheon Books, New York (1988)
14. Dahlgren, P.: The Internet, public spheres, and political communication: dispersion and deliberation. Polit. Commun. **22**, 147–162 (2005)
15. van Dijk, J.A.G.M.: Digital democracy: vision and reality. http://www.doc88.com/p-8905287751229.html
16. Breindl, Y.: Critique of the democratic potentialities of the Internet: a review of current theory and practice. Triple **8**(1), 43–59 (2010)
17. Clarke, A.: Exploiting the Web as a tool for democracy: new ways forward in the study and practice of digital democracy. World Forum for Democracy 2013. Issue Paper (2013)
18. Putnam, R.D.: Bowling Alone. The Collapse and Revival of American Community. Mediteran Publishing, Novi Sad (2008)
19. Tilly, C., Tarrow, S.: Contentious Politics. Oxford University Press, Oxford (2015)
20. Norris, P.: Digital Divide, Civic Engagement, Information Poverty and the Internet Worldwide. Cambridge University Press, Cambridge (2001)
21. Castells, M.: The Internet galaxy. Reflections on the Internet, business and society. Naklada Jesenski i Turk, Zagreb (2003)
22. Hargitai, E., Gallo, J., Kane, M.: Cross-ideological discussions among conservative and liberal bloggers. Public Choice **134**, 67–86 (2008)
23. Holmes, J.W., McNeal, R.S.: Social media, participation, and attitudes: does social media drive polarization? In: Deželan, T., Vobić, I. (eds.) (R)evolutionizing Political Communication Through Social Media. Information Science Reference, Hershey (2016)
24. Kim, Y.: The contribution of social network sites to exposure to political difference: the relationship among SNSs, online political messaging, and exposure to cross-cutting perspectives. Comput. Hum. Behav. **27**, 971–977 (2011)

25. Wihlbey, J.: Does Facebook drive political polarization? http://journalistsresource.org/studies/society/social-media/facebook-political-polarization-data-science-research
26. Pew Internet & American Life Project: The Internet and Democratic Debate (2004)
27. Conover, M.D., Ratkiewicz, J., Goncalves, F.B., Flammini, A., Menczer, F.: Political polarization on Twitter. In: Proceedings of the Fifth International AAAI Conference on Weblogs and Social Media (2011)
28. Mitchel, A., Killey, J., Gottfried, J., Guskin, E.: Social media, political news and ideology. Pew Research Center (2014)
29. Gottfried, J., Barthel, M.: How Millennials political news habits differ from those of Gen Xers and Baby Boomers. Pew Research (2015)
30. Mitchel, A., Gottfried, J., Kiley, J. Matsa, K.E.: Political polarization & media habits. Pew Research (2014)
31. Bakhsy, E., Messing, S., Adamic, L.: Exposure to ideologically diverse news and opinion on Facebook. www.sciencemag.org
32. McPherson, M., Lovin, L.S., Cook, J.M.: Birds of a feather: homophily in social networks. Ann. Rev. Sociol. **27**(1), 415–444 (2001)
33. Douglas, S., Raine, R.B., Maruyama, M., Robertson, S.P.: Community matters: how young adults use Facebook to evaluate political candidate. Inf. Polity **20**(2, 3), 135–150 (2015)
34. Turcotte, J., York, C., Irving, J., Scholl, R.M., Pingree, R.J.: News recommendations from social media opinion leaders: effect on media trust and information seeking. J. Comput. Mediated Commun. **20**, 520–535 (2015)
35. Knoblach, M.: Millennials trust user-generated content 50% more than other media. http://mashable.com/2014/04/09/millennials-user-generated-media/#pJXf0X4tIgq1
36. Vilović, G.: Ethical contoveries in globus and nacional. Politička misao, Zagreb (2004)
37. Ilišin, V.: Political participation of youth and politics toward youth: Croatia in European context. Politička misao **40**(3) (2004)

Employability and Workplace

How Is Information Literacy Related to Social Competences in the Workplace?

Anne-Sophie Collard[1], Thierry De Smedt[2], Pierre Fastrez[2],
Valèria Ligurgo[2], and Thibault Philippette[1(✉)]

[1] Center in Information, Law and Society, University of Namur, Namur, Belgium
anne-sophie.collard@unamur.be,
thibault.philippette@uclouvain.be
[2] Groupe de Recherche en Médiation des Savoirs, Université catholique de Louvain,
Louvain-la-Neuve, Belgium
{thierry.desmedt,pierre.fastrez,valeria.ligurgo}@uclouvain.be

Abstract. This article reports on a work-in-progress research on media and information literacy in teamwork and distance work environments. We introduce a theoretical framework that articulates the social and informational dimensions of media and information literacy in the workplace. Based on this framework, we propose a method for investigating the relationship between information literacy and work organization in distant teamwork. This method is illustrated by preliminary data from our ongoing research project. We conclude with a necessary redefinition of the concept of information.

Keywords: Information literacy · Digital and media literacy · Teamwork · Distance work · Social organization

1 Introduction

The digital turn in work environments involves changes in workers' media and information competences. Although competences are often linked to ideas of efficiency and performance, they also touch upon diverse dimensions of the digital turn. First, being competent is commonly seen as a factor of (e-)inclusion, not only within the organization, but also in the broader work environment, as today's collaborations within and across organizations are sustained through diverse information and communication technologies (ICT). Media and Information Literacy (MIL) [1] also has implications for well-being at the workplace: a lack of competence can create stress and frustration, and ultimately demotivation and isolation. Furthermore, ICT-supported work practices such as teleworking tend to blur the boundaries between work time and leisure time, professional life and private life, workplace and home. These new conditions also require a range of competences in order to be handled in an efficient and meaningful way. In this context, the LITME@WORK research project, funded by the Belgian Science Policy Office, proposes an interdisciplinary approach to study MIL in teamwork and distance work environments. The research team brings together sociologists and media and communication scholars to investigate the social and the individual dimensions of MIL.

Our research aims at providing deep knowledge on the informational, technical and social competences of workers in team and distance work environments.

Within the context of this project, this article proposes a theoretical and methodological framework for the analysis of the relationship between digital media uses and competences in new distant teamwork practices. Specifically, we examine how informational and social competences related to digital media and technology form an integrated literacy, and participate in the social construction of work organization. This work-in-progress framework is based on the literature on information literacy, digital literacy, media literacy and computer-supported cooperative work. Taking inductive approach, it is fed by data collected from interviews and observations on workers practices. This paper first explores the notion of media and information competence through a specific focus on the concept of information literacy. After presenting our method, it introduces a model crossing the different activities encountered in workers' practices and the dimensions of technology-supported distant teamwork.

2   Information Literacy

2.1   The Evolution of the Concept of Information Literacy

The concept of information literacy appeared in the 1970s in the field of library science and the context of US educational reforms [2, 3]. It was first described as a set of skills to identify one's information needs and to locate, evaluate and use information for problem-solving or decision-making [4]. Even if the concept referred broadly to work environments involving information resources, its initial application was mostly limited to libraries or private sector initiatives, such as information databanks and publishers [2]. In the 1980s, with the advent of personal computing, the concept of information literacy was used to describe the gap between the individuals who could manipulate those technologies efficiently to process, store or transmit information, and those who couldn't [2]. It therefore began to compete with others such as *Digital Literacy* or *Computer Literacy* [3], and to be used not only by librarians, but also by industry spokesmen, educators and communication researchers [5].

In the business field, information management became an important topic with the advent of information technologies [6] although, the first focus on information in this context was often limited to data management. With the development of multimedia networked information technologies, the requirements regarding traditional information skills (selection, interpretation or synthesis) extended to a broader range of data organized in systems designed to hide cues of its structure or its production context [6]. Gradually, within and outside libraries, the focus shift from specific text-based contents to a variety of sources [7, 8]. Information literacy also evolved beyond issues of information access, management or transmission, to include content creation skills [1]. Gradually, from being able to use various existing information systems, the information literate users came to be defined as capable of adapting themselves to their changing information environments. Considering information literacy as a set of survival skills feeding a lifelong learning process, some authors stressed the necessity to link information literacy to understanding, meaning and (learning) context [3, 9]. More broadly, mass media

analysts started to use the concept as well, to point to people's ability to liberate themselves from the institutionalized discourses of mass media [2]. In brief, the evolution in the use of the concept suggests a transition from procedural capacities in specific contexts (such as libraries) towards more general and adaptive competences and social participation or citizenship [3].

2.2 Information Literacy as Competences and Practices

Lloyd [10] argued that being information literate is not limited to possessing a set of fixed information skills, but also include mastering the information landscape. Therefore, information literacy can be defined as a socially situated information practice [10], involving "lifelong learning and professional development, and the ability to interact in the information society" [11]. While we agree that information literacy cannot be limited to a set of operational skills, we believe in the value of defining it as a set of competences. Shifting from skills to competences has the benefit of establishing a straightforward relationship between literacy and practices.

The concept of competence emerged as an attempt to reduce a gap between qualifications, defined as a set of techniques and know-hows recognized by a degree or a certification [12], and the reality of the job. The competent (as opposed to qualified) worker is able to "manage a complex professional situation" [13]. Rey [12] mentioned four inherent properties of the concept of competence: (1) the adaptability it confers to a person, allowing her to face unexpected situations efficiently; (2) its singularity which connects it to the personality and the history of the person; (3) the fact that one cannot observe a competence directly, but only its effects through the performance of an activity, and (4) the fact that it exceeds the simple possession of knowledge and know-hows to include the capacity to call upon them selectively to act in relevant ways in novels situations [14].

Based on this definition, the relationship between competences and practices can be described as follows. Practices are situated performances that are shaped by the affordances and constraints of the material and social resources of the site in which they unfold. Practices make the individual's competence manifest: her ability to make relevant use of the material and social resources of the novel situations she finds herself in, along with her own knowledge and skills. In this sense, information literacy can be interpreted both as a set of competences and as a set of situated practices.

2.3 Information Literacy as an Individual and Collective Accomplishment

In the analysis of complex socio-technical arrangements such as new work environments, where technologically-mediated teamwork and distance work have spread widely [15], the concept of information literacy cannot be limited to individual competences. While the ability to search, evaluate, produce, or organize information are often implicitly considered as skills of the individual, it is also necessary to take the collective dimension of information literacy at work into account [16, 17]. Considering information as endowed with meaning by users, and their management as a process of knowledge

creation [6], we include both the individual and the social construction of information in the definition of information literacy.

3   Research Goals and Method

We consider information literacy as an integrated set of informational, technical and social competences [18, 19] that underpin workers' collective activities. This theoretical stance is complemented by a methodological position that leads us to unveil the (individual and collective) information literacy of workers by studying their distant teamwork practices, which we view as a set of socially constructed and situated collective practices that make their competences apparent.

Our research aims at highlighting how our informants' informational work practices are not valuable in themselves but only in relation to the social organization they contribute to elaborate. We consider information literacy to be social in at least three ways: (1) it relies on social relationships and organization as resources for its expression and development, (2) it shapes social relationships and social organization, and (3) it is (at least in part) a collective accomplishment.

Specifically, we intend to examine the interdependencies between information literacy (considered as individual and collective competences) and the functioning of the team in distant (technologically mediated) teamwork practices; and between the informational and the social dimensions of the practices (and hence the competences).

The objective pursued in the LITME@WORK project is the very definition of the competences called for and developed by ICT-supported distant teamwork practices from the perspective of workers, based on field observation. We interview office workers about their practices and make observations in their work environments [20–22]. We have selected ten case studies of Belgian organizations involved in projects changing the way employees work in team and at a distance. Forty workers and twenty team managers will have been interviewed by the end of the study. The next section presents the structure of our main observation instrument: our interview guide. We will subsequently use data from preliminary interviews to illustrate how this instrument allows us to pursue our research goals.

3.1   Data Collection Method

Our interview guide is structured around a set of work activities related to distant teamwork. These activities were identified by reviewing the computer-supported cooperative work (CSCW) literature [23–26], which provides abundant observational research on collaborative work practices, aimed at designing novel (or redesigning existing) tools to better assist users in these practices. All of these technology-supported collaborative activities involve both social interaction between team members, and the mediation of technological apparatus, and are a potential venue for the expression of information literacy competences. We hypothesize the observed teams will vary in terms of the

relative importance and complexity of these activities, thereby determining how information literacy can affect teamwork practices and work completion (and vice versa). The selected activities are:

1. Authoring a document collectively;
2. Sharing a collection of documents;
3. Managing outgoing information;
4. Managing incoming information;
5. Using others to find information;
6. Making collective decisions regarding task distribution, team governance and roles, and overall team functioning;
7. Managing one's tasks in relation with others;
8. Planning a meeting;
9. Planning the team's activity;
10. Working synchronously in the distance with other team members;
11. Organizing one's workspaces for collaboration.

Each of these eleven activities is further detailed into up to eight dimensions of technology-supported distant teamwork, which are systematically accounted for in our interview guide. These dimensions allow for a fine-grained analysis of how workers are able to perform these activities. The necessary redundancy between activities and dimensions accounts for the intricate relationships between the technologically-mediated activities of distant teamwork. These dimensions are the following.

1. **Task management**. At the team level, it consists in the technologically-mediated management of the distribution of work activities among team members and their articulation [27]. At the individual level, it involves the use of technology to adjust one's task execution to the others' activities.
2. **Time management** touches upon how team members make use of technology to manage the time allocation, frequency, scheduling, and synchronicity of both the team's activity and the individual's activity in relationship to the team [31]. It includes the management of interruptions [32]: both when one interrupts others, and when one is accessible and can be interrupted by others [33].
3. **Space and distance management** is the management of the spatial properties of one's work environment at different scales: the spatial layout of one's local digital workspace [37], the proxemics of one's work place (for example who is working closest to whom), and the separation between work sites in teleworking [38].
4. **Information management** includes collective digital information production, as well as individual information authoring for the team, and information sharing (including the timing of sharing, the organization of shared resources, and the management of accesses to shared information). While the individual management of personal information has been extensively studied [21, 22, 28, 29], the individual management of shared information has garnered less attention [30].
5. **Awareness** is the understanding of the activities of others, which provides a context for your own activity [34]. Schmidt [35] highlighted how awareness was as a (too) broad concept that spans from a general awareness of the respective knowledge, expertise and social standing among team members, and of their respective location

and availability (or social awareness [36]), to a more specific awareness pertaining to tightly coordinated team activities, namely the practice and ability to coordinate by monitoring others as well as making one's own activity visible to others.

6. **Collective decision making** corresponds to the processes through which collective decisions are made with the support of information technology [39].

7. **Reflexive tool use** is one of two "meta" dimensions that involve the individual's ability to not only use information technology, but also reflect on the way information technology affects their work. It includes identifying one's technological needs, knowing how the affordances of different technologies meet them, selecting tools accordingly, appropriating them [40], and assessing their efficiency.

8. **Comprehension of "sociomatics"** is the second "meta" dimension. Contemporary information technology goes beyond the automatic processing of information (informatics), to encompass the automatic processing of social interactions (which we call "sociomatics"). The comprehension of sociomatics is the understanding the individual has of the social entailments of technology use. Examples include understanding how the choice of one tool for sharing information impacts access to information for each team member; or understanding how one's activity is visible to different people and how others can negotiate access to one's time through the use of a given tool [41].

3.2   Examples of Practices of Collective Authoring

As it is not possible to provide a detailed description of each dimension for each activity within the scope of this article, we will illustrate these dimensions for one activity: the collective authoring of a document (activity #1), with examples taken from two interviews from the exploratory phase of our data collection. These data are too scarce and anecdotal at this point to yield any result regarding the definition of media and information literacy in distant teamwork and its relationship to team functioning. Yet they allow us to showcase how our interview guide points to the (potential) role of information literacy in distant teamwork. Our first informant, whom we will call Oliver, coordinates a team of advisors in a vocational guidance center. Our second informant, whom we will call John, is a project coordinator within a research unit.

As far as task management is concerned, both teams manage the task of collective authoring sequentially. Collectively authored documents are created by one team member, who places it either on a shared network drive (Oliver), or a cloud-based storage volume (John), and works on it individually, before notifying another team member that they can contribute. Hence, from the perspective of time management, collective authoring only happens asynchronously. Regarding space and distance management, the socio-technical arrangements of both teams exclude the possibility of synchronous distant collaborative authoring: if team members need to co-author a document synchronously, they just work together on the same computer. On the other hand, asynchronous co-authoring is made possible by the shared distant storage of documents, irrespective of the distance at which team members work.

Information management differs between the teams. On Oliver's team, the network drive that hosts the shared documents is equally accessible to all team members. The

location of the document on the drive, its name and possible shortcuts, all follow rules that were decided collectively by the team. On John's team, the visibility and accessibility of each sub-folder and document is managed by the document or folder creator, depending on rights that were defined by their IT department.

Regarding awareness, Oliver's team members are notified they can work on the collective document by email or by face-to-face communication. They typically send a link to the document on the shared drive (instead of sending attachments that could overload their email server). John's team uses either emails or phone calls for such notifications, but to a lesser extent, as they expect coworkers to check whether the document has been edited (and by whom) on the cloud service's notification system.

As far as collective decision making goes, when collective authoring comes to an end in Oliver's team, the co-workers expect the team to agree on the final version, and to subsequently archive or delete the old versions files, but the cleanup is not always completed. In John's team, for each document, the final decision is the responsibility of one person (usually the project manager) who validates the final version.

The team members' reflexive tool use does not always appear clearly. When they contribute to a collective document, Oliver's team members either use Microsoft Word's revision mode, or create successive versions of the file with different names. It is unclear whether the respective uses of revision mode and file versioning is the result of a collective decision (with a preliminary reflection on the respective merits of these two affordances), of the sum of individual habits and competences, or of random contextual factors. Each of these situations would correspond to a different level of collective or individual literacy (from the highest to the lowest level). Future interviews will investigate this issue in further details. By contrast, the way their shared drive is organized was adopted as a result of collective trial-and-error practices, through which the team seems to have increased its collective information literacy.

Finally, the comprehension of sociomatics concerns the team's ability to balance the access to a maximum of shared resources and the ability to find previously produced documents. While John's team practices limits who has access to what, Oliver's team members, who have access to the whole shared drive, rely on their coworkers' support when they fail to find documents. Such occasions of failed document retrieval remind the team members that their shared server needs to be "cleaned" from old useless versions of finalized documents.

4   Conclusion and Perspectives

The concept of information literacy has evolved from a "documentary" perspective to a broader "generalist" approach. The information literate person is neither a librarian nor a library user, neither a student, nor a researcher, but an ordinary average worker.

Media and information literacy, taken as independent variable, appears to be the condition under which the use of information technology becomes good enough to ensure the development and performance of the individual and/or the team at work. In other words, the information literate worker is able to produce, retrieve and process information critically, relying on the workplace affordances and constraints. Their

informational practices enable efficient collective activity, and contribute to the constitution, maintenance and evolution of the organization, and to the fulfillment of its missions. As it empowers the worker to fully participate to the existence of the organization, information literacy contributes to social inclusion.

Information literacy only develops in concrete circumstances, highly dependent on the technological and anthropological environment within which the individuals are collaborating. The definition of literacy is therefore variable in quality (to what type of acts does it extend?), and in terms of levels (what is the degree of difficulty of these actions?). In this article, we proposed to measure these two orders of differences using a dual approach. The first step is to build an abstract grid of eleven activities by eight dimensions of technology-supported distant teamwork, allowing for detailed accounts of the intricate ways in which the collaborative activities of teams call upon both social relationships and technical affordances of media devices. The second step consists in conducting case studies in a sample of organizations practicing distant teamwork. Based on the results of observations and interviews, our goal is to draw a map of the intensity, frequency and complexity with which the individual and team act upon the technical affordances of media available to them to achieve the socio-informational functions (at large) that allow a due performance of their activities.

But defining and identifying the media and information literacy of people working remotely in teams cannot be reduced to producing a quantified inventory of the skills of workers. The research presented in this article, although it is not yet completed, already suggests at least two new theoretical issues affecting the concept of information.

The first issue arises from the acknowledgment that the "informational" exchanges between workers are crowded with things that, in reality, are not information, but communicative acts with pragmatic incidences on the way the members of the team are working together. The question is: what is the standing of the competences related to the practices of social regulation between the members of a team within a model of media and information literacy? How can one analyze, in terms of competences, the expressions of support, divergence, feelings, complicity or irony that are present in the uses of media and technology, but cannot be accounted for by the concept of information?

The second theoretical issue also calls the scope of the concept of information into question. It emerges as researchers consider the collective management of collections of data by a team. The ensuing observations unequivocally suggest to adopt the postulate that any information is information for someone. This implies that there is no information independently of a community of people who regard it as having a meaning, a purpose - albeit potential - and who dedicate themselves to secure its existence and accessibility, through shared memory or shared media. It is consequently necessary to redefine the concept of information itself, by adding to it a new property: the designation of the people or the communities that produce, acquire, use, secure and share it because they hold it to be relevant. Hence, information, in its generic form, does not only define the combination of a predicate to a subject (two-dimensional concept). Information, in the renovated sense, combines a predicate to an object by specifying for whom (three-dimensional concept).

References

1. Moeller, S., Ammu, J., Lau, J., Carbo, T.: Towards media and information literacy indicators. Background Document of the UNESCO Expert Meeting, Bangkok, Thailand, 4–6 November 2010. UNESCO, Paris (2011)
2. Behrens, S.J.: A conceptual analysis and historical overview of information literacy. Coll. Res. Libr. **55**, 309–322 (1994)
3. Bawden, D.: Information and digital literacies: a review of concepts. J. Doc. **57**, 218–259 (2001)
4. Koltay, T.: The media and the literacies: media literacy, information literacy, digital literacy. Media Cult. Soc. **33**, 211–221 (2011)
5. Demo, W.: The idea of "information literacy" in the age of high-tech (1986). http://files.eric.ed.gov/fulltext/ED282537.pdf
6. Mutch, A.: Information literacy: an exploration. Int. J. Inf. Manag. **17**, 377–386 (1997)
7. Doyle, C.S.: Information literacy in an information society: a concept for the information age. Diane Pub. Co., Darby (1994)
8. Snavely, L., Cooper, N.: The information literacy debate. J. Acad. Librariansh. **23**, 9–14 (1997)
9. Ambach, G.M., Bainbridge, W.L., Breivik, P.S., Eaton, J.S., Imig, D., Kilgore, S., Kuhlthau, C., Mika, J., Miller, R.D., Rogers, S.J., Wedgeworth, R.: Presidential Committee on Information Literacy: Final Report. American Library Association, Washington, D.C. (1989)
10. Lloyd, A.: Trapped between a rock and a hard place: what counts as information literacy in the workplace and how is it conceptualized? Libr. Trends **60**, 277–296 (2011)
11. Kirton, J., Barham, L.: Information literacy in the workplace. Aust. Libr. J. **54**, 365–376 (2005)
12. Rey, B., Carette, V., Defrance, A., Kahn, S.: Les compétences à l'école: Apprentissage et évaluation. De Boeck, Bruxelles (2012)
13. Le Boterf, G.: De la Compétence à la Navigation Professionnelle. Editions d'Organisation, Paris (1997)
14. Le Boterf, G.: De la compétence: Essai sur un attracteur étrange. Editions d'Organisation, Paris (1994)
15. Bruce, C.S.: Workplace experiences of information literacy. Int. J. Inf. Manag. **19**, 33–47 (1999)
16. Lloyd, A.: Working (in)formation: conceptualizing information literacy in the workplace. In: Proceedings of 3rd International Life Long Learning Conference, pp. 218–224. Central Queensland University Press, Rockhampton (2004)
17. Crawford, J., Irving, C.: Information literacy in the workplace: a qualitative exploratory study. J. Librariansh. Inf. Sci. **41**, 29–38 (2009)
18. Fastrez, P.: Quelles Compétences le Concept de Littératie Médiatique Englobe-t-il? Une Proposition de Définition Matricielle. Rech. En Commun. **33**, 35–52 (2010)
19. Fastrez, P., De Smedt, T.: Une Description Matricielle des Compétences en Littératie Médiatique. In: Lebrun-Brossard, M., Lacelle, N., Boutin, J.-F. (eds.) La Littératie Médiatique Multimodale. De Nouvelles Approches en Lecture-écriture à l'école et hors de l'école, pp. 45–60. Presses de l'Université du Québec, Québec (2012)
20. Malone, T.W.: How do people organize their desks?: implications for the design of office information systems. ACM Trans. Inf. Syst. **1**, 99–112 (1983)
21. Barreau, D., Nardi, B.A.: Finding and reminding: file organization from the desktop. SIGCHI Bull. **27**, 39–43 (1995)

22. Boardman, R., Sasse, M.A.: "Stuff goes into the computer and doesn't come out": a cross-tool study of personal information management. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 583–590. ACM, New York (2004)

23. Olson, G.M., Olson, J.S.: Research on computer supported cooperative work. In: Helander, M.G., Landauer, T.K., Prabhu, P.V. (eds.) Handbook of Human-Computer Interaction, pp. 1433–1456. North-Holland, Amsterdam (1997)

24. Olson, G.M., Olson, J.S.: Collaboration technologies. In: Jacko, J.A. (ed.) Human Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications, 3rd edn, pp. 549–564. CRC Press, Boca Raton (2012)

25. Grudin, J., Poltrock, S.: Taxonomy and theory in computer supported cooperative work. In: Kozlowski, S.W.J. (ed.) The Oxford Handbook of Organizational Psychology, pp. 1323–1348. Oxford University Press, New York (2012)

26. Grudin, J., Poltrock, S.: Computer supported cooperative work (2013). https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/computer-supported-cooperative-work

27. Schmidt, K., Bannon, L.: Taking CSCW seriously. Comput. Support. Coop. Work CSCW **1**, 7–40 (1992)

28. Jones, W.: Keeping Found Things Found: The Study and Practice of Personal Information Management. Morgan Kaufmann, Burlington (2008)

29. Jones, W., Teevan, J. (eds.): Personal Information Management. University of Washington Press, Seattle (2007)

30. Zhang, H., Twidale, M.: Mine, yours and ours: using shared folders in personal information management. In: Proceedings of the PIM 2012 Workshop. ACM Press, Seattle (2012)

31. Blandford, A.E., Green, T.R.G.: Group and individual time management tools: what you get is not what you need. Pers. Ubiquit. Comput. **5**, 213–230 (2001)

32. O'Conaill, B., Frohlich, D.: Timespace in the workplace: dealing with interruptions. In: Conference Companion on Human Factors in Computing Systems, pp. 262–263. ACM, New York (1995)

33. Reder, S., Schwab, R.G.: The temporal structure of cooperative activity. In: Proceedings of the 1990 ACM Conference on Computer-Supported Cooperative Work, pp. 303–316. ACM, New York (1990)

34. Dourish, P., Bellotti, V.: Awareness and coordination in shared workspaces. In: Proceedings of the 1992 ACM Conference on Computer-Supported Cooperative Work, pp. 107–114. ACM, New York (1992)

35. Schmidt, K.: The problem with 'awareness': introductory remarks on 'awareness in CSCW'. Comput. Support. Coop. Work CSCW **11**, 285–298 (2002)

36. Tollmar, K., Sandor, O., Schömer, A.: Supporting social awareness @ work design and experience. In: Proceedings of the 1996 ACM Conference on Computer Supported Cooperative Work, pp. 298–307. ACM, New York (1996)

37. Kirsh, D.: The intelligent use of space. Artif. Intell. **73**, 31–68 (1995)

38. Olson, G.M., Olson, J.S.: Distance matters. Hum-Comput. Interact. **15**, 139–178 (2000)

39. DeSanctis, G., Gallupe, R.B.: A foundation for the study of group decision support systems. Manag. Sci. **33**, 589–609 (1987)

40. Dourish, P.: The appropriation of interactive technologies: some lessons from placeless documents. Comput. Support. Coop. Work CSCW **12**, 465–490 (2003)

41. Hollan, J.D., Stornetta, S.: Asynchronous negociated access. In: McDonald, S., Waern, Y., Cockton, G. (eds.) People and Computers XIV - Usability or Else: Proceedings of HCI 2000, pp. 17–26. Springer, London (2000)

Information Literacy and Graduate Employability

Stéphane Goldstein[(✉)]

InformAll, 39 Esmond Road, London, NW6 7HF, UK
`sg@informall.org.uk`

Abstract. Employability is an increasingly important issue in higher education settings, and there is a strong case for a mapping of information skills and competencies against the expectations of employers. This paper addresses this need and provides an indication of how such information know-how, or information literacy, can make a valuable contribution to the employability and future careers of students as they move from higher education to employment.

Keywords: Information literacy · Employability · Workplace

1 Background and Research Design

This paper is drawn from a study undertaken on behalf of SCONUL, the Society of College, National and University Libraries, aimed at producing a graduate employability lens for their Seven Pillars of Information Literacy model [1]. The formulation of the lens provided an opportunity to investigate the expectations and needs of employers (across all sectors, private, public and not-for-profit), and to relate these to information literacy (IL). This is potentially important, because the concept of IL, and its relevance to the world of business, is not well recognised by enterprises.

The research was articulated around the following elements:

- Definitions of employability.
- A review of selected sources and frameworks, mostly from the UK, on how employability attributes are perceived by key stakeholders.
- An overview of how employability attributes are viewed in a perspective that is broader than the immediate requirements of employers and that recognises longer-term developments in working practices and behaviours.
- A brief consideration of the scholarly literature on IL in the workplace.
- Interviews with a small range of key players, who have agreed for their views to go on record: Helen Beetham, Consultant in Higher Education; Moira Bent, Faculty Liaison Librarian at Newcastle University; Bonnie Cheuk, Global Head of Knowledge and Collaboration at Euroclear; Lucy Hawkins, Career Consultancy Manager at University of Reading; and Mark Hepworth, Professor in People's Information Behaviour at Loughborough University.

2 Definitions of Employability

There is a significant body of literature that seeks to define, frame and illustrate the concept of employability. For instance, SCONUL's 2014 literature review [2] provides an overview of the material and arguments that characterise this area. The Higher Education Academy (HEA), in a guidance framework developed for the higher education (HE) sector [3], also references a wide range of relevant material. It recognises employability as a major strategic issue and provides a succinct and widely-used definition of employability [4]:

> "a set of achievements – skills, understandings and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy".

The Confederation of British Industry (CBI) explored and defined the notion of employability in 2007 and came up with a definition founded on a review that it undertook of then-existing literature, along with consultations with CBI members and others [5]:

> "A set of attributes, skills and knowledge that all labour market participants should possess to ensure they have the capability of being effective in the workplace – to the benefit of themselves, their employer and the wider economy".

But such definitions tend to be based on attainment of quantifiable job-related objectives. There is a broader perspective, and HEA also recognises that employability is not just about gaining employment. It therefore proposes a complementary definition:

> "Employability is not just about getting a job. Conversely, just because a student is on a vocational course does not mean that somehow employability is automatic. Employability is more than about developing attributes, techniques or experience just to enable a student to get a job, or to progress within a current career. It is about learning and the emphasis is less on 'employ' and more on 'ability'. In essence, the emphasis is on developing critical, reflective abilities, with a view to empowering and enhancing the learner".

In this view, employability should be seen less as a set of clear-cut attributes and more as a complex form of learning development. The CBI itself refines its own definition by stressing that employability is not just about a set of mechanistic skills:

> "The term 'employability' or 'employability skills' is used to refer to a set of generic softer skills such as self-management, teamworking and communication. Much work has been done in defining what employability means as well as in establishing a list of the competencies that are central to being employable. Although the term 'employability skills' is commonly used, it is evident from our research that employability is not solely concerned with the possession of a certain set of skills".

3 Employability Attributes: Employer Perspectives

Over the past few years, several organisations at the interface between higher education and employment have sought to explain the attributes and skills that contribute to employability. Most of these correspond to the more workplace-focused definitions of

employability, although some relate to broader notions, such as openness to new ideas and cultural awareness.

Building on its perception of employability, the CBI sets out a set of key workplace competencies [5]. These are broken down into a set of seven broad attributes: self-management; teamworking; business and customer awareness; problem solving; communication and literacy; application of numeracy; and application of information technology. A further factor, positive attitude, acts as a foundation for all these attributes. The CBI describes this as "a 'can-do' approach, a readiness to take part and contribute, openness to new ideas and a drive to make these happen".

There is a shared understanding of graduate employability between the CBI and the national bodies representing HE institutions and students, respectively Universities UK (UUK) and the National Union of Students (NUS) [6, 7]. These players recognise how important it is for students and graduates to understand the skills that employers value – and having the confidence to articulate this understanding when seeking to enter a very competitive labour market. The CBI attributes are perceived as significant both by universities and employers – although the former place more stress on research skills, managing complex information and critical thinking (all of which have a direct bearing on IL). A further, cross-cutting factor is entrepreneurship/enterprise, defined as an ability to demonstrate an innovative approach, creativity, collaboration and risk taking. The NUS emphasises that employability actually means more than skills: it also stresses the underpinning factor of a positive attitude, and underlines how knowledge is a vital component of what makes graduates employable – knowledge being closely associated to skills such as literacy and numeracy. A similar line emerged from the interview with Hawkins: many of the skills associated with employability are those which can also contribute to improving students' academic performance, for instance adaptability and resilience.

In addition to the categorisation deployed by the above reports, surveys of employers' and students' expectations can also provide important pointers to attributes associated with employability. This paper considered a range of such surveys, encompassing employers' attitudes to employment-related attributes among school and college leavers as well as graduates [8]; employers' perceptions of skills for young people leaving education at all stages, including HE [9]; skills and capabilities that employers consider important when recruiting new graduates [10]; attributes that undergraduates feel to be important for their post-university employment prospects [11]; and how employers rate the importance of different competencies, and also how they accordingly grade their graduate recruits [12].

What emerges from the perception of the various stakeholders is a picture of the employability attributes that are most commonly cited as being desirable. Two attributes are flagged up by all eight of the frameworks and surveys examined here: teamworking and communication (oral and written). Further desirable attributes recur in nearly all cases: problem-solving; planning and organisation; business/customer awareness and customer handling; numeracy; and IT skills. Other cited attributes of lesser importance include self-management and/or time management; analytical skills; literacy/use of English; and job-specific skills. Tellingly, information or digital literacies do not feature explicitly. Some of these attributes are sources of concern, in areas where employers

feel that employees, and not least graduate entrants to the labour market, fall short. These areas include business/customer awareness and self-management. And there are differing interpretations of these issues too; for instance, from a student perspective, fewer than a third of undergraduates believe that commercial awareness is a very important attribute.

4 Employability Attributes: Broader and Longer-Term Perspectives

As suggested above, there are further views of employability that look beyond the attributes reflecting employers' current expectations. Employability derives from complex learning, and is a concept of wider range than those of 'core' and 'key skills'; and it is not merely an attribute of new graduates: it needs to be continually refreshed throughout a person's working life [13]. Employability may even impact the lives of individuals beyond the confines of the workplace; it takes place in the context of lifelong learning processes dependent on the achievement of a range of literacies, including digital and information literacies. Employability would thus benefit from a more careful and critical definition, with "a need for further work to extend perceptions of employability beyond conventional careers services to include approaches to learning, programme design and engagement with employers" [14]. A further view suggests that graduate employability depends not just on attributes, capabilities and skills, but also on a range of commitments that graduates must make, on an ongoing, long-term basis, to lifelong learning and lifelong employability [15].

HEA, in its 2013 guidance [3], also makes it clear that it does not view employability merely in terms of preparing students for employment. It describes different models which recognise that employability should be concerned with helping individuals develop their self-awareness and self-belief, and preparing them to be good citizens and to contribute to the community and the broader economy. One of the best-known of these models [16] suggests that employability is associated with broader personal effectiveness.

Approaching employability through the prism of graduate identity is another way of identifying attributes that lie beyond conventional views of skills and competencies. Research undertaken with employers in East Anglia [17] suggests that performance is not the only criterion that employers take into account when assessing the potential in graduates; in addition, four key elements that characterise graduate identity are deemed to be very important: value, intellect, social engagement and performance.

A further and more specific approach to employability stresses the importance of career management skills, with an emphasis, for instance, on what graduates need to know in order to build and develop their own careers, and navigate their way through the ever-evolving and highly competitive world of work [18]. This implies the acquisition of both self-management skills (appraisal and knowledge of self, including values, abilities, aptitudes and interests) and career-building skills (such as finding and using information about labour markets, locating and applying for work, and creating professional relationships). As outlined above, employability implies that graduates need to

show a lifelong, proactive commitment. Success requires them to commit to display the foresight as well as the strategic, planning and social capabilities that would equip them for a lifetime of learning and work [15]. In her interview, Beetham argued that, given the changing nature of work, graduates require smart capabilities to help them wend their way through career paths that are often more complicated than would have been the case in the past; they increasingly need to be sophisticated in the way that they knit together and manage their careers and their lives. These are lifelong attributes that look beyond the requirements of any particular job. But there is evidence to suggest that new graduates may have a poor grasp of what is implied by career management; they often find it difficult to apply either to their own career development the sort of information know-how that they acquire in the course of their studies [19]. Hawkins reinforced this view during her interview, suggesting that, in their approach to identifying job opportunities, many undergraduates do not 'search smart': their ability to seek occupational information and data and their career planning ability are often weak, they have poor occupational awareness characterised by an uncritical approach to the use of employment-related resources, and a tendency to take the easy route.

Employability is not determined just by *current* factors; much of the employment environment is evolving rapidly and even radically, driven by emerging business models, technological change (not least through the impact of digital technologies), fundamentally new perceptions of the nature of work – and also influenced by political and economic factors. The world of work is becoming less secure, more casualised; more entrepreneurial; fragmented in terms of attention, tasks, work-time and work-space; multiple and hybrid; dislocated from traditional workplaces, often characterised by home working; and automated or at risk from automation [20]. In this context, factors relating to employability are unlikely to remain static.

The interview with Beetham elaborated on these points. The notion of working, and how people are valued for their labour, is changing – and with it, the elements that are likely to influence employability. This should therefore not be accepted as a given, immutable set of attributes handed down by employers and career managers, but instead should be considered in a way that is more open and less bound by established convention, paying heed to the views and experiences of emerging forms of business – including microbusinesses, which are generating a large proportion of the new types of jobs. Innovation and innovative, disruptive thinking should also feature more prominently – it is striking that there is relatively little mention of this in the frameworks described above (although it is recognised by the CBI as part of business and customer awareness and under the heading of entrepreneurship).

The UK Commission on Employment and Skills (UKCES) identifies the key drivers of change in the UK and globally which may impact the employment and skills landscape in England by 2020 [21]. It does not make any explicit reference to employability, but suggests the role that education, at all levels, would need to play in order to foster a refreshed balance of generic attributes that addresses new and evolving ways of working, that also addresses attributes such as resilience, social skills, intelligence, interest, responsibility, understanding and awareness; and the demand for generic skills such as

autonomy, initiative taking, problem solving, self-management, teamworking, flexibility/adaptability, communication (including inter-cultural communication), and media literacy.

5   Information Literacy in the Workplace

It is increasingly recognised that in the workplace, and more so than in academia, IL bears a strong relationship to factors driven by context and working environments, and that an approach based on defining a set of generic skills, as taught in educational/academic settings, is not always appropriate for addressing the multi-facetted requirements of employment. During his interview, Hepworth stressed this point: he spoke of an IL employability kaleidoscope, rather than a lens, to capture complexity of the different contexts. A 2014 review of IL in the workplace [22] concludes that the ability to make use of information in employment settings

> "contrast[s] with the focus on more formal search skills and finding information which has often been the case in IL education and which is unlikely to translate well into workplace contexts. The nature of the sources used in workplace and professional contexts also differs from sources emphasised in traditional (i.e. academic library-focused) IL education: in the workplace a much greater prominence is given to the use of people as information sources (for instance, colleagues, contacts) and relatively little use of libraries. The interpretation of IL as a narrow skills-based approach is criticised as being inappropriate for the workplace".

A further literature review [23], also undertaken in 2014, reaches similar conclusions, notably that although IL taught in HE is relevant during students' time at university, it does not always translate into useful workplace skills. The workplace is rather more 'messy' than scholarly learning environments, characterised by business challenges (and associated information needs) that are often less linear, less predictable and more open-ended, with requirements for employees to be more resilient and adaptable than they may have been used to during their time as students [24, 25]. Moreover, information needs are likely to vary according to different employee roles and levels of seniority within organisations; this added complexity reinforces the idea that IL in employment is highly context-specific.

The different nature of workplace information environments can be disconcerting for former students who come to discover the requirements and expectations of employment. In her interview, Bent explained how students may be thrown by the sudden loss of access to scholarly published material following their transition from higher education to employment. For such individuals, there is an imperative – which deserves to be recognised – to adapt rapidly to new and unfamiliar, non-academic information practices; and a corresponding need to prepare them for these changed circumstances. But on occasion, academic approaches to information may still continue to be relevant, and consequently, graduate recruits may need to develop working methods which recognise the balance to be struck by academic and non-academic information practices.

Notwithstanding this last point, much of the literature suggests that IL's contribution to employability should be driven largely by factors and requirements that reflect the reality of the workplace, rather than the particular exigencies of academic endeavour, and by the contextual nature of workplace information practices. Thus, Hepworth

suggested that relevant training and learning, whatever form this takes, should focus, pragmatically, on the benefits of acquiring information capabilities in terms of successfully reaching workplace objectives – so that employees can more easily relate to such capabilities [26]. Building on this, a useful definition of IL, as adapted for the workplace, summarises the relationship to employability [27]:

> "A set of abilities for employees to recognize when information is needed and to locate, evaluate, organize and use information effectively, as well as the abilities to create, package and present information effectively to the intended audience. Simply speaking, it is a set of abilities for employees to interact with information when they need to address any business issues or problems at work."

It is beyond the scope of this paper to examine in detail how IL is perceived and addressed within the workplace and in the context of specific professional environments. But a brief overview of selected sources provides valuable pointers. For instance, in their review, Williams *et al.* [22] usefully highlighted three broad sets of information-related capabilities that characterise workplace environments – and that might consequently be matched to employability attributes:

- Social, informal, contextualised processing of information: the capacity to learn about and handle information in ways that are specific to and influenced by different working environments; and by the social interactions that influence how information is shared and used [28].
- Transformation of information into knowledge: the contribution that the effective handling of information makes to the growth of organisational knowledge.
- Information creation, packaging, and organisation: in work environments where information tends to be less structured (and, as suggested above, 'messy') than in academia, the ability and capacity to manage different types of information can be challenging for employees.

Two of the interviews concurred with these ideas about context and the diffuse nature of workplace information. Cheuk stressed that this does not just reside on systems and tools, but importantly, is vested in the flows of knowledge that occur between staff members. Information is thus embedded in exchanges, in connections, in networks – and is very fluid, reflecting the ever-evolving and dynamic nature of such networks. Workplace IL should therefore address the complex and often informal web of organisational information and knowledge flows. IL training in workplace settings should seek to influence (i) the behaviour of employees, so that they may successfully exploit the information potential represented by these networks; and (ii) the ability of organisational leaders to foster a workplace culture and to enable systems that promote such flows. In his interview, Hepworth underlined the relevance of acclimatisation of employees to their business culture, allowing them to develop their information behaviours and practices accordingly; such acclimatisation takes place through daily social interactions, and also in reaction to physical environment, task-specific information tools and procedures.

Some of the literature also proposes models relating to employability – but builds on these by relating employability attributes to IL. In one useful categorisation [29], ten skills most useful in helping to define workplace IL were picked out and were matched against four of the five IL standards defined in 2005 by the Association of College and

Research Libraries (ACRL) [30]: (i) determining information need, (ii) accessing information, (iii) evaluating information and (iv) using information.

A further appreciation emerged from a US study which enquired about employers' expectations of prospective graduate employees' information know-how [31]. Across all types of enterprise, there was a general expectation that candidates must have the ability to search online, and to possess a range of baseline information competencies that include knowing how and where to find information online with minimum guidance; using a search strategy beyond the first page of Google results; and articulating a 'best solution' and conclusions from the information that was found. In most cases, employers placed a higher premium on candidates who exhibited openness to learning and natural curiosity. But at the same time, employers expressed concerns about relevant competencies which they felt graduates lacked, in particular (i) engaging team members during the research process, (ii) retrieving information using a variety of formats, (iii) finding patterns and making connections, and (iv) exploring a topic thoroughly. Hawkins made a similar point during her interview, suggesting that employers expect their graduate recruits to work smart, and to have the ability to find resources.

6   Conclusion

Graduate employability is a well-recognised concept among stakeholders at the interface between higher education and employment. This is demonstrated by the range of statements, frameworks and surveys by interested parties such as the CBI, by the extent of the literature in this area, and by the positions and practices adopted by universities. There is a broad consensus about the relevance of employability to undergraduates and the need for universities to play a role in preparing them for professional life, and more broadly for managing their long-term careers. However, few of these positions refer in any way to IL or even to digital literacy. This is rarely recognised as a term in employment settings – which reflects its relative absence as an explicit feature of employability frameworks – but that it is inherent in, and important for, a wide range of workplace-related behaviours and practices.

The challenge for any model that seeks to chart the relationship between IL and employability is therefore to tease out the employability attributes that can be most closely aligned with IL. Drawing from our analysis of employability frameworks, employer-related survey results and inferences from the literature on workplace IL, it is suggested that the interface between IL and employability attributes fall under five broad headings:

- Business and customer awareness: keeping proactively informed about the practices, expectations and goals of employers; the dynamics of the workplace; the evolving nature of the business environments in which enterprises operate and the needs of customers and users. This requires an ability to seek out, interpret, share and present information/data which exists in many forms, and which tends to be specific to given business environments. New graduates, with little or no experience of employment, may find this attribute challenging, and employer surveys suggest that there are

concerns about graduates' often poor grasp of the business environment and what this entails.

- Coping with workplace complexities: understanding that the information needs of enterprises are complex, often messy and largely determined by the nature of their services, products and organisational cultures. Adaptability is therefore important to cope with a context-specificity that varies from enterprise to enterprise.
- Analytical skills and problem-solving: using, handling, interpreting and analysing information/data, to resolve business questions and problems. This bears some similarity to the skills and competencies necessary in higher education – but the key distinction is that, in the world of employment, such know-how is deployed for the purpose of providing practical, timely, innovative and cost-effective solutions to meet organisational goals.
- Ability to work socially: making use of people (colleagues, associates, clients and others) and teams as valuable sources of organisational information and knowledge; and sharing information as appropriate. This implies an aptitude to work collectively and to network imaginatively, seeking and obtaining information, and tapping into corporate knowledge, in ways which may be less formal and more diffuse than is the case in student settings.
- Career management and lifelong learning capacity: keeping informed about career opportunities, the evolving nature of work, and the adaptability and resilience needed to cope with that, as a means of charting career paths and defining lifelong learning and self-development preferences.

References

1. SCONUL: A Graduate Employability Lens for the SCONUL Seven Pillars of Information Literacy (2015)
2. Wiley, M.: A Review of the Literature on Current Practice in the Development of Employability Skills. SCONUL (on behalf of the SCONUL User Experience and Success Strategy Group) (2014)
3. Cole, D., Tibby, M.: Defining and developing your approach to employability: a framework for higher education institutions. Higher Education Academy (2013)
4. Pegg, A. et al: Pedagogy for employability. Higher Education Academy (2012)
5. Confederation of British Industry (CBI): Time Well Spent: Embedding Employability in Work Experience (2007)
6. CBI/Universities UK: Future Fit: Preparing Graduates for the World of Work (2009)
7. CBI/National Union of Students: Working Towards the Future: Making the Most of Your Time in Higher Education (2010)
8. CBI: Gateway to Growth – CBI/Pearson Education and Skills Survey 2014 (2014)
9. UK Commission for Employment and Skills (UKCES): Employer Skills Survey 2013 (2014)
10. Archer, W., Davison, J.: Graduate Employability: What Do Employers Think and Want? Council for Industry and Higher Education (CIHE) (2008)
11. GTI Media Research: Great Expectations: How Good are Universities at Making Their Students More Employable? (2013)
12. National Association of Colleges and Employers (NACE): Job Outlook 2013 (2012)

13. Yorke, M.: Employability in Higher Education: What It is – What It is Not. Higher Education Academy and ESECT (Enhancing Student Employability Co-ordination Team) (2006)
14. Beetham H., McGill L., Littlejohn A.: Thriving in the 21st Century: Learning Literacies for the Digital Age (LLiDA project), Jisc (2009)
15. Chatterton P., Rebbeck G.: Technology for Employability, Jisc (2015)
16. Knight, P., Yorke, M.: Learning, Curriculum and Employability in Higher Education. Routledge Falmer, London (2004)
17. Hinchliffe, G.W., Jolly, A.: Graduate identity and employability. Br. Educ. Res. J. **37**(4), 564–584 (2011)
18. Bridgstock, R.: The graduate attributes we've overlooked: enhancing graduate employability through career management skills. High. Educ. Res. Dev. **28**(1), 31–44 (2009)
19. Goldstein, S.: Transferring Information Know-How: Information Literacy at the Interface Between Higher Education and Employment. InformAll (2014)
20. Beetham, H.: Deepening Digital Know-how: Building Digital Talent. Jisc (2015). (not yet published at the time of completing this paper)
21. UKCES: Horizon Scanning and Scenario Building: Scenarios for Skills 2020 (2010)
22. Williams, D., Cooper, K., Wavell C.: Information Literacy in the Workplace – An Annotated Bibliography. Robert Gordon University, Institute for Management, Governance and Society (IMaGeS), in association with InformAll (2014)
23. Inskip, C.: Information Literacy is for Life, not Just for a Good Degree: A Literature Review. CILIP (2014)
24. Lloyd, A.: Building information resilient workers: the critical ground of workplace information literacy. What have we learnt? In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 219–228. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_28
25. Mutch, A.: Information literacy: a critical realist perspective. In: Bruce, C., Candy, P. (eds.) Information Literacy Around the World: Advances in Programs and Research (2000)
26. Hepworth, M.: Information literacy in the workplace – generic and specific capabilities. In: Duckworth V., Ade-Ojo, G. (eds.) Landscapes of Specific Literacies in Contemporary Society, pp. 78–86 (2014)
27. Cheuk, B.: Delivering business value through information literacy in the workplace. Libri **58**(3), 137–143 (2008)
28. Lloyd, A.: Working (in)formation: conceptualizing information literacy in the workplace. In: Proceedings of 3rd International Lifelong Learning Conference, 13–16 June 2004, pp. 218–224. Central Queensland University Press (2004)
29. Klusek, L., Bornstein, J.: Information literacy skills for business careers: matching skills to the workplace. J. Bus. Financ. Librariansh. **11**, 3–21 (2006)
30. American Library Association: Information Literacy Competency Standards for Higher Education (2005)
31. Head, A., et al.: What information competencies matter in today's workplace? Libr. Inf. Res. **37**(114), 74–104 (2013)

Are We Speaking the Same Language? Croatian Employers' IL Competency Requirements for Prospective Employees

Mihaela Banek Zorica[1(✉)], Sonja Špiranec[1], and Vjeran Bušelić[2]

[1] University of Zagreb, Zagreb, Croatia
{mbanek,sspiran}@ffzg.hr
[2] Polytechnics of Zagreb, Zagreb, Croatia
vbuselic@tvz.hr

Abstract. Employability is one of the main concerns of the European Union and the transition of graduates from higher education to the workplace is pushing agendas in front of higher education institutions. Research has shown that the educational sector and the employment sector usually lack common ground in understanding what other side can offer or expects. On the other hand, both sides often neglect the fact that the concept of information literacy competence is a fundamental generic competence which can fulfill the full potential of employability. Only after defining generic competences from the employers' viewpoint can we start defining the impact of information literacy on the development of these competences. The results of the study on Croatian employers defining five core generic competences have proved our initial concerns that both educators and employers are identifying the same type of competences but use different terminology. What is specifically missing is an understanding of the concept of information literacy and its influence on employability, and therefore, building national information literacy employability models is of great importance.

Keywords: Employability · Generic competences · IT sector · Information literacy

1 Introduction

Dialogue of employers and higher education in the role of practitioner production is usually poor where there is no mutual understanding of needs and offerings. Educational reforms in Croatia rarely focus on generic competences related to information literacy. Research on university syllabi [1] has shown that there is no general approach to the issue, but a partial incorporation of information competences in study programs by individual enthusiasts. Furthermore, research on employers' job advertisements [2] shows focus on official qualifications and neglect of the competences as an employment criteria. Still, a body of literature from the human resource management field, shows that competencies present the most prevalent method used to define ideal employees, and have thus become a fundamental part of talent management [3]. Furthermore, competency management enables effective hiring decisions and presents a common

language during the interview process [4]. Unfortunately, the emergence of various competency models actually deepens the communication divide between higher education and employers and consequently, also with the graduates. One of the possible solutions could be utilization of the information literacy models which are often avoided due to the employer's unawareness of their existence or misunderstanding of the term.

Employment sector and workplace research in Croatia has shown that there are a lot of valuable generic competences expected from new practitioners that could be mapped to information literacy models [5] which often prove to bring more value than their subject matter expertise. On the other hand, structured approach to information literacy requirements in the workplace such as the SCONUL employability lens [6] proves a necessity to define information literacy competences in a workplace context in order to bridge these communication gaps.

Current socio-political trends in Croatia are focused on connecting graduates with the employment sector. Therefore, our research of employers' position on generic competences they seek during the hiring process, and later mapping these competences with information literacy competences, is crucial for setting the basis for further development and for raising awareness.

Preparation for the research included understanding the role of generic competencies in the employability of HE graduate students in the field of ICT in Croatia. At the moment, in Croatia, there are 30 EU-funded projects on building the European Qualification Framework (EQF)/Croatian Qualification Framework (HKO) [7] competence-based curricula in HE, signaling the significant presence of a competence based approach in HE. The most popular and widely used core (generic competences/transferable skills/ employability skills) competence frameworks are European [8] and national, with accompanying generic competence frameworks [9, 10].

From an educational standpoint, on the other hand, the TUNUNG set of competences [11] is very popular and widely used. But when approaching employability issues, 31 generic competences defined in the Tuning project are exceedingly too many for operational use.

One of the oldest frameworks, giving an employability perspective is the OECD [12], developed with industry partners. It concentrates on three areas (using tools interactively, interacting in heterogeneous groups and acting autonomously), as well as reflectiveness as a core approach to building competences. From a wide variety of views and frameworks like [13–19], perhaps most recent and in a way most suitable, are UNESCO [20] and WEF [21]. Still, all of them, with their different approaches to generic competences clearly indicate that there is no silver bullet or one framework suitable for all purposes and contexts.

2 Higher Education and Graduates' Employability – The Croatian Case

Literature and recommendations on connecting the higher education sector with student employability are showcasing a strong theoretical background and requesting that higher

education align its programs with future strategies. Still, the definition of employability is multifaceted, and therefore, its implementation is not an easy task.

The term employability can be approached from different perspectives, but the common ground is that it is a combination of personal, educational and socio-economic factors. Yorke [22] defined it as "a set of achievements – skills, understandings and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations". Hillage and Pollard [23] suggest that it is "about being capable of getting and keeping fulfilling work but also to move self-sufficiently within the labor market to realize potential through sustainable employment." Similarly, McQuaid and Lindsay [24] conclude that it "is about a person's ability to get a job, maintain a job or change jobs, an ability determined by individual characteristics and circumstances, as well a broader external factors." Guilber et al. [25] on the other hand look at employability through socio-economic factors, stating that it is "directly linked to regional and national economic conditions". This aspect appears to be crucial for countries like Croatia where there is a high unemployment rate of young graduates. Sin and Amaral [26] in their research of collaboration between higher education and employers in Portugal present the influence of the financial crisis on graduates' employment, actually questioning the impact of higher education on employability. If there are not enough workplaces are employability competences important? Furthermore, in their study they have shown that employers are the "most absent stakeholders" in higher education, as their involvement in the development of the new curricula is almost non-existent; thus their understanding of undergraduate/graduate licenses or competences and learning outcomes is on a low level.

Still, the problem with employability and graduates, from an information literacy perspective, is that if we are only discussing the employability competences of graduates we are not seeing all of its aspects. It is certainly true that students have problems transitioning their competences from secure higher education settings to the unstable and insecure workplace setting. As Goldstein [27] points out "graduates often find it difficult to apply either to professional environments or to their own career development the sort of information know-how that they will have acquired in the course of higher education". In this context, the role of higher education certainly is "to equip students with the knowledge, skills and competences that they need in the workplace and that employers require; and to ensure that people have more opportunities to maintain or renew those skills and attributes throughout their working lives". It certainly does not equal employment but it enables graduates to find employment as well as it is supposed to help them keep their employment during their work years, and not necessarily in the same position or the same company.

We need to think more broadly and move the education of graduates towards developing lifelong employment abilities where information literacy comes on the scene. To state that one has developed employability competences means that they are enabled to sustain a job, advance or even change their work setting or that they have developed "information know-how".

Higher education graduates in Croatia face higher unemployment rates than young people with medium levels of education. Unfortunately, obtaining a higher education degree does not imminently lead to a more secure labor market position [28]. This is

partially a result of the 2008 economic crisis which has created great instability for young graduates regarding their employability. Curricular reforms, creation of the national qualifications framework based on the European Qualification Framework are still in their first phase. The qualifications registries are only being filled in and distinctions between subject specific and generic competences required could not be researched or concluded in this phase. The discrepancy between state strategies, policies and the situation onsite is huge. Job opportunities are scarce and therefore a well-defined information literacy competences framework becomes even more important.

Hence, the first step was to investigate employer insight into the generic and transferrable competences they expect from their employees in different stages of their employment. The purpose of the research is to develop a competency framework that can serve as a communication tool during the development of the curriculum, as guidance to graduates during their transfer between the higher education and the employment sector, and as a set of clearly defined competences for the human resource management sector during their employment process.

3   Methodology

Qualitative research was based on interviews with human resource managers from five top Croatian private sector companies during the one-month period of March 2016. These companies were chosen due to their high employment rates covering the telecom, financial and retail industries, with strong corporate IT departments and internal IT-driven business development. The hiring rate of these companies is, 10–40 per year quite big numbers for the Croatian industry field, and they have 150–600+ internal jobs with strong ICT competences. The company selection process was based on their long, corporate HR-driven culture which was perfect for spotting the requirements placed upon young employees, just arriving from HE.

One of the research questions was to investigate if and what generic skills are recognized as key elements of hiring young ICT professionals. The goal of the research was also to investigate employers' perception of the importance of generic competences vs. technical ones, in this particular research, ICT-related, required for their job position.

- R1: to investigate if and what generic skills are recognized as key elements of hiring young ICT professionals.
- R2: what are employers' perception of generic competences vs. technical ones, ICT-related, required for their job position.

Research was based on the grounded theory as it was not possible to simply apply or adapt any of the existing frameworks. From the research of the body of literature. proposed frameworks are either very socio-economical or even culturally bound (difference between western and eastern philosophy). Interviews were divided into two phases; first employers received a scenario, and second, based on their answers, they were asked questions about specific competences chosen from various competency frameworks.

This type of interview was chosen primarily as scenarios which offer a broad spectrum of answers and are related to real life problems, which is very similar to case studies usually utilized in the business sector.

During our scenario development we integrated the following questions:

1. When hiring a young (preferably first job) technical person, graduated from technical university for ICT related job, which generic competences you pay attention to and what is your hiring procedure.
2. Do you have a competence based management framework, growing people to fit company values and norms, and what are those competences or potential you are already looking at in hiring candidates.
3. How do you assess or recognize them, and can lack of one or more of them be an eliminating criteria.

After the first phase and the employer's explanation of their hiring procedure and generic competence requested, during the second phase, various lists and frameworks of generic competences from listed practice were shown and discussed for likelihood, similarity, or "I completely forgot to mention this one" situation.

All interviewees were highly senior positioned, three of them HR managers themselves, one accompanied with recruiting manager, and the other two companies were represented by senior hiring managers with 10+ years of working practice for ICT positions within the company. Four out of five companies have established a company values chain linked with job requirements on all levels of seniority. And they all clearly distinguish professional vs clerk or management positions. For professional positions specific expertise is required. In our case, we were considering wide ICT-related positions. All companies are running CBM systems for compensation and staff promotions, having yearly reviews and career development discussions, thus having excellent expertise not only in hiring practice, but further people development.

All interviews are recorded and authorized; some additional internal documents are acquired and all of them acknowledge findings. All of them were very open, enthusiastic and willing to help, because as one of them implied "we are in similar business of people development, you (meaning HE) are doing it just on larger scale, and we handpick them for further development".

The final stage of the research was the data analysis and coding process of the interviews in order to identify specific themes from the interviews and to create links, patterns or overlapping between identified competences.

4   Findings and Discussion on Employers' View of Graduates' Competences

The dominant characteristics of these interviewed companies is a strong inside people development practice. For the young professionals, they dedicate enough time, resources and manpower to mentor, train or send young professionals to specific education. One of their strong suits is their orientation to in-house training and building up all of the technical/ICT experts they are hiring, meaning that they are keen to invest in the

development of all the technical competences of their young professionals. During the employment process they are actually looking more into generic than subject specific competences as they are much more likely to hire young potential and develop that person internally than hire the expert on some senior position.

Hiring procedure is standardized and similar in all five companies. Candidates' CV are means of fulfilling the posted requirements and serve as the first filter. All candidates are then tested with more or less standardized employee assessments, which usually include cognitive ability tests and various personality assessments.

Only one company has prior defined and developed requirements for all positions (including needed competences), while the rest have general requirements. Nearly all develop job matching conditions in discussion with the line managers. So, sometimes even specific requirements or competences can be included in job posting. But always, after first round of interview with the HR personnel, line managers are included in staff selection.

Their role is to check technical abilities and requested knowledge and also to check how the candidate would fit in the existing organization, with already developed specific working culture and habits. The hiring manager is to check for personality extremes which can be a show stopper for hiring. When asked if it is common for a line manager to appreciate the level of technical expertise candidate can bring to a team and wants to employ a person, but the hiring manager recommends not to employ someone (because of personality issues), all the interviewees agreed. They explained that this is their main contribution to the hiring decision so the line managers always pays attention to their observations. Depending on other candidates and specific needs, sometimes they schedule another interview with a "problematic" candidate in order to make an appropriate decision. In general, their great experience tells us that ICT industry candidates may have appropriate or above average technical abilities but are sometimes lacking generic competences which makes them difficult to fit into existing teams.

The second round of interviews, where line managers are actively engaged, is a combination of technical expertise problem solving discussion showing experience of technical knowledge, and situational scenarios from which they both can assess needed general competences. The manager asks questions such as "How would you react …", "What would you do or decide …" in hypothetical situations, which are always based on real needs. This is the best way for both line and hiring managers to assess how a candidate would fit in. Based on these questions employers identified the following competences as crucial for employment: Teamwork, Communication, Adaptability/Flexibility, Positive attitude/initiative, Self-management/Goal orientation/Business awareness.

All interviewees agreed that finishing technical study and passing a cognitive test is a clear sign of having the core ICT competences they are looking for. Those candidates clearly had to have sufficient **digital competences**, but also **problem solving**, **critical thinking** and **analytical thinking** competences as well. These competences are considered gained through study, which is excellent feedback to Croatian HE.

4.1   Teamwork

In all interviews, clearly the most important competence is the ability to fit into the existing team – to be a team player, willing to contribute to the success of the team, and thus the whole organization. Organizations are big enough; most of solutions they provide are based on a kind of teamwork, not individual abilities. Even if they do have or need a specific technical expert, it is the team that provides the final solution. So, all interviewees are looking for clear signs of candidate's teamwork experience, co-operation, awareness of other teammate's needs and working habits, respect for others, and greater goal orientation, not individuals simply showing off.

4.2   Communication

Next, communication is very important for all interviewers, as it is closely connected with teamwork, which clearly demonstrate candidate openness and the ability to articulate their thoughts and feelings. "It is something we are always looking for, because it is inevitable – whether with colleagues, the boss, partners, clients, and others, good communication is an essential part of today's working environment". Communication also means presentation skills, often used in respected businesses, but four of them very clearly pointed out the ability to actively listen and understand others.

4.3   Adaptability/Flexibility

Openness to the new, acceptance to live and work in a quickly changing environment is easier for ICT students due to constant change of technology even during their five-year study period, but on the other side they are somehow, especially developers, seen as rigid, strictly following the rules. That is why this ability to quickly and fully adapt to organizational culture and new rules of work, and to be fully flexible because of ever changing business rules and environment is a clear #3 competence on this short list, everyone pointed out.

This competence is usually checked through situational questions asked by line managers and can be one of the eliminating issues if the candidate fails to recognize its importance. "When looking at newcomers, we assume they do have good technical abilities – they already finished university and passed cognitive tests, so it is far more important their openness to new, ability to learn new rules and procedures, sometime even new technologies, because they will not be immediately thrown in production. There is usually three- to six-month adaptation period when they will work with their mentor, do some tasks, simple project of their own just to get productive in new business environment".

4.4   Positive Attitude/Initiative

One thing which is seen through psychological testing is candidate attitude, and everyone was, in direct or indirect wording, appreciating and looking for candidates' positive attitude towards technology, the interview, the job - anything. It could also be

seen through initiatives, small projects the candidate did while studying, and the energy and optimism they bring to the table. A proactive approach and healthy motivation are very high on everyone's competence list.

4.5 Self-management/Goal Orientation/Business Awareness

The last competence mentioned is something all agree can be gained during the working period, but is also considered an advantage in hiring. It is the candidate's internal way of dealing with difficult situations or even stress during study, and the ability to manage, drive, and motivate oneself. Any kind of real business experience, not necessary in the company's field is always a good indicator of being able to look beyond technology towards real life expectations. This is never a disqualifying criteria but made the top five in the competence list.

When discussing different core or generic competence frameworks and adjacent study results on questions from [29] the "Graduates' employability skills" report, they all concluded that these competences are at least equal to or more important than technical skills; one of them even rated it at 70:30.

The need for checking these core or generic competences, especially five that arose from the interviews, is seen as a lack of Croatian higher education – "These things (competences) are not taught or practiced during their study. Our education system is rigid – fully content oriented, Bologna process made it even worse. Students are checked just for knowledge, never rewarded on mode, methods how they got the results, which is all the difference we need from them. Proper way of solving problems, working in teams, helping colleagues, … that is the only way to teach them to learn, be proactive, make difference".

On the other hand, when asked about their stand on generic vs technical competences, they were full of understanding for the transitional period of graduates "they are young, just finished university and it is normal for them to be fully focused on their study subject and its internal rules, and in the real world it is never that simple". That is the reason all of them consider generic competences, especially the five named ones, sometimes more important than pure technical expertise.

What is interesting is that in some cases the employer thinks that critical and analytical thinking as well as problem solving are well developed during studies, and on the other hand they think that the education is too rigid.

5   Conclusions

As the generic competences are differently observed in the state official documents from the ones requested by the employers', it was of great interest to identify competences employers expect from graduates in practice. Findings of our study show that information literacy competences, although not explicitly but implicitly emphasized by employers are considered as the foundational ones. Furthermore, its mapping with the SCONUL employability lens shows an overlap. The employers on one hand consider that during their higher education, the students are taught critical thinking well (i.e. how

to identify and evaluate information), but in practice, that they are too much oriented towards theory and lacking managing, planning, presenting and adaptability, or what could be mapped to the scope lens. The problem that still persists in Croatia is that both higher education and employers have identified the existence of the problem, but are not identifying and communicating them well. One of the solutions for this miscommunication between higher education and employers is the development of information literacy employability models and integrating them into the higher education curriculum, as well as promoting them to the employers in order to understand the possibilities and its application in the modern digital information environment.

References

1. Banek Zorica, M., Spiranec, S.: Assessment of the information competences in the study programs. In: Gómez Chova, L., López Martínez, A., Candel Torres, I. (eds.) INTED 2014 Proceedings, pp. 4439–4446. IATED Academy, Valencia (2014)
2. Pažur Aničić, K., Arbanas, K.: Right competencies for the right ICT jobs – case study of the croatian labor market. TEM J. Technol., Educ., Manag., Inf. **4**(3), 236–243 (2015)
3. Griffiths, B., Washington, E.: Competencies at Work: Providing a Common Language for Talent Management. Business Expert Press, New York (2015)
4. Wilton, N.: Employability is in the Eye of the Beholder: employer decision-making in the recruitment of the work placement students. High. Educ., Skills Work-Based Learn. **4**, 3 (2014)
5. Banek Zorica, M., Spiranec, S., Ogrizek Biskupic, I.: What is the employers stand on ınformation literacy – researching employers on expected generic outcomes of their future employees. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 673–682. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_70
6. Goldstein, S.: Graduate Employability Lens on the SCONUL Seven Pillars (2016). http://www.sconul.ac.uk/publication/graduate-employability-lens-on-the-sconul-seven-pillars
7. The Croatian Qualifications Framework Act. Official Journal of the European Unional Journal of the Republic of Croatia, no. 22/2013, p. 29 (2013)
8. European Parliament and Council of the European Union. Establishment of the European Qualifications Framework for lifelong learning - (2008/C 111/01). Official Journal of the European Union, November 2004, pp. 1–7 (2008)
9. European Council. Recommendation of the European Parliament and the Council of 18 December 2006 on key competencies for lifelong learning. Official Journal of the European Union, March 2002, pp. 10–18 (2006). http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:394:0010:0018:en:PDF
10. Croatian Employment Service. Croatian Employment Service - Questionary on Key Competences and Generic Skills (2016)
11. TUNING Educational Structures in Europe. Generic Competences (2006). http://www.unideusto.org/tuningeu/competences/generic.html
12. OECD. The definition and selection of key competencies - Executive summary. DeSeCo Executivee Summary, pp. 1–20 (2003). http://doi.org/10.1080/2159676X.2012.712997
13. Bartram, D.: The great eight competencies: a criterion-centric approach to validation. J. Appl. Psychol. **90**(6), 1185–1203 (2005). doi:10.1037/0021-9010.90.6.1185
14. Rutherford, J.: Key competencies in the New Zealand curriculum: development through consultation. Curriculum Matters **1**, 210–228 (2005)
15. CIPD. Annual Survey Report 2007: Learning and Development (2007)

16. Bowman, K.: Background paper for the AQF Council on generic skills, pp. 1–39, March 2010. http://www.aqf.edu.au/wp-content/uploads/2013/06/Generic-skills-background-paper-FINAL.pdf
17. Gallup. Employers' perception of graduate employability - Summary, p. 194, November 2010. http://ec.europa.eu/public_opinion/flash/fl_304_sum_en.pdf
18. OECD. Talent.oecd Competency Framework, p. 22 (2014). http://www.oecd.org/careers/competency_framework_en.pdf
19. CIPD. Competence and competency frameworks Factsheet (2015). http://www.cipd.co.uk/hr-resources/factsheets/competence-competency-frameworks.aspx
20. UNESCO. Transversal competencies in education policy and practice (Phase I) (2015)
21. WEF. New Vision for Education Unlocking the Potential of Technology, pp. 1–32 (2015)
22. Yorke, M.: Employability in Higher Education: What It Is - What It Is Not. Higher Education Academy, York (2006)
23. Hillage, J., Pollard, E.: Employability: Developing a Framework for Policy Analysis. DfEE, London (1998)
24. McQuaid, R.W., Lindsay, C.: The concept of employability. Urban Stud. **42**(2), 197–219 (2005)
25. Guilbert, L., Bernaud, J., Gouvernet, B., Rossier, J.: Employability: review and research prospects. Int. J. Educ. Vocat. Guidance **16**(1), 69–89 (2016)
26. Sin, C., Amaral, A.: Academics' and employers' perceptions about responsibilites for employability and their initiatives towards its development. High. Educ. 1–15 (2016)
27. Goldstein, S.: Transferring information know-how: information literacy at the interface between higher education and employment (2014). http://www.researchinfonet.org/wp-content/uploads/2014/09/Report-on-transferability-of-IL-beyond-academia-FINAL.pdf
28. European Commission/EACEA/Eurydice. The European Higher Education Area in 2015: Bologna Process Implementation Report. Luxembourg, Publications Office of the European Union (2015). http://eacea.ec.europa.eu/education/eurydice/documents/thematic_reports/182EN.pdf
29. Institute of Directors skills briefing. Graduates' employability skills, pp. 1–22, December 2007

How Groups Talk Information Literacy into Being

Andrew Whitworth[1(✉)], Maria Carme Torras i Calvo[2], Bodil Moss[3],
and Nazareth Amlesom Kifle[3]

[1] University of Manchester, Manchester, UK
drew.whitworth@manchester.ac.uk
[2] Universitetet i Bergen, Bergen, Norway
maria.carme.torras@uib.no
[3] Høgskolen i Bergen, Bergen, Norway
{bodil.moss,nazareth.amlesom.kifle}@hib.no

Abstract. A research project considered how groups make collective judgments about information in workplaces, employing a mapping methodology that raised judgments into collective awareness and 'talked them into being' as representations on a map. Recordings of conversations held during mapping sessions reveal the role of facilitation, and how facilitators and participants learned to use mapping to help make judgments about information and practices. Group judgments about relevance can be captured in ways that may remain hard to embed in information systems viewed only as technology, but nevertheless help embed these judgments in socio-technical systems.

Keywords: Relevance · Mapping · Communities of practice · Group judgments · Facilitation · Information literacy

1 Introduction

This paper reports on results from a project that investigated how groups make judgments about information in the workplace. The research did more than observe these communitarian, intersubjective processes, instead using a mapping methodology that actively intervened in and facilitated them. We discuss here how facilitated concept mapping thus impacted upon the information literacy practices of the group as a whole, particularly how the groups made collective judgments about relevance.

Harris [1] criticises typical, standards-based models of information literacy (IL) as being linear, individualised and largely based around studies of how higher education (HE) students find and make judgments about information [2, 3]. Harris observes that judgments about the relevance and validity of information cannot be wholly reduced to the subjective level. Communities share "displays of information and knowledge" and "specific or unique uses of language" [1, p. 248]. As a result, IL becomes defined within different community settings not as a generic set of skills and competencies but as context-specific practices [4]. In workplaces particularly, creation and use of the information are only rarely separated, and usage of information occurs in settings which are inherently social and intersubjective.

Information literacy therefore "shows itself in the activities of the community" [1, p. 250] rather than in how well an individual has adhered to standards and rubrics.

Nevertheless, Harris, though his critique is pertinent, does not transcend the notion that what is required is better IL 'instruction', delivered by librarians, intervening in formal education settings. Such interventions are less conceivable in workplace settings, where knowledge is less often transmitted through the medium of texts, being more nebulous. Information literate practices take many forms in these settings, connected with membership of social networks, appreciation of different practices, familiarity with people as sources, even the physical arrangement of offices and buildings [5]. The project reported on here therefore set out to investigate workplace IL through a quite different methodology than one oriented to understanding instruction and/or information retrieval; one that intended to reveal how group judgments can become embedded in sociotechnical systems and communities of practice. The view of IL used in this paper is very much one that sees it as manifested in practices, and the role of information practitioners to facilitate critical reflection on that practice [4]: hence, group judgments about relevance.

2 The Problem and Practice of Group Judgments

2.1 "Saracevic's Conundrum"

In his seminal review of the notion of *relevance* in information research, Saracevic notes a central "conundrum" [2, p. 2135], one that sheds doubt on whether more than a "weak" view of relevance can inform the *technological* design of information systems. The conundrum is: how can relevance truly be evaluated, and instantiated in a system supporting effective information retrieval, when the human judgments that must be captured are unstable and inconsistent?

The conundrum stems, in part, from the laboratory-style methods typically used to capture judgments of relevance. Such methods idealise and simplify the messy reality. Test subjects, invariably HE students or academics, conduct set-piece information searches and report on the criteria they used to judge whether retrieved texts are relevant or not. Yet this "does not take into account a host of situational and cognitive factors that enter into relevance assessments and that, in turn, produce significant individual and group disagreements" [2, p. 2132]. In a 1956 study by Gull [6], which attempted to investigate group judgments, a "Pandora's box" [2, p. 2134] was opened when different groups rated the relevance of information quite differently from each other, and even after being shown the judgments of others, would not change their own first impressions. For information retrieval research, the persistent conclusion was: never use more than a single judge per query [2, p. 2134].

Yet the reality of intersubjective, community-based judgments of relevance is not in question. In the work of authors like Wenger [7, 8] and Lloyd [4], the idea that individuals can be socialised into the literacy practices and judgments that are made in an organisational setting depends on the notion that at the very least, there are agglomerations of individual judgments that coalesce into relevance criteria that are then applied by community members. Practice-based views define IL not as individual competencies but as intersubjective agreements, through which the information landscape of the group or community is

continuously negotiated. The problem with Gull's study is that there is no evidence the groups he described were in fact *communities*; groups that identified as collectives, with shared learning needs [7].

Saracevic's conundrum is therefore not a challenge to the *existence* of these intersubjective processes, but of how to *raise the group's awareness of them, then capture them*. And it is important to capture them in ways that do not reify or institutionalise the judgments [7], but allow the community to scrutinise them, review them if necessary, and thus distribute authority over information practice across the group. Scrutiny of information practice is essential for integrating IL into workplace learning in ways that empower communities of practice, rather than take judgments about practice out of their hands [3], but these difficulties with both facilitating and capturing it have led to the conundrum Saracevic describes.

2.2   Alterity and Facilitation

Judgments about information relevance are not made 'once and for all'. Rather, they are dynamic and will change, over time, depending on the composition of the community and on changes in other sources that are themselves relevant. Thus, intersubjective judgments are dialogic [3, 9], based around the communications between group members that help meet shared learning needs. Yet as Wenger says [7], "no community can wholly design its own learning"; parochialism risks closing a community off from the fresh inputs it requires to keep its judgments dynamic, instead of reifying particular habits and routines. For this reason, "outsideness", what Linell [9] calls *alterity*, is an essential ingredient in the learning required to make dynamic information judgments.

This alterity is not that of the "instructor", informing communities about what judgments they should make. Instead alterity can be exploited through *facilitation*, raising awareness in group members about the criteria on which judgments are based. Facilitation includes specific acts of awareness raising, bringing into focus the reasons why judgments have been made by the group (or individuals within it) and allowing them to be scrutinised; this important step distinguishes this approach from Gull's, where results from one group were simply presented to others, without an attempt to create a dialogue between them and thus form a community. Facilitation can also play a broader role in creating a generally conducive environment, a culture of reflection and dialogue within the community [1, p. 250]. Elmborg [10] writes about how instead of seeing their role as one of IL instruction, librarians could adopt an 'activist' role *within* a community of learners, but even he does not take this argument to its conclusion: that the facilitator then integrally becomes a part of the community of practice and/or that a "fresh" community of practice can coalesce around the IL activity. There is also no reason to limit this role to the librarian.

3   The *Bibliotek I Endring* Project

3.1   Background and Setting

The setting and logistics of our project have been described before in more detail [11] and space here is limited, so only notes will be given. *Bibliotek i endring* (*Bie*) or "Changing Libraries" took place at two locations in Norway and ran from 2013-15, with

some data analysis still ongoing at the time of writing (May 2016). We worked with academic librarians facing significant changes to their professional setting (a merger of campuses at one location, a new Director at the other), to investigate how their information landscapes were collectively managed during the project. That we looked at academic librarians does not contradict the above-mentioned aim of taking IL research out of the library setting. These just happen to be the workplaces we studied; our methods are generalisable. In 2012 the methods were piloted with a housing co-operative and a group of academics and researchers; at the time of writing a funding bid is in preparation to continue the work with digital media developers.

3.2   Maps and Mapping

Group concept mapping was the core method by which intersubjective judgments about information were facilitated and recorded. As Cosgrove writes [12, p.7], mapping "involves sets of choices, omissions, uncertainties and intentions". All maps are *bounded* by judgments made about what should be considered for inclusion, and what is actually plotted on the map. Thus, creating a map requires the author(s) to make judgments about relevance. Maps are thus *generative means* [13, p. 228]: tools for exploring potentials within a landscape. What we could learn from the maps themselves about the information landscapes being dynamically created by these groups has already been discussed in [11]. Our aim in this paper is to focus on the *process* by which the groups "talked the map into being". The maps were a tool by which dialogue and, through facilitation, alterity were brought to bear in a collective attempt to represent the group's information landscape: the maps were "thinking spaces" [14, p. 7]. What evidence is there that *Bie*'s groups learned to use mapping as a tool that helped them make shared judgments about the relevance of information?

Bie's maps (for images see [11]) were created using Ketso (see www.ketso.com), a non-digital concept mapping tool. They depicted relationships between elements of the information landscapes. Staff from across the libraries worked together to define, then plot on the map, representations of the tasks they had to complete at work (which clustered around particular topics, such as user services, collections, user education and so on); the information they needed to complete these tasks; sources for this information; barriers to acquiring this information; actions to be taken; and priorities. Ketso maps use 'leaves' that represent the different elements of the landscape as noted above. These leaves can be written on, positioned on the map, moved and removed as the group see fit. The project maps thereby have *materiality,* they are objects to be interacted with physically, not just abstract representations [14, p. 229]. Adding concepts, revising them, removing them when a task is complete or a source is considered no longer relevant: these are practical manifestations of judgments about relevance and temporality (map creators must ask: is this process still ongoing, has it finished?). Thus the map is a *physical* as well as a social site of knowledge [4].

The session conversations were recorded; these are the qualitative data used in §4 below. Saracevic suggests [2, p. 2127] that we must look for the "clues… that people use in assessments of relevance". In this paper we seek these clues not from self-reporting, that is, interview or survey data in which participants tell the researchers, after

the fact, why they made particular judgments, but try to reveal them as they occurred, through recordings of the discussions which took place as group members developed then reviewed their maps. Six mapping sessions were held over a 12-month period at each location, referred to here as library A and library B. At each, two groups were formed that created and revised one map over the year. In the discussion below, these different sessions are referenced according to the following example: §4A2 means a discussion from the fourth session, library A, group 2. Note that for §6A only one group was formed.

4   Results

4.1   Facilitation

Groups were not simply given the mapping tool and asked to depict their information landscape. The role of the facilitators was crucial in helping the group talk the map into being and keep it updated as their work context evolved. Two members of the project team facilitated the sessions, referred to as facilitator A and B. Note that all participant names are anonymised, with pseudonyms randomly distributed by gender.

At the most basic level, facilitation helps "firm up" what is in the group mind and helps a concept be plotted on the map, or subsequently removed if it is no longer relevant. For example, from §4A2:

> *Facilitator A*: "So you did go to Voss?" [this was a map item that referred to a staff 'awayday' in the town of Voss].
> *Carol*: "Yes, that happened."
> *Facilitator A*: "OK, we'll take that off".

Participants frequently checked procedure with the facilitator, as in these two separate passages from §5B1 (the bold text in the second highlighting repeated requests for confirmation from this participant):

> *Luke*: Do the tasks need to be completely fulfilled to be removed?
> *Facilitator B*: No, not necessarily, but you might want to write new leaves as well, if the goal or the task has changed in some ways.
> *Jacob*: we can leave it on, because there will be some restructuring etc. **can I just leave it**?
> *Facilitator B*: Yes, but you could also add a comment.
> *Jacob*: Yes, but… we have a perspective of one year from now, **should I write that** on some kind of a note?
> *Facilitator B*: yes, take a square comment-note
> *Jacob*: I write time horizon of one year, or I say sept. 2015, **is that ok**?

Facilitators played other roles. A small but significant one was in creating a conducive environment for discussion, not just while the meeting was in progress, but through preparing the room beforehand, and even serving coffee during meetings. Facilitators compensated for and/or anticipated unavoidable limitations of the mapping process; for example, keeping the group to time (mapping discussions could not last indefinitely; most were timetabled as 90-min. slots in the work diaries of busy people). In §6A, facilitator A prompted the group to remove duplicated map elements as there was a need to create more space on the Ketso field.

Facilitators acted as *agents of scrutiny*, prompting group members to review every leaf on a map and making sure no regions were neglected. This neglect could happen for various reasons, beyond there simply being no perception of change in given areas of the landscape. For example, one recurrent issue which arose with mapping, and thus the question of whether group judgments of relevance could be truly made, was that at times, group members would act 'territorially', putting in most of the work in plotting or revising those areas of the map which were related to their particular areas of professional expertise. As Whitworth et al. [11] discuss, this is understandable at one level, as it acknowledges the specialised roles played by certain individuals. However, in principle the act of mapping was itself a way of opening up practices to scrutiny by other members of the group, but there were times when group members were reluctant to make adjustments to areas of the map that were seen as the professional territory of others, whether they were present at the meeting or not. In §4A2 there is a nine-minute passage of the recording where the discussion is almost exclusively between facilitator A and one participant, Dawn, who was library A's digital resources specialist. The region of the map being discussed is one where the facilitator says to Dawn, "your handwriting is all over this…", thus acknowledging that this is an area of the map mostly plotted and managed by her. However, as this section is reviewed, the discussion still contains some interjections and observations from other group members, and conversing with the facilitator (as opposed to just completing the review herself and in silence) ensures Dawn's judgments about the ongoing relevance of information sources and needs are not made *in camera*.

Finally, it is significant that there are times when the participants spontaneously adopt the role of facilitators. The following discussion from §6A shows how one participant, Fay, is persuaded by two others, Mary and Dawn, to lay on the map a leaf that represents an information need. She needs to know, from the operations team (a source) whether there have been changes to certain routines since the opening of the new merged campus library:

> *Mary*: You depend on Drift [Norwegian for 'operations']?
> *Fay*: Yes I depend on them, but I don't need to *know* anything.
> *Dawn*: Well, you need to know whether there are changes…
> *Fay*: Ok, I'll write "change of routines".

In §5B1, an external staff member (Frank) is brought in to the conversation to confirm that web sites will need updating due to new technology. This is done without facilitators' prompting; group members themselves determine that fresh input is required, and the boundaries of the community of practice are made temporarily permeable to new information. That is, Frank's input is considered relevant.

4.2 Learning to Use the Mapping Process

The mapping process was not just a representation of information literacy practices developed elsewhere, but was itself an IL practice. The group was learning to use this particular technique and tool to represent elements of the information landscape in these workplaces, and then to use the map to make decisions about practice, including evaluating the ongoing relevance of information sources and needs; setting priorities and

actions; and reviewing the impact on the information landscape of actions taken since the last meeting. Importantly, this learning community included the facilitators. While mapping had been piloted by the principal investigator prior to the start of the *Bie* project in summer 2013, this did not mean it came in as a fully-formed practice and was unchanged as the group learned to create and read the maps. All members of the group were continuously reviewing the relevance of the mapping process itself, and making adjustments to the practice where they could. In §4A2, facilitator A says at the beginning: "We're learning to do this as well, as we go".

An illustration of this was that group members came to recognise the limitations in the Ketso 'interface'. All maps use some form of symbolic representation to depict the landscape, and these representations, while they allow for the map to come into being, simultaneously simplify the complexity of reality. At the very start of §6A, while getting ready for the first activity of the session (plotting/reviewing tasks), Bill reflected on the fact that all Ketso "leaves" are the same size, and that it would be an improvement if more significant tasks could have bigger leaves:

> *Bill*: We should have something very big, to show how much time some things take, because some of these are tinier things we do, others take up 50% of our time, it doesn't show on one little leaf.

Bill recognises that Ketso maps do not represent *scale*, and that it would be a more effective aid to making judgments about the comparative relevance and priority of information if a scaling device were available. In a way, this is 'user feedback', as such a change could be introduced to the mapping tool to optimise it. But it was not feedback solicited by the researchers or facilitators, instead being spontaneous reflection that emerged as the map was talked into being.

Group members also noted occasions where the map itself constrained practice: meaning, not the technique, but the content, the way each map had evolved and been configured. Previous discussions about practice, the judgments about relevance made in earlier sessions, could be seen as limiting. Group A2 complained, both in §4 and §5, about the fact that "reorganization" and "moving" had become combined (in §1) as a *single* topic around which tasks, needs and sources clustered. Both were consequences of the campus merger in library A's institution, but where "moving" related to the physical move of books and equipment, "reorganisation" was a topic that related to the changes in jobs, management structures and so on which the merger also caused. Group A2 had combined these in their first session, but by §4, six months later, were concerned that this was confusing their judgments about relevance:

> *Mary*: Reorganisation and moving are on the same leaf, but are not the same thing…
> *Facilitator A*: I think we're OK to pick out the differences?
> *Dawn*: But "flytteprosjekt" [the project to physically relocate the libraries] isn't directly connected to the reorganisation.

In their next session participants returned to the same point. Carol defends combining the topics on the grounds that it separates them from others; the bold passages highlight how she perceives their depiction and proximity on the map as a way of helping to make judgments in this area of work:

> *Carol*: **they are put together here**, in my view it is because **they are things that are connected** with what is happening now in the organization. **They are not things that we normally work with** in a normal situation. It is a way to prepare the establishment of the new college.

These passages suggest that Carol and her colleagues are not just learning to map, they are also learning how the map depicts elements of the configuration of the information landscape, as they learn about how to manage the informational demands of this challenging period at work.

4.3   Knowledgeability

Workplace information literacy is not focused on searches for texts, but is constructed through groups continually, and dialogically, making judgments about *practices*. In library A this was brought into focus as the merger required staff to learn about, then reconcile practices that had developed on separate campuses. In Wenger-Trayner and Wenger-Trayner's term, they needed to exhibit *knowledgeability* of practices across the broader 'landscape' of this workplace [8, 11].

Whitworth et al. [11] considered the question of how the mapping process enhanced staff's knowledgeability of practices across this landscape with reference to the maps themselves and the feedback given by participants to the researchers, but did not make reference to the recordings of in-session conversations. It is worth referring to an exchange in §6A, which shows both how the mapping process highlighted the need for knowledgeability in this setting, and also shows how participants had learned to use the map as a tool to help resolve a dispute. The exchange is too long to reproduce verbatim, but in summary, a dispute arose regarding a user services practice that had developed differently on two separate campuses, and had become embedded in the values and definitions of 'good practice' that were held by two participants in the session. Library A's Director, Joanna, who was a participant in the session tried to cool the dispute via her role as Director but also in terms of the *mapping practice*:

> *Bill*: …we are delivering very bad service to the researchers, this is not possible!
> *Fay*: What do you mean?
> *Joanna*: Ok? Is this something that needs to be addressed?…If it is an obstacle or a challenge, **it is very important that it is written here** [on the map].

Bill suggests how the mapping process has raised awareness – thus, enhanced knowledgeability - of practices elsewhere in the library, but in a negative way. He uses the term "uneven" (in Norwegian: *ujevn*) to describe how attitudes and values have developed differently across the landscape of practice. As the discussion becomes more antagonistic. Kirsty says three times "this is not the place" for it, but Bill replies that the issue is on the map so they should discuss it. Despite tension an 'obstacle' leaf gets talked into being, and the discussion moves on, but the issue has not been resolved, and re-emerges in the next phase, the setting of priorities. Bill is insistent that the user service issue be prioritised, justifying his stance by drawing on specific items plotted on the map, saying: "What I have written here shows a problem we have, user understanding…" Eventually, Joanna says: "I agree that we put this as a priority in the short term and take a look at the quality of our services."

In the end an agreement was reached, and the priority settled on: all without significant input from the facilitators. Whether this final statement by Joanna (and her authority in this setting) was to bring an end to the dispute, rather than an acknowledgement that consensus had been reached, is a moot point, but the mapping has revealed that the problem exists and associated information needs are relevant.

5 Conclusion

The central question of concern in this paper is: how does facilitated concept mapping help raise awareness of, and capture, collective judgments about relevance? Analysis of the dialogues that took place between participants and facilitators in the sessions highlighted various aspects. Facilitators were important, guiding participants through the logistical issues arising with the mapping process, and acting as agents of scrutiny. There is also evidence that participants took on this role for themselves, learning about the affordances of the mapping process, and how it could be used to enhance their knowledgeability of practices across this information landscape. Although some limitations were recognised in the physical form of the maps (for example, their lack of a scaling device to represent the relative significance of particular judgments about relevance), mapping was something project participants *learned about*; it became, over the year of the project, a tool that could be used to make judgments about information. Thus, mapping could be said to have enhanced the group's information literacy. This is a view of information literacy that is in accordance with that of authors such as Lloyd [4] and Whitworth [3]; one in which authority over information practice is *distributed*, and defined intersubjectively rather than objectively (standards and rubrics) or purely subjectively, as an individual pursuit. It may remain difficult to capture the kinds of intersubjective judgments, revealed on these concept maps, in an information system if that system is seen as only technological – but the mapping process helps to capture these group judgments in the *social* elements of the system.

References

1. Harris, B.R.: Communities as necessity in information literacy development: challenging the standards. J. Acad. Librarianship **34**, 248–255 (2008)
2. Saracevic, T.: Relevance: a review of the literature and a framework for thinking on the notion in information science, Part III: behavior and effects of relevance. J. Am. Soc. Inf. Sci. Technol. **58**, 2126–2144 (2007)
3. Whitworth, A.: Radical Information Literacy: Reclaiming the Political Heart of the IL Movement. Chandos, Oxford (2014)
4. Lloyd, A.: Information literacy as a socially enacted practice: sensitising themes for an emerging perspective of people-in-practice. J. Documentation **68**, 772–783 (2012)
5. Goldstein, S., Whitworth, A.: Determining the value of information literacy for employers. In: 2015 European Conference on Information Literacy, Tallinn, Estonia (2015)
6. Gull, C.D.: Seven years of work on the organization of materials in special library. Am. Documentation **7**, 320–329 (1956)

7. Wenger, E.: Communities of Practice: Learning, Meaning and Identity. Cambridge University Press, Cambridge (1999)
8. Wenger-Trayner, E., Wenger-Trayner, B.: Learning in landscapes of practice: A framework. In: Wenger-Trayner, E., Fenton-O'Creevy, M., Hutchinson, S., Kubiak. C., Wenger-Trayner, B. (eds.) Learning in Landscapes of Practice: Boundaries, Identity, and Knowledgeability in Practice-Based Learning. Routledge, London (2015)
9. Linell, P.: Rethinking Language, Mind, and World Dialogically: Interactional and Contextual Theories of Human Sense-Making. IAP, Charlotte, NC (2009)
10. Elmborg, J.: Critical information literacy: implications for instructional practice. J. Acad. Leadersh. **32**, 192–199 (2006)
11. Whitworth, A., Calvo, M.T., Moss, B., Kifle, N.A., Blåsternes, T.: Mapping the landscape of practice across library communities. Portal: Libr. Acad. **16**(3), 557–579 (2016)
12. Cosgrove, D.: Introduction: mapping meaning. In: Cosgrove, D. (ed.) Mappings, pp. 1–23. Reaktion, London (1999)
13. Corner, J.: The Agency of Mapping: Speculation, Critique and Invention. In: Cosgrove, D. (ed.) Mappings, pp. 213–252. Reaktion, London (1999)
14. Dodge, M., Kitchin, R., Perkins, C.: Rethinking Maps: New Frontiers in Cartographic Theory. Routledge, London (2007)

Knowledge Management and Information Literacy: An Exploratory Analysis

Sirje Virkus[(✉)]

School of Digital Technologies, Tallinn University, Tallinn, Estonia
sirje.virkus@tlu.ee

Abstract. Since the mid-1990 s knowledge management (KM) has emerged as a rapidly growing field that covers diverse areas and disciplines. However, research on the relationship between information literacy (IL) and KM is still quite rare. This article explores the question to what extent IL and KM are addressed in the research literature. An analysis of research publications was based on searches in the Web of Science database. A statistical descriptive analysis of document type, authors, source titles, publication years, languages, countries and subject areas of publications as well as a thorough content analysis of these publications was made. The author presents an overview of how IL and KM are discussed in the research literature and identifies research gaps in this field. The added value is that this analysis for identifying research gaps from systematic review can direct research agendas to influence future research.

Keywords: Information literacy · Knowledge management · Literature review · Statistical descriptive analysis

1 Introduction

Since the mid-1990 s, knowledge management (KM) has emerged as a rapidly growing field that covered diverse subject areas and disciplines. Girard and Girard [1] demonstrated that KM definitions focused on various aspects of how organizations created, captured, shared, and used knowledge from a variety of fields: for example, accounting, aerospace, archival science, artificial intelligence, content management, defence, development studies, education, energy, engineering, finance, governance, health, human resource management, library and information science, information management, information technology management, law, management, science and technology, statistics, and systems thinking. There are also many definitions of a general nature and knowledge management has even been defined in the context of social media applications.

Dalkir [2, p. 4] defined KM in the following way: "Knowledge management is the deliberate and systematic coordination of an organization's people, technology, processes, and organizational structure in order to add value through reuse and innovation. This is achieved through the promotion of creating, sharing, and applying knowledge as well as through the feeding of valuable lessons learned and best practices into corporate memory in order to foster continued organizational learning".

Girard and Girard [1, p. 1] noted that KM has now moved beyond an academic theory to an essential component of organizational life. Quast [3] highlighted three key reasons why

actively managing knowledge was important to a company's success. It (1) facilitates decision-making capabilities; (2) builds learning organizations by making learning routine; and, (3) stimulates cultural change and innovation.

Several authors explored knowledge management from the library and information science (LIS) perspective and found a strong link between these two domains [4, 5]. Moreover, Roknuzzaman [5, p. 8] noted that the academic movement of KM in LIS is promising and several studies confirmed that LIS institutions are the most active in KM education among the competing disciplines. Saito [4, p. 34] stated that KM was a natural extension to the field of LIS and "with a long tradition in the organization, storage, distribution, access and retrieval of information, librarians have been discussing the changes in the role of the information professional and proposing the professionalization of KM". He believed that LIS topics relevant to KM were the organization of information through classification systems and taxonomies, the study of information needs and information behaviour, information architecture, information audits, and content, document and record management applications. In addition, LIS deals with the organization, access and retrieval of information, which is by its nature codified knowledge [4, p. 34, 56].

Rooi and Snyman [6] conducted a content analysis of the literature to report on the progress of research regarding the opportunities for librarians within the context of KM. They identified five main areas of KM where LIS professionals can contribute: (1) facilitating an environment conducive to knowledge sharing; (2) managing the corporate memory; (3) transfer of information management and related skills to a new context linked to business processes and core operations; (4) development of corporate information literacy; and (5) management of information in a digital/electronic environment. Furthermore, Todd and Southon [7, p. 315] noted that KM can help to move librarians "beyond the narrow confines of their traditional roles" and improve their image as well as offer "a 1he information professional and an opportunity to rejuvenate the profession".

Although an increasing numbers of publications focus on information literacy (IL) in the workplace [8–16], a quick literature search revealed that research that explicitly focuses on IL and KM in the workplace is still quite rare. Most of the literature on workplace based IL research and practice does not even attempt to define IL for the workplace [17]. However, Williams et al. [17, p. 3] noted that, in comparison with many of the generic definitions and models of IL, these contextualised workplace IL descriptions all tend to place much greater emphasis on social, informal, contextualised processing of information, the transformation of information to knowledge, and information creation, packaging, and organisation.

In this paper I define IL as the skills, knowledge, attitudes, experience, attributes, and behaviour that are needed to find, evaluate, and use information effectively [18, p. 470]. Weiner [19] provided a good review of the literature that focused on IL and the workplace and Williams, Cooper and Wavell [17] presented an annotated bibliography on IL in the workplace. Lloyd [20] provided a number of lessons learned and themes based on the research into workplace IL that explained what IL is, how IL emerges, and how it is enacted as a practice.

The purpose of my paper is to present an overview of how IL and KM are explicitly discussed in the research literature and identify research gaps in this field. I present a statistical descriptive analysis of document type, authors, source titles, publication years, languages, countries, keywords, and subject areas of publications. I will present a thorough

discussion of the findings in relation to previous studies on IL in work contexts. The added value of this paper is that this analysis for identifying research gaps from systematic review can direct research agendas to influence future research and practice.

I divided the paper into three sections. The first section gives an overview of the methodology used in this study. The second provides the results of the study and discussion. Finally, I present the conclusions.

2 Methodology

My analysis of research publications on information literacy and knowledge management was based on searches in the Web of Science database. Web of Science™ Core Collection provides access to the world's leading citation databases and its authoritative, multidisciplinary content covers over 12,000 of the highest impact journals worldwide, including Open Access journals and over 150,000 conference proceedings across more than 250 disciplines with coverage to 1900 [21].

I proposed the following research questions: (1) What are the main tendencies in date of publication, subject areas, document types, countries and languages of publications, source titles, and authors of publications related to IL and KM? (2) What are the main themes discussed in the publications related to IL and KM?

I carried out searches in the database in May 2016 using terms 'information literacy' and 'knowledge management'. I explored the following categories: (1) the years in which the documents were published; (2) the subject areas involved; (3) the document types of the publication; (4) the countries of origin; (5) the languages of publication; (6) the journals in which the documents were published, and (7) the authors of the publication.

I conducted a statistical descriptive analysis of publication years, subject areas, document type, countries of origin, languages, source titles, and the authors of the publication through a content analysis of 31 publications. I analysed the full-texts of publications in the English languages (25), while I analysed the publications in Spanish (3), Chinese (2) and German (1) through reading the abstracts in English in Web of Science database.

Since the objective of this study was to explore how IL and KM are explicitly reflected in the research publications in the Web of Science™ Core Collection database, it was beyond the scope of this study to explore publications in related areas such as decision-making, learning, and knowledge sharing and use in the workplace.

3 Results and Discussion

3.1 Information Literacy

IL has been a concept that has received increased attention since the early 1970 s. In the Web of Science database, 2,586 publications were received under the topic area 'information literacy' in the period from 1990 to 2016 (see Table 1).

In the beginning of 1990 s there were only few research IL publications, but the number of publications has been growing steadily. The year 2013 saw the greatest number of LI publications. The reason for this is obviously due to the first European

Table 1. Years of information literacy publications

Year	Number of publications	Percentage of publications
2016	79	3.06
2015	255	9.86
2014	199	7.70
2013	347	13.42
2012	254	9.82
2011	235	9.09
2010	192	7.43
2009	181	6.70
2008	159	6.15
2007	144	5.57
2006	106	4.10
2005	78	3.02
2004	77	2.98
2003	51	1.97
2002	45	1.74
2001	40	1.55
2000	22	0.85
1999	33	1.28
1998	15	0.58
1997	24	0.93
1996	17	0.66
1995	8	0.31
1993	17	0.66
1992	1	0.04
1991	5	0.19
1990	2	0.08

Conference on Information Literacy that took place in Istanbul in 2013 and which is reflected in the Web of Science database by 168 publications in 2013.

The highest contribution to IL research comes from the LIS research community. Sixty-six point seventy eight percent (1727) of publications come from the subject area of information science and library science, followed by education and educational research 20.73% (536), computer science 19.49% (504), nursing 2.94% (76), engineering 2.94 % (76), business economics 1.90% (49), chemistry 1.55% (40), social sciences and other topics 1.47% (38), medical informatics 1.47% (38), health care sciences and services 1.39% (36) and communication 1.16% (30) (see Table 2). Publications whose percentages are lower than one per cent are not presented in Table 2.

Thus, it is important to note that IL research showed a tendency to increase and is still predominantly carried out by LIS researchers. It is beyond the scope of this study to explore thoroughly bibliometric aspects of IL as this study focuses on IL in relation

Table 2. The subject areas of the publications

Subject area	Number of Publications	Percentage of publications
Information Science and Library Science	1727	66.78
Education and Educational Research	536	20.73
Computer Science	504	19.49
Nursing	76	2.94
Engineering	76	2.94
Business Economics	49	1.90
Chemistry	40	1.55
Social Sciences and other Topics	38	1.47
Medical Informatics	38	1.47
Health Care Sciences and Services	36	1.39
Communication	30	1.16

to KM. However, several other studies have explored the development of IL by using bibliometric analysis [22–28].

3.2 Knowledge Management

Although KM emerged in the mid-1990 s the term 'knowledge management' generated 17,757 document items in the period 1990–2016 under the topic area category in the Web of Science (see Table 3).

Forty-four point five eight percent (7,916) of publications came from the subject area of computer science, followed by business economics 37.28% (6,620), engineering 22.49% (3,994), information science and library science 17.14% (3,043), operation research and management science 10.98% (1,949), education and educational research 4.49% (815), telecommunications 3.11% (552), psychology 3.01% (535), social sciences and other topics 2.90% (514), public administration 1.92% (341), medical informatics 1.81% (321), automation control systems 1.70% (301), health care sciences and services 1.46% (260), environmental sciences and ecology 1.22% (216), construction building and technology 1.12% (199) and materials science 1.04% (185) (see Table 4). Publications whose percentages were less than one per cent were not presented in the Table 4.

From the above numbers, it was clear that the publications related to KM were greater in numbers than those related to IL. The ratio was about 6.9 to 1. The most productive years of KM publications were 2008 and 2009 and there was a tendency for the numbers to decrease over time. However, there were still more KM research publications than IL publications even in the information science and library science subject area of the Web of Science. In the period 1990–2016, 3,043 km research publications and 1,727 IL research publications were published. The ratio was about 1.76 to 1. It seems that the topic of knowledge management attracted more research interest in general and also in the field of library and information science.

Table 3. Years of knowledge management publications

Year	Number of publications	Percentage of publications
2016	206	1.16
2015	1073	6.04
2014	1316	7.41
2013	1327	7.47
2012	1357	7.64
2011	1439	8.10
2010	1440	8.11
2009	1675	9.43
2008	1608	9.06
2007	1257	7.08
2006	968	5.45
2005	870	4.90
2004	771	4.34
2003	654	3.68
2002	533	3.00
2001	450	2.53
2000	348	1.96
1999	201	1.13
1998	139	0.78
1997	73	0.41
1996	22	0.12
1995	6	0.03
1994	5	0.03
1993	6	0.03
1992	3	0.02
1991	6	0.03
1990	4	0.02

3.3 Information Literacy and Knowledge Management

I retrieved 31 items through a Boolean search of 'information literacy' AND 'knowledge management' under the topic area category in the Web of Science database in the period 1990–2016 (see Table 5). The first paper was published in 1999.

Twenty-two papers came from the subject area of information science and library science (nine of which were also related to the subject area of computer science, two to education and educational research, and one to communication), fourteen from computer science (nine of which also were related to the subject area of information science and library science, two to health care sciences and services, and one to education and educational research), four from education and educational research (two of them also were related to the subject area of information science and library science and one to

Table 4. The subject areas of the publications

Subject area	Number of publications	Percentage of publications
Computer Science	7,916	44.58
Business Economics	6,620	37.28
Engineering	3,994	22.49
Information Science and Library Science	3,043	17.14
Operations Research and Management Science	1,949	10.98
Education and Educational Research	815	4.59
Telecommunications	552	3.11
Psychology	535	3.01
Social Sciences and Other Topics	514	2.90
Public Administration	341	1.92
Medical Informatics	321	1.81
Automation Control Systems	301	1.70
Health Care Sciences and Services	260	1.46
Environmental Sciences and Ecology	216	1.22
Construction Building and Technology	199	1.12
Materials Science	185	1.04

computer science), three from health care sciences and services (connected also to medical informatics and two of them to the subject area of computer science), three from medical informatics (also related to health care sciences and services), two from business economics, one publication both from communication (also connected to the subject area of information science and library science) and social issues.

Four publications were written in England, Spain and the USA; three publications in Sweden; two in Colombia, China and Poland; and one in Australia, Cuba, Czech Republic, Italy, Kenya, Kuwait, Lithuania, Mexico, Scotland, Singapore, South Africa, and Switzerland. Most of the publications (25) were written in English, followed by Spanish (3), Chinese (2) and German (1).

The articles category was the largest (19), followed by proceedings papers (9), editorial material (2), and book chapters (1). Most of the authors write only one publication. However, Maria Pinto was an author of three publications and David Bawden, Christina Brage, Agneta Lantz and Rubén Toledano O'Farrill wrote two publications each. Three publications were published in the *Journal of Documentation,* two in the *Revista Espanola De Documentacion Cientifica, Libri*, *Journal of Information Science* and *IFLA Publications*. The remaining publications appeared only once in various journals and conference proceedings.

The content analysis revealed that many analysed publications just mentioned briefly the concept of KM or IL and these concepts were not discussed sufficiently together. Some papers just highlighted the importance of IL and KM in the knowledge society

Table 5. Years of information literacy and knowledge management publications

Year	Number of publications
2016	1
2015	3
2014	3
2013	3
2012	4
2011	3
2010	1
2008	5
2007	1
2006	4
2003	1
2001	1
1999	1

and discussed these concepts in the academic library or higher education context. Although Cox and Corrall [29] noted that past optimism around the role of librarians in KM has largely been disappointing, it was believed that IL was "an essential and integral competency for both the knowledge worker and effective KM" [30].

Some papers discussed conceptual issues rather than reporting empirical research. For example, Whitworth [31] examined how IL emerged as a theoretical and practical concept in the 1970 s and found that the approach of Zurkowski [32] was representative of the KM approach to IL. Only few papers reported empirical results related to IL and KM. Cheuk [33] provided a good real life example demonstrating how the world's largest environmental consulting firm, Environmental Resources Management (ERM), recognised IL as a critical component of its KM program to create value for the company.

Several papers referred to personal information and KM. Świgoń [34] suggested personal knowledge and information management (PKIM) as an integrated approach of three concepts – personal KM, personal information management and IL and believed that this offered an appropriate and comprehensive approach to these issues with overlapping and supplementary areas of interests.

Lloyd [30, p. 87] noted that the lack of evidenced-based research into the transfer of IL from an educational context to a workplace context had implications for our understanding of the process and, as such, for the effective teaching of IL programmes that were professionally and vocationally relevant. She argued that "in an information driven economy, employees who are able to develop information pathways and to create new corporate knowledge provide the strategic difference between a highly successful business and those that remain mediocre".

4   Conclusions

Both the concepts of information literacy and knowledge management have grown in importance in the period from 1990 to 2016. My analysis showed that the research that explicitly explored IL in the KM context was very limited. I identified only 31 publications under the topic area category in the Web of Science database in the period 1990–2016. The majority of publications came from the subject area of information science and library science. However, the research seemed to be interdisciplinary by nature and belonged to several research areas: for example, nine out of 22 papers were associated with both information science and library science and computer science. Several publications belonged both to information science and library science and education and educational research or computer science and health care sciences and services. More than half of the publications were articles, followed by proceedings papers. More than half of the publications were written in English and were published in various countries. Most of the authors had written only one publication and only few researchers had published two or three papers.

My content analysis revealed that KM and IL were not discussed sufficiently together in the research literature and there was a lack of empirical research. However, I explored only research papers from the Web of Science database with the keywords IL and KM. I extended the study to cover research papers in the Scopus and the Google Scholar database and with the extended keywords, for example. 'information skills', 'information competencies', 'information culture', 'information use', 'information practice', 'knowledge sharing', 'knowledge construction', 'decision making', 'learning' together with 'workplace' and 'organizations'.

References

1. Girard, J., Girard, J.: Defining knowledge management: toward an applied compendium. Online J. Appl. Manage. **3**(1), 1–20 (2015)
2. Dalkir, K.: Knowledge Management in Theory and Practice, 2nd edn. MIT Press, Cambridge MA (2011)
3. Quast, L.: Why Knowledge Management is Important to the Success of Your Company. Forbes (2012). http://www.forbes.com/sites/lisaquast/2012/08/20/why-knowledge-management-is-important-to-the-success-of-your-company/#2715e4857a0b5a94ec8c5e1d
4. Saito, A.: Educating Knowledge Managers: A Competence-Based Approach. Japan Advanced Institute of Science and Technology, Tokyo (Dissertation) (2007). https://dspace.jaist.ac.jp/dspace/bitstream/10119/3739/2/121paper.pdf
5. Roknuzzaman, Md.: When Existing and Emerging Disciplines Meet: Library and Information Science vs Knowledge Management. Ph.D. Thesis. School of Knowledge Science Japan Advanced Institute of Science and Technology (2009)
6. Rooi, H.V., Snyman, R.: A content analysis of literature regarding knowledge management opportunities for librarians. Aslib Proceedings: New Information Perspectives **58**(3), 261–271 (2006)
7. Todd, R.J., Southon, G.: Educating for a knowledge management future perceptions of library and information professionals. Aust. Libr. J. **50**(4), 313–327 (2001)

8. Cheuk Wai-Yi, B.: An information seeking and using process model in the workplace a constructivist approach. Asian Libr. **7**(12), 375–390 (1998)

9. Bruce, C.S.: Workplace experiences of information literacy. Int. J. Inf. Manage. **19**(1), 33–47 (1999)

10. Abell, A., Oxbrow, N.: Competing with Knowledge: The Information Professional in the Knowledge Management Age. Library Association Publishing, London (2001)

11. Kirton, J., Barham, L.: Information literacy in the workplace. Aust. Libr. J. **54**(4), 365–376 (2005)

12. Somerville, M.M., Howard, Z.: Systems thinking: an approach for advancing workplace information literacy. Aust. Libr. J. **57**(3), 257–273 (2008)

13. Crawford, J., Irving, C.: Information literacy in the workplace: a qualitative exploratory study. J. Librarianship Inf. Sci. **41**(1), 29–38 (2009)

14. Zhang, X., Majid, S., Foo, S.: Environmental scanning: an application of information literacy skills at the workplace. J. Inf. Sci. **36**(6), 719–732 (2010)

15. Lloyd, A.: Trapped between a rock and a hard place: what counts as information literacy in the workplace and how is it conceptualized? Libr. Trends **60**(2), 277–296 (2011)

16. Lundh, A., Limberg, L., Lloyd, A.: Swapping settings: Researching information literacy in workplace and in educational contexts. Inf. Res. 18(3) (2013). http://www.informationr.net/ir/18-3/colis/paperC05.html#.U6qbDyfDtaQ

17. Williams, D., Cooper, K., Wavell, C.: Information Literacy in the Workplace: An Annotated Bibliography. Robert Gordon University, Aberdeen (2014)

18. Virkus, S.: Development of information-related competencies in European ODL institutions: senior managers' view. New Libr. World **107**(11/12), 467–481 (2006)

19. Weiner, S.A.: Information Literacy and the Workforce: A Review. Libraries Faculty and Staff Scholarship and Research. Paper 86 (2011). http://docs.lib.purdue.edu/lib_fsdocs/86

20. Lloyd, A.: Building information resilient workers: the critical ground of workplace information literacy. what have we learnt? In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 219–228. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_28

21. Web of Science Core Collection (2016). http://thomsonreuters.com/en/products-services/scholarly-scientific-research/scholarly-search-and-discovery/web-of-science-core-collection.html

22. Tsay, M.-Y., Fang, B.-L.: A bibliometric analysis on the literature of information literacy. J. Educ. Media Libr. Sci. **44**(2), 133–152 (2006)

23. Nazim, M., Ahmad, M.: Research trends in information literacy: a bibliometric study. SRELS J. Inf. Manage. **44**(1), 53–62 (2007)

24. Aharony, N.: Information literacy in the professional literature: an exploratory analysis. Aslib Proc. **62**(3), 261–282 (2010)

25. Park, M.-K., Kim, H.: A bibliometric analysis of the literature on information literacy. J. Korean Soc. Inf. Manage. **28**(2), 53–63 (2011)

26. Hsieh, P.-N., Chuang, T.-M., Wang, M.-L.: A bibliometric analysis of the theses and dissertations on information literacy published in the United States and Taiwan. In: Chang, R.S., Jain, L., Peng, S.L. (eds.) Advances in Intelligent Systems and Applications. Smart Innovation, Systems and Technologies (SIST), vol. 20, pp. 337–348. Springer, Heidelberg (2013)

27. Panda, I., Maharana, B., Chhatar, D.C.: The journal of information literacy: a bibliometric study. Int. J. Sci. Res. Publ. **3**(3), 1–7 (2013)

28. Taşkın, Z., Doğan, G., Şencan, İ.: Analyzing the intellectual structure of world information literacy literature through citations and co-citations. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 54–60. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_6

29. Cox, A., Corrall, S.: Evolving academic library specialties. J. Am. Soc. Inform. Sci. Technol. **64**(8), 1526–1542 (2013)

30. Lloyd, A.: Information literacy: the meta-competency of the knowledge economy? an exploratory paper. J. Librarianship Inf. Sci. **35**(2), 87–92 (2003)

31. Whitworth, A.: Radical Information Literacy: Reclaiming the Political Heart of the IL Movement (Chandos Information Professional Series). Chandos Publishing, London (2014)

32. Zurkowski, P.G.: The Information Service Environment Relationships and Priorities. National Commission on Libraries and Information Science, Washington (1974)

33. Cheuk, B.: Delivering business value through information literacy in the workplace. Libri **58**(3), 137–143 (2008)

34. Świgoń, M.: Personal knowledge and information management - conception and exemplification. J. Inf. Sci. **39**(6), 832–845 (2013)

Various Literacies

Citizen Science as an Educational Tool for Improving Scientific Literacy of Undergraduate Students

Kristýna Kalmárová[✉]

Masaryk University, Brno, Czech Republic
k.kalmarova@mail.muni.cz

Abstract. The aim of my paper is to propose a new approach to support scientific literacy of undergraduate students that uses methods of active participation in scientific research. I introduce the concept of citizen science as scientific literacy. Based on the accessible literature review, I present the overall approach to the educational potential of citizen science, as well as the results of selected surveys conducted to measure the impact of citizen science projects to the participants' scientific literacy level. I make the claim that even short-term projects may make great impact, although the subject definitely needs more research. In this paper, I also outline the possibility of using citizen science projects in the undergraduate curriculum.

Keywords: Citizen science · Public participation in scientific research · Scientific literacy · Higher education · Undergraduate students

1 Introduction

A significant part of scientific work is based on gathering data. The amount of data one now needs to gather in order to conduct scientific research is increasing. Although this work could be possibly performed by non-experts, often many qualified scientific workers are wasting their time and energy on these routine activities.

According to experts [1], at the same time, the increasing global problems, require more scientific literate citizens. According to Majestic and Pellegrino [2], even the undergraduate students do find it difficult to decode science in the media due to limited content knowledge and shifting definitions of accuracy".

Do these science-related problems have anything in common? They certainly do. Citizen science seems to be the answer for both of the problems. When amateur volunteers help scientists with routine scientific activities they have opportunity to learn and improve their own skills, including scientific literacy. This can apply also to undergraduate students. In this paper I advocate for its targeted usage for supporting the scientific literacy since in current projects the educative aspect is often played down in behalf of work effectiveness.

2 Citizen Science

The concept of the citizen science has been evolving since the 19th century, when the first organised ornithological observations took place. Bonney et al. [3] remind us of the

observation work of houselight keepers who took notes about the birds that accidentally crashed into the lighthouses.

Table 1. Citizen science typology according to Bonney et al. [5]

Aspects of scientific research/ monitoring process:	Contractual projects	Contributory projects:	Collaborative projects:	Co-created Project:	Collegial project
Choose or define question(s) for study	X			X	X
Gather information and resources	(X)			X	X
Develop explanations (hypotheses)				X	X
Design data collection methodologies				X	X
Collect samples and/or record data		X		X	X
Analyze samples				X	X
Analyze data		(X)		X	X
Interpret data and draw conclusions	(X)		(X)	X	X
Disseminate conclusions/ translate results into action	(X)	(X)	(X)	X	X
Discuss results and ask new questions	X			X	X

However, most authors agree on the Cooperative Observer Program, lead by the National Weather Service in USA was the very first official attempt of using volunteers for gathering scientific data. This project was launched in 1890 and its aim was collecting meteorological data. Another project was the Christmas Bird Count. The project was initiated by the Audubon Society and it is held till today.

One can conclude that the most natural way of involving public in scientific research is through collecting and gathering data. This trend persisted until the 1990s when the information technology allowed researchers to extend the scale of volunteer's contribution to other phases of the scientific process [4] such as analyzing data gathered electronically. However, the data collection still remains the process most frequently performed by volunteers.

As stated by a range of papers [5, 6] there is not only one understanding of the citizen science. In order to avoid any confusion regarding different citizen science practices, some authors came with the typology distinguishing the level of involvement of the volunteers. For instance, in 2009 Bonney et al. [5] presented a five-level typology of citizen science that takes into account the phases of scientific process practised by volunteers (Table 1).

Wiggins and Crowston [6] introduced a similar approach to creating a typology of citizen science that shifted the emphasis from the level of public participation on the research to the dominant activity performed by volunteers. Thus, citizen science projects were divided into: action, conservational, investigative, virtual, and educational [6].

These examples of citizen science typologies were provided with a purpose of demonstrating how comprehensive is the range of citizen science projects. Considering the possible usage of its principles in order to support scientific literacy of its participants, one must take into account their variable characteristics.

3 Scientific Literacy

Scientific literacy is described as an ability to "understand scientific concepts and processes required for personal decision making, participation in civic … affairs, and economic productivity" [7]. Arrange of authors have already discussed its importance [8–10]. In 1996 achievement of scientific literacy was deemed the most important task for the upcoming 21st century [7]. Scientific literacy was also set as the "major domain for PISA (Programme for International Student Assessment) 2015 [1, p. 3], since humanity, according to its authors," face[s] major challenges in providing sufficient water and food, controlling diseases, generating sufficient energy and adapting to climate change [1, p. 3].

After a series of investigations conducted in USA and Europe, the level of scientific literacy of adult citizens was not considered high [8] in spite of the proclamations. In last few years others have been investigating the possible impact of participating in citizen science projects on science literacy.

3.1 Teaching Scientific Literacy Through Citizen Science

Bonney et al. [3] were some of the first citizen science project coordinators who reflected its educational potential. In 2009, they created a "model for developing and implementing a citizen science project" [3, p. 979], defining nine steps that citizen science project should include in order to have an educational effect. These steps are the following:

1. Choose a scientific question;
2. Form a scientific/educator/technologist/evaluator team;
3. Develop, test, and refine protocols, data forms, and educational support materials;
4. Recruit participants;
5. Train participants;
6. Accept, edit, and display data;
7. Analyze and interpret data;
8. Disseminate results; and,
9. Measure outcomes

According to the authors, the project must follow all these steps to effectively increase the participants scientific literacy.

As Price and Lee pointed out [10], there are few studies that focused on the actual impact of active participation in citizen science projects on an individual's level of scientific literacy. The same authors carried out research on changes in scientific attitudes of participants involved in astronomical citizen science projects. Their results proved that the scientific attitudes and beliefs about the nature of science of the participants improve significantly after six months of participation in the citizen science project. The authors also suggest that the main source of the improvement consists in the participation in social components of the project. Similarly, Cronje et al. [9] conducted a study that proved that even two day events may have positive impact on scientific literacy of the participants.

3.2   Citizen Science in Undergraduate Curriculum

Since citizen science has been proven a good educational tool, voices asking about its place in undergraduace curriculum started to be heard. We assumed the science-oriented faculties did have the scientific literacy covered enough in the curriculum while the humanities and liberal arts did not concentrate on this issue as much. This assumption explained the fact that the main cases of good practice, although still quite limited, still took place on these types of schools.

Bard College in New York's Hudson Valley is the pioneer in the field of taking part in citizen science projects in order to increase the level of their students' scientific literacy. The college focused on visual and performing arts, therefore scientific research does not have a significant place in the curriculum. According to an article published in 2014 [11], they implemented participation in a microbiology citizen science project as a compulsory part in the first-year curriculum in 2011. The goal of the program was "providing a common and immersive experience in the process of science to all students in their first year of college" [11, p. 365]. As the authors of the project claimed, participation in the project helped students to understand basic scientific principles although it appeared that no evaluation in form of pre- and/or post-tests took place.

4   Conclusions

Citizen science is a popular and often practiced method of guiding public into scientific research. Since it is way of easily connecting amateur volunteers with the scientific process, several authors have started to ask a questions about its possible impact on their scientific literacy.

In this paper I reviewed other authors studies about this issue. The literature review provides support for the claim that citizen science may serve as an educational tool, even in the undergraduate college environment for non-science majors. In order to learn more about its actual impact on scientific literacy, more projects are expected to be implemented into the undergraduate curriculum.

References

1. OECD: PISA 2015: Draft Science Framework. OECD, Paris (2013)
2. Majestic, C., Pellegrino, C.: When science and information literacy meet: an approach to exploring the sources of science news with non-science majors. Coll. Teaching. **62**(3), 107–112 (2014)
3. Bonney, R., Cooper, C., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K., Shirk, J.: Citizen science: a developing tool for expanding science knowledge and scientific literacy. Bioscience **59**(11), 977–984 (2009)
4. Bonney, R., Dickinson, J.L.: Citizen science: public participation in environmental research. Comstock Pub. Associates, Ithaca (2012)
5. Bonney, R., Ballard, H., Jordan, R., McCallie, E., Phillips, T., Shirk, J., Wilderman, C.C.: Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education. CAISE, Washington (2009)
6. Wiggins, A., Crowston, K.: From conservation to crowdsourcing: a typology of citizen science. In: Proceedings of the 44th Hawaii International Conference on System Science, Koloa, pp. 1–10 (2011)
7. National Research Council: National Science Educational Standards. National Academy Press, Washington (1996)
8. Cronin, D.P., Messemer, J.E.: Elevating adult civic science literacy through a renewed citizen science paradigm. Adult Learn. **24**(4), 143–150 (2013)
9. Cronje, R., Rohlinger, S., Crall, A., Newman, G.: Does participation in citizen science improve scientific literacy? A study to compare assessment methods. Appl. Environ. Educ. Commun. **10**(3), 135–145 (2011)
10. Price, A.C., Lee, H.: Changes in participant's scientific attitudes and epistemological beliefs during an astronomical citizen science project. J. Res. Sci. Teach. **50**(7), 773–801 (2013)
11. Savage, A.F., Jude, B.A.: Starting small: using microbiology to foster scientific literacy. Trends Microbiol. **22**(7), 365–367 (2014)

Everyday Health Information Literacy of Young Finnish and Namibian Students: Is There a Difference?

Maija-Leena Huotari[1(✉)], Heidi Enwald[1], Noora Hirvonen[1], Cathrine Nengomasha[2], Ruth Abankwah[2], Wilhelm Uutoni[2], and Raimo Niemelä[3]

[1] Department of Information and Communication Studies, Faculty of Humanities, Medical Research Centre Oulu, University of Oulu, Oulu, Finland
{Maija-Leena.Huotari,heidi.enwald,noora.hirvonen}@oulu.fi
[2] Department of Information and Communication Studies, Faculty of Humanities and Social Sciences, University of Namibia, Windhoek, Namibia
{cnengomasha,rabankwah,wuutoni}@unam.na
[3] The City of Oulu Department of Education, Kastelli Upper Secondary School, Oulu, Finland
raimo.niemela@ouka.fi

Abstract. The everyday health information literacy (EHIL) of students with different cultural backgrounds is compared. The data were collected with a self-assessment based EHIL screening tool from Namibian university students (n = 271) and Finnish upper secondary school students (n = 217). The tool corresponds to the definition of health information literacy (HIL) by the Medical Library Association. The groups were compared with cross-tabulations with Fisher's exact tests and the group means of an EHIL sum variable with Student's t-test. The results show that the mean scores of the EHIL sum variable do not differ between the groups. Yet, significant differences are found with regard to each of the tool's statements. Mostly these relate to health information infrastructure, lingual issues, and reading culture. The study contributes to research on cultural differences on HIL and to validating the EHIL screening tool.

Keywords: Health information literacy · Screening tool · Students · Cultural differences · Survey

1 Introduction

Health literacy (HL) is a widely used concept in health sciences and can be defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" [1]. Health literacy is often understood as the basic reading and numeracy skills needed to function in the health care environment [2]. Multiple HL tests have been designed on the basis of this idea, such as the Test of Functional Health Literacy in Adults (TOFLA) and the Rapid Estimate of Adult Literacy in Medicine (REALM). However, the investigation of literate populations should be able to focus on health information related challenges people face in their everyday life, rather than on detecting individuals with limited basic literacy [3, 4]. According to

the working definition of the Medical Library Association, [5] health information literacy includes the abilities to "recognize a health information need; identify likely information sources and use them to retrieve relevant information; assess the quality of the information and its applicability to a specific situation; and analyse, understand, and use the information to make good health decisions". The definition was framed within two related concepts, health literacy and information literacy, and it has gained some ground in the field of information studies.

By introducing the concept of everyday health information literacy (EHIL), Niemelä et al. [4] highlighted its importance to our everyday lives in dealing with health issues. They developed a screening tool with the aim of "detecting individuals with problems related to their interest and motivation, finding, understanding, evaluating and using health information but being literate at the average level" [4].

Studies on cultural differences in health information literacy (HIL) are rare. Most of the previous studies focused on the measurement and screening of health literacy (HL). Some of these studies observed that not all measures were suitable as such for different groups of people. Instead, the measures needed to be adjusted in one way or another. In these studies, cultural differences between developed and developing countries had also been a concern. Dowse [6] reviewed the suitability of current health literacy measures, mainly designed in the USA or Europe, for use in developing countries. According to Dowse [6], the focus of measures was often on the use of language, in other words, whether the statements were made in the respondents' mother tongue or their second language or in their language of instruction. When referring to the use of the language, Dowse [6] claimed that it was rare that tests could be used in their original form, even after being translated into the local language.

As an example of this, Dowse et al. [7] highlighted the inappropriateness of the Rapid Estimate of Adult Literacy in Medicine (REALM) in a South African study conducted in an English second-language population. Dowse [6] claimed that, in many cases, these instruments needed to be re-lexicalised and even modified so that the content of the tests was contextualized to reflect local culture and lifestyle. By taking the REALM as an example, Dowse [6] stated that a straight translation did not ensure cultural or contextual relevance, but demanded exploring the local health system structure and characteristics, health beliefs, unfamiliar concepts, lifestyle, eating habits, or controversial health topics. With his colleagues, Dowse re-lexicalised the REALM test in South Africa [8]. In a similar manner, the Short Assessment of Health Literacy (SAHL) had been further developed and validated for patients in the Netherlands as the SAHL for Dutch patients (SAHL-D) [9].

Accordingly Dowse [6] stated that measures should not rely solely on reading literacy and numeracy. The screening tool by Niemelä et al. [4] is based on self-assessment, which is an effective means of gaining knowledge about individuals' subjective experiences. When developing the tool, the interest was in the respondents' personal views, not in a measurement of their observable skills. Moreover, people may feel uncertain when facing health issues that are presented in medical terminology they do not fully understand.

Our study focused on the everyday health information literacy of Namibian and Finnish students. We selected these populations on the basis of a collaboration project between the University of Namibia and the University of Oulu within the North-South-South Library and Information Studies Network from 2005 to 2015 [10]. From 2013 to 2015 this network focused on research into information literacy which enabled this study.

2   Objectives

This study aimed to find out how people with different cultural backgrounds responded to the statements in the EHIL screening tool [4] and discusses the findings in relation to related studies. The research questions were set as follows:

(1) What can we tell about the everyday health information literacy of these two groups?
(2) Are there statistically significant differences in the responses to the individual statements of the EHIL screening tool between the Finnish and Namibian students?

3   Methodology

In this comparative study we applied a quantitative method of analysis. The data consisted of the responses to the EHIL screening tool [4] by Namibian university students (n = 271) and Finnish upper secondary school students (n = 217). We selected these two populations on the basis of collaboration between the University of Namibia, along with two other African universities, one library school, and three Finnish universities since 2005. They formed a collaborative entity called the North-South-South Library and Information Studies (N-S-S LIS) Network. The N-S-S LIS Network aimed at strengthening north-south-south collaboration and building the capacities of the south-south dimension. From 2013 to 2015 it focused on information literacy research.

Both population groups studied in urban areas. They were of closely related age. The Namibian students raged from 17 to 19 years of age and the majority (88.1%) of Finnish students were from 17 to 18 years old. The EHIL screening tool includes ten statements with response options from 1 (strongly disagree) to 5 (strongly agree). The statements are:

EHIL1. It is important to be informed about health issues.
EHIL2. I know where to seek health information.
EHIL3. I like to get health information from a variety of sources.
EHIL4. It is difficult to find health information from printed sources (magazines and books).
EHIL5. It is difficult to find health information from the Internet.
EHIL6. It is easy to assess the reliability of health information in printed sources (magazines and books).
EHIL7. It is easy to assess the health information on the Internet.
EHIL8. Health related terminology and statements are often difficult to understand.

EHIL9. I apply health related information to my own life and/or that of people close to me.
EHIL10. It is difficult to know who to believe in health issues.

We used a Finnish version of the screening tool with the Finnish students and an English version with the Namibian students. Thus, for the Finnish students we used the respondents' mother tongue. English is their second language or language of instruction for the Namibian students.

For a general view of the results, we aggregated the individual EHIL statements to form a sum variable for everyday health information literacy with a minimum of 10 and a maximum of 50 points. Statements 4, 5, 8, and 10 are negatively worded and were, therefore, reversed when calculating the sum scores. We performed descriptive analyses by using the mean and standard deviation (SD) values for continuous variables and percentages for categorical variables. We used a Student's t-test to analyse the statistical difference between group means. We analysed associations between the categorical variables using cross-tabulation using a two-sided Fisher's Exact test. We used this test instead of a chi-squared test since the expected cell counts were low (<5) in some cases. We performed statistical analyses using the IBM Statistical Package for the Social Sciences Version 22.0 software.

4   Results

The total scores of the EHIL sum variable ranged from 11 to 50 in the Namibian sample and from 27 to 47 in the Finnish sample, respectively. Both samples followed a normal distribution. The mean EHIL scores were 36.8 (SD = 3.8) for the Finnish students and 36.4 (SD = 5.5) for the Namibian students, respectively. The mean scores did not differ from each other statistically significantly. We measured the internal consistency of the EHIL scale with Cronbach's alpha, and it was 0.58 in the Finnish population and 0.56 in the Namibian population.

When we compared the individual statements (see Table 1), we found statistically significant differences with regard to each statement.

The differences in the responses to the individual statements related to knowledge about where to seek health information (EHIL2) as 18.1% (n = 49) of the Namibian students strongly disagreed or disagreed with this statement and only 0.5% (n = 1) of the Finnish students did so respectively. There were also clear differences in the use of a variety of health information sources (EHIL3). A preferred usage was indicated by 48% (n = 130) of the Namibian students and 19.8% (n = 43) of the Finnish students, who strongly agreed with the statement. The responses indicated a difference with regard to the students' experienced difficulty in their ability to find health information from printed sources (EHIL4) as 20% (n = 54) of the Namibian students and 11.1% (n = 24) of the Finnish students agreed with this statement. Similarly, 19.1% (n = 52) of the Namibian students and 5.6% (n = 12) of the Finnish students agreed or strongly agreed with the statement "It is difficult to find health information from the Internet" (EHIL5). Furthermore, 51.1% (n = 136) of the Namibian students and 18.5% (n = 40) of the

Finnish students agreed or strongly agreed with the statement "It is easy to assess the reliability of health information from the Internet" (EHIL7).

Table 1. Namibian (n = 271) and Finnish (n = 217) students' responses to the statements of the EHIL screening tool.

Statement/ population[a]	Response, N (%)					P[b]
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	
EHIL1.						<.001
FIN	130 (59.9)	69 (31.8)	18 (8.3)	0 (0.0)	0 (0.0)	
NAM	215 (79.3)	32 (11.8)	8 (3.0)	1 (0.4)	15 (5.5)	
EHIL2.						<.001
FIN	88 (40.6)	104 (47.9)	24 (11.1)	1 (0.5)	0 (0.0)	
NAM	93 (34.4)	63 (23.3)	65 (24.1)	26 (9.6)	23 (8.5)	
EHIL3.						<.001
FIN	43 (19.8)	85 (39.2)	81 (37.3)	6 (2.8)	2 (0.9)	
NAM	130 (48.0)	63 (23.2)	56 (20.7)	12 (4.4)	10 (3.7)	
EHIL4.						<.001
FIN	1 (0.5)	23 (10.6)	64 (29.5)	101 (46.5)	28 (12.9)	
NAM	20 (7.4)	34 (12.6)	76 (28.3)	54 (20.1)	85 (31.6)	
EHIL5.						<.001
FIN	2 (0.9)	10 (4.7)	21 (9.8)	76 (35.3)	106 (49.3)	
NAM	18 (6.6)	34 (12.5)	27 (10.0)	38 (14.0)	154 (56.8)	
EHIL6.						<.001
FIN	18 (8.3)	85 (39.2)	81 (37.3)	27 (12.4)	6 (2.8)	
NAM	60 (22.2)	52 (19.3)	107 (39.6)	32 (11.9)	19 (7.0)	
EHIL7.						<.001
FIN	10 (4.6)	30 (13.9)	87 (40.3)	77 (35.6)	12 (5.6)	
NAM	74 (27.8)	62 (23.3)	68 (25.6)	38 (14.3)	24 (9.0)	
EHIL8.						<.001
FIN	5 (2.3)	40 (18.4)	88 (40.6)	71 (32.7)	13 (6.0)	
NAM	39 (14.6)	52 (19.5)	80 (30.0)	46 (17.2)	50 (18.7)	
EHIL9.						<.001
FIN	22 (10.1)	106 (48.8)	76 (35.0)	10 (4.6)	3 (1.4)	
NAM	92 (34.2)	81 (30.1)	64 (23.8)	16 (5.9)	16 (5.9)	
EHIL10.						<.001
FIN	7 (3.2)	25 (11.5)	79 (36.4)	85 (39.2)	21 (9.7)	
NAM	57 (21.0)	63 (23.2)	77 (28.4)	34 (12.5)	40 (14.8)	

[a] FIN = Finland, NAM = Namibia, [b] Fisher's exact test

With the statement "Health related terminology and statements are often difficult to understand" (EHIL8), 34.1% (n = 91) of the Namibian students and 20.7% (n = 45) of the Finnish students agreed or strongly agreed. With the statement "It is difficult to know who to believe in health issues" (EHIL10) 44.2% (n = 120) of the Namibian students and only 14.7% (n = 32) of the Finnish students agreed or strongly agreed.

5   Discussion

In this study, we aimed to indicate differences in people's health information literacy by finding out how students with different cultural backgrounds responded to the statements of an EHIL screening tool. The study also aimed to reflect on our findings in the light of related studies. Based on the findings, the comparison of the mean values of the EHIL sum variable showed no statistically significant differences between Namibian and Finnish students. However, the comparison of individual EHIL statements indicated clear differences between the two populations.

5.1   Information Infrastructure and Access to Information

Nowadays, it is common for Finnish students to access health information on the Internet besides using other sources of health information. In Namibia, the health information infrastructure is still underdeveloped. According to Anasi, [11] access to and dissemination of health information in Africa is at its lowest development stage. The Namibian government also faces challenges in providing health information to its citizens [12]. This could explain the higher proportion of the Namibian students compared to Finnish students who agreed that it was difficult to know where to seek health information and that the Namibian students liked to get health information from a variety of sources. With the absence of a central source where health information can be obtained along with poor opportunities and low levels of ability for searching the Internet, the Namibian students may make up for this deficiency by seeking information from a variety of sources. The recommendation by Angula [12] for a mobile based system for disseminating and sharing health information in Namibia is therefore a very welcome innovation.

Moreover, Namibian students encountered more difficulties with seeking and finding health information on the Internet. This can be explained due to non-exposure and the unavailability of information and communication technology to the students prior to joining the university. It should be noted that the Namibian respondents were mostly in their first year at the university having come from marginalised communities and schools. A study by Nengomasha et al. [13] showed that only 17% of schools had Internet facilities in Namibia, and 50% of those schools rated the Internet as unreliable. Despite the contribution of Internet access to health information, the Namibian students found it more difficult to find health information from the Internet than the Finnish students. Possibly, the Namibian students' cultural backgrounds had not prepared them to use this valuable tool (see also [14]).

5.2   Lingual Issues Such as Mother Tongue, Second Language, and Reading Culture

There seemed to be a cultural difference related to lingual issues in our findings. It must be noted that the EHIL screening tool is especially targeted for literate populations. The tool is based on a self-reported assessment of the respondents' skills and motivation towards health related information behaviour. The ten statements of the tool are quite generally written. Therefore, we assumed that the tool could more easily be suitable for

use in different cultural environments than those health literacy tools that are based on measuring basic literacy or numeracy.

The higher number of Namibian students who agreed with the statement "Health related terminology and statements are often difficult to understand" could be explained by the fact that unlike the Finnish students who are exposed to medical terms in their own language, the Namibian students read about these medical terms in a second language, English. This is supported by an Audit on Namibia Education System that found that the national rating of English proficiency was below basic, where nearly 80% of learners in six northern regions scored the poorest marks [15]. As English is the second official language of the Namibian students, they also responded to the English, translated version of the EHIL screening tool. Finnish was the first language of the Finnish respondents, who responded in Finnish.

Many articles reporting validation and development of health literacy measures focused on ethnic minority populations whose literacy was limited in their second language. Minority ethnic groups are known to be at a higher risk of numerous diseases and suffer from more severe illnesses than their majority-culture counterparts. They can also be seen as high-risk populations for limited health literacy [16]. Such studies concerned, for example, the Spanish speaking population in the USA [17, 18]. Nguyen et al. conducted a review on the topic in 2015 [19].

Also the cultural background related to reading being a common habit and way of sharing and spending time may explain our findings. A study on the role of rural school libraries in Namibia [20] established that reading cannot be regarded as a social activity that children and adults can share as it was regarded as an activity that one engages in only when it is necessary. This resulted in most learners not having fully developed reading skills as they may not have had a culture of reading [20]. This may also provide an explanation for the Namibian students' responses to the statement "It is difficult to find health information from printed sources". This might be further explained by the fact that the school library system in Namibia's public schools where most of the University of Namibia's students matriculate from is inadequate [13, 21].

The main limitations of this study focused on the lingual issues and the nature of the EHIL screening tool. As the screening was based on respondents' self-assessment, it was impossible to know how they perceive and interpret the statements. These issues might be culturally-bound. With the Finnish students the respondents' mother tongue was used, whereas with the Namibian students English, which is their second language or language of instruction, was used. Therefore, the possibility of misinterpretation and misunderstanding of the wording of the statements should be taken into account when looking at the findings of this study. The data were based on the responses to a self-reported questionnaire. The data were collected at a single point in time, and we were not able to investigate changes in the populations or draw conclusions on cause and effect. More research is needed in order to generalize the findings.

5.3   Future Studies

Niemelä et al. [4] conducted exploratory factor analyses on data collected with the EHIL screening tool among the Finnish students of this study to examine the tool's factorial

structure. In the Finnish data included in the present study, the following factorial structure for the scale was suggested: motivation (EHIL1–3, EHIL9), evaluation (EHIL6, EHIL7), and confidence (EHIL10, EHIL5, EHIL4). Niemelä et al. [4] did not include EHIL8 referring to the respondents' ability to understand health terminology into the factor analysis but analysed it separately since, according to them, it was a particularly important element of everyday health information literacy. In future studies, the factorial structure of the screening tool will also be analysed with data collected from other samples. This will further help to test the applicability of this tool among populations with varying characteristics and cultural backgrounds. In particular, on the basis of the findings of this study, it would be necessary to increase our understanding of the lingual aspects in this context.

6   Conclusion

As studies on cultural differences related to HIL are still quite rare, this comparative study adds significantly to this body of research. We presented an HIL screening tool that was based on literate individuals' self-assessment and subjective experience in the context of their everyday life when facing health issues. The findings indicated that the EHIL screening tool was applicable in different cultural contexts. If the tool is used in health care, the outcome is highlighted as a screening result for health professionals interacting in care practice. The data and findings of the study can be utilised in the validation of the EHIL screening tool and its further development.

References

1. U.S. Department of Health and Human Services: Healthy People 2010: Understanding and Improving Health. U.S. Government, Washington DC (2000)
2. Baker, D.W.: The meaning and the measure of health literacy. J. Gen. Intern. Med. **21**(8), 878–883 (2006)
3. Hirvonen, N.: Health information matters: everyday health information literacy and behaviour in relation to health behaviour and physical health among young men. Acta Universitatis Ouluensis. B, Humaniora, 133 (2015). http://jultika.oulu.fi/Record/isbn978-952-62-1040-7
4. Niemelä, R., Ek, S., Eriksson-Backa, K., Huotari, M.-L.: A screening tool for assessing everyday health information literacy. Libri **62**(2), 125–134 (2012)
5. Medical Library Association: What is Health Information Literacy? http://www.mlanet.org/resources/healthlit/define.html
6. Dowse, R.: The limitations of current health literacy measures for use in developing countries. J. Commun. Healthc. **9**(1), 4–6 (2016)
7. Dowse, R., Lecoko, L., Ehlers, M.S.: Applicability of the REALM health literacy test to an English second language South African population. Pharm. World Sci. **32**(4), 464–471 (2010)
8. Hunt, S., Dowse, R., La Rose, C.: Health literacy assessment: relexicalising a US test for a South African population. South. African Linguist. Appl. Lang. Stud. **26**(2), 267–281 (2008)
9. Maat, H.P., Essink-Bot, M.L., Leenaars, K.E.F., Fransen, M.P.: A short assessment of health literacy (SAHL) in the Netherlands. BMC Public Health **14**(199) (2014). http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-14-990

10. CIMO: NSS LIS: Library and Information Studies Network. http://www.cimo.fi/programmes/north-south-south/nss-networks/lis

11. Anasi, S.N.I.: Access to and dissemination of health information in Africa: the patient and the public. J. Hosp. Librariansh **12**(2), 120–134 (2012)

12. Angula, N.A.: Mobile Based System for Healthcare Information Dissemination and Sharing in the Namibian Environment. https://www.acdemic.edu/16811312/_A_Mobile_Based_System_for_Healthcare_Information_Dissemination_and-Sharing_in_the_Namibian_Environment

13. Nengomasha, C.T., Uutoni, W., Yule, W.: School libraries and their role in promoting a reading culture: a case study of Caprivi, Omusati, Omaheke, Karas, and Khomas regions in Namibia. J. Stud. Humanit. Soc. Sci. **1**(1), 159–171 (2012)

14. Nengomasha, C.T., Abankwah, R., Uutoni, W., Pazvakawambwa, L.: Health information literacy of University of Namibia students. J. Stud. Humanit. Soc. Sci. **4**(1–2), 179–192 (2015)

15. Heita, D.: Undisciplined Teachers a Bane to Education. Linking Libraries and Academic Achievement. http://www.doe.virginia.gov/VDOE/Technology/OET/llaa/overview.html

16. Shaw, S.J., Huebner, C., Armin, J., Orzech, K., Vivian, J.: The role of culture in health literacy and chronic disease screening and management. J. Immig. Minor. Health **11**, 460–467 (2009)

17. Lee, S.Y., Stucky, B.D., Lee, J.Y., Rozier, R.G., Bender, D.E.: Short assessment of health literacy – Spanish and English: a comparable test of health literacy for Spanish and English speakers. Health Serv. Res. **45**(4), 1105–1120 (2010)

18. Rodríguez, S.A., Roter, D.L., Castillo-Salgado, C., Hooker, G.W., Erby, L.H.: Translation and validation of Spanish-language genetic health literacy screening tool. Health Psychol. **34**(2), 120–129 (2015)

19. Nguyen, T.H., Park, H., Han, H.R., Chan, K.S., Paasche-Orlow, M.K., Haun, J., Kim, M.T.: State of the science of health literacy measures: validity implications for minority populations. Patient Educ. Couns. **98**(12), 1492–1512 (2015)

20. Lumbu, S.: The role of rural school libraries on Namibian children's reading development. In: Paper Presented at the 3rd Annual Education Conference (EDUCon) under the theme "Teaching and Learning for Improved Educational Outcomes" in Rundu, Namibia, 10–12 September 2014 (2014)

21. Iyambo, A.: The Impact of School Libraries on the Reading Culture of Learners: a Comparison of Government and Private Schools in Namibia. (Unpublished Undergraduate Dissertation). University of Namibia, Windhoek, Namibia (2015)

English Language as a Promoter of Media Literacy Education

Tihomir Živić[✉] and Tamara Zadravec

Josip Juraj Strossmayer University, Osijek, Croatia
{tzivic,tzadrave}@kulturologija.unios.hr

Abstract. In a post-literate society, wherein the previous print literacy is augmented to the notion of multi-literacy, media literacy education implies learning and teaching about the media arts to foster the students' ability to access, analyze, create and evaluate messages in various formats and genres. The paper therefore compares appropriation, collective intelligence, distributed cognition, experiment, judgment, multitasking, negotiation, networking, simulation, performance, play and transmedia navigation in a mother tongue (for example, in Croatian) to English, which de facto is a lingua franca. Hypothetically, language instruction within an expanded media literacy concept facilitates a unified empowering and protective perspective, for it provides for an examination of representational typology to detect censorship, commercialization, copyright breaches, gender and racial stereotypes (for example, sexist expression), propaganda, violence and the Internet privacy infringements (that is, cyberbullying) in the new digital "narratives" or "texts," too.

Keywords: Digital narratives · Distributed cognition · English language instruction · Media arts · Media literacy education · Mother tongue · Multiliteracy · Post-literate society · Representational typology · Transmedia navigation

1 Introduction

In media literacy education [1, 2], the students' profiles may be modified from simple consumers to conscious observers, who are capable of discerning commercial profit-driven manipulation or reality constructs fabricated by public relations experts, as hypothesized by media theoreticians [3] in terms of audience, language, production and representation. Henry Jenkins [4] consequently reconfigures these media landscapes to better reflect participating industry professionals' practices, that is, to address their circulatory and distributional regulations, as well as to appease the differences and satisfy the target audience's expectations, so an involved modern juvenile has to acquire a new set of media-influenced cultural competences and social skills [5, 6].

1.1 Rationale

Constructively contextualized and pioneered by the Center for Media Literacy's 2010–2011 interviews and curricular training resources provided by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), an integrated, modern critical and

theoretical framework has been historically established in the United States (US), European Union (EU), and beyond [7], being derived from the variously focused but generally positive experiences that usually date back, in the case of Europe, as far as the 1990s (Finland, Sweden, Denmark, France, Germany, the Netherlands, and so forth). Nonetheless, pursuant to the notes by Culver, Hobbs, and Jensen [8], this paper's objective is a congenial demonstration that a concept of media literacy education should be extended to also encompass "teaching about media," not merely a state-of-the-art multimedia technology application in classrooms, especially when it comes to English Language instruction.

1.2   Methodological Application and Contribution

In terms of a communicational interactivity, this paper's outcome is dedicated to an exemplification of how formal, informal, and non-formal English Language instruction, assisted by the ideas of active inquiry, affinity space, critical thinking, and lifelong learning, may be successfully instrumentalized and transmediated in a realization of the thematic and terminological (intertextual) connection between history, literature, motion pictures and television, consequently promoting an objective appraisal of contemporary audiovisual digitization of mass culture, as well as collaborative problem-solving techniques, necessary for an individual's engaged democratic socialization. Involving its paradigmatic selections and syntagmatic combinations, the English language is a frequent vehicle of multimedia products' syntheses and information disseminations, whereby a proper study of its codified conventional semantics and salient linguistic details may indeed increase the students' media literacy and their inclusive mental capacities.

2   Translational Requisitions

Presently, the English language noticeably imitates the former (Vulgar) Latin that was used as an ancillary, vehicular lingua franca throughout a substantial part of common European history. Still, the real lingua franca, literally denoting the "Frankish tongue" in a manner deployed to demarcate all the West European languages of that time, is of a more recent date. It actually was a Renaissance mixture of the Italian and the Arabic, French, Greek, Portuguese, Spanish and Turkish, established to facilitate the Italian navigation and commerce with these areas of the Ottoman Empire. The latter examples imply French in European foreign affairs and Russian in the states of the former Union of Soviet Socialist Republics (USSR). In addition to English, Arabic, Chinese, and Spanish gradually become the linguae francae as well.

What is more, in the EU territory, a metalinguistic analysis of the notion of Eurospeak should also be mandatorily taken into account in our post-literate society that constantly and increasingly produces various transmedia contents. Thus, when dealing with media literacy education and the new digital narratives in terms of a collective appropriation of the English language, one should be cognizant that Eurospeak is primarily a jargon, that is, a linguistic variant that utilizes a specially coined interdisciplinary terminology, frequently that of journalism, Information and Communication Technology (ICT), and the like, in addition to the literary one. Exactly for that reason, it simultaneously represents a kind of an unexpected,

oxymoronic opposition: due to its inclusiveness, it enables—or at least significantly alleviates—a connoisseurs' communication in a new environment within the EU Member States, but without additional explanations it regularly becomes excessively exclusive (and therefore more difficult to decipher) to the wider circles of unfamiliarized listeners, readers, or viewers of the same information or of the identical multimedia contents.

With time, in our multitasked, networked society, numerous Internet- and media-related English terms that were almost completely enigmatic only yesterday have been negotiated as quotidian vernaculars. Thereby, most frequently, there are still no appropriate equivalents for some of them in many European arterial languages. Lots of these expressions are difficult to translate with a single word, especially if the notion itself is a neologistic acronym. A historical datum that some of the contemporary EU Member States in Central and Eastern Europe (CEE) were a part of totally different, occasionally censored, propagandistic, and stereotyped multimedia régimes of the ex-communist Eastern Bloc (for example, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Rumania, Slovakia and Slovenia) as long as up to the 1990s is reflected in this fact philologically, too.

Consequently, media literacy instruction in a higher educational institution should generally approximate such a vocabulary to the listeners, readers, or viewers commensurate with a level of their prescience, and English language proficiency may complement the mother-tongue definitions and denotations, suggestively promote overall comprehension, and raise awareness of the amended connotations which this ever-expandable lexis contains in academia as well. Especially, such an approach also provides for a necessary lucid insight in lexical discrepancies or in an inconsequence that is not instantly coherent, intelligible, or logical, in spite of a circumstance that the media inundate their consumers with such a phraseology, mostly with that of an Anglophonic provenience. For instance, the English computerese and journalese recurrently exemplify attractive, pronunciational acronymic adjustments, guided by the rules of their usage incidence. As attested by multiple indices, every now and then one should treat even an apparently known multimedia idiomaticity and characteristic parlance very carefully, particularly if uttered in a foreign language such as English. Sporadically, supplemental traductological clarifications or explications may be beneficial, for the language blocks may assume and infer subtextual associations in an arbitrary multimedia verbalization that they usually do not invoke in an everyday communication, be it in the first (native) language or in English. In view of that, Sonia Livingstone suggests that media literacy should be comprised of a "four-component model" [9, pp. 18–20].[1]

3 A Future Perspective

The aforementioned specimens circumstantiate the significance of a correct renditional interpretation and subsequent conversion, paraphrase, and transformational utilization of a harmonized, recommendably prescribed multimedia terminology, especially when

---

[1] A contemporary media literacy exactly implies an ability to access, analyze, create or evaluate the trans-contextual messages to avoid perplexity.

transmitting a complete contextual scope of an adopted European segment, such as the acquis communautaire.[2]

In fact, the very indicative notion of "multimedia terminology," that is, of the one that also implies linguistic competence, would significantly entail a special set of expressions characteristic of an entrepreneurial, professional (vocational), or a scientific branch, being a necessary foundation for an efficacious and undisturbed communication while perfecting the knowledge sharing within an entire Ipri's transliteracy concept [10], thus accompanying general societal development. As all the listeners, readers, or speakers within a discipline principally apply the same or at least compatible multimedia terminology, such a lexicon prevents the possibilities of ambiguities, confrontations, dilemmas and errors, particularly if an accurate, legitimate authenticity or an explicit veracity are required. Moreover, the EU promotes the principle of a "multi-speed Europe" that pertains to a scope of acceptance of its attainments even linguistically, and this commendation and an advocated deepening of a Member State's involvement in all the spheres of a common European coexistence, unless an opting-out clause is being effectuated, transcend the mere flexicurity or governance models.

Thus, the scientific-teaching units of many European universities already feature a unique integrative model of undergraduate and graduate study programs with the courses of studies in Media, Culture, and Communication. Besides interdisciplinarity, such open universitarian scholarship types aspire to promote the acquisition of theoretical knowledge and competences in various analytical discourses, for instance, in cultural anthropology, information science, and in the media, while applying innovative educational prototypes and conjoining them with practice directly. A multimedia-enhanced instruction, especially that of the English Language, is then methodologically based on an alteration in didactic paradigm, oriented toward "learning through research," the development of students' appreciation of local, regional, and national social participation, and their professional qualification for the labor market.

Hence, it is not difficult to realize what Europe unequivocally demands in its educational media literacy policy, for it may be epitomized as a "hard core," that is, as the intrinsic cooperative values that promote close collaboration, frequently even teamwork, between the neighboring countries with a similar historicocultural background. As this tendency has been gradually manifested in our areas, too, it is quite realistic to contemplate that a day on which some new pages of the European media literacy-oriented Green Book will be open to discussion is not so far away. Although the real expenses incurred by the multimedia content translations in the European minority languages may be enormous, they confirm a clear European directive toward a respect for diversity, cemented already in 2001 by a UNESCO-supported Council of Europe's decision on the proclamation of the European

---

[2] Namely, as of 1958, this accumulative legislative corpus comprises all the decisions, declarations, directives, international agreements, obligations, regulations, resolutions and treaties of the European Union, as well as the judgments of its Court of Justice. —On legal aspects of the EU's acquis communautaire, cf. EUR-Lex: Access to European Union Law, http://eur-lex.europa.eu/home-page.html?locale=en; on a linguistic dimension of the EU's acquis communautaire, cf. EuroVoc: Multilingual Thesaurus of the European Union, http://eurovoc.europa.eu/drupal/?q=request&uri=http://eurovoc.europa.eu/210682.

Year of Languages (EYL). Likewise, centered on the aforementioned pronouncement of the Strasbourg, France-based organ, that is, on an initiative promulgated to circa 800 million European citizens, the European Day of Languages (EDL) is celebrated annually on September 26.

4   The Modes to Become Intermedially Literate

As the contemporary comparative curricula and syllabi of universitarian interdisciplinary graduate programs in digital humanities, that is, in Cinematic Arts, Liberal Studies, Literary and Cultural Studies, Popular Culture and the like, regularly entitle the bachelors to pursue their edification in the second cycle both in the EU and in the US, such models empower the enrolled students to be progressively profiled as experts in the domain of Media Studies, frequently with a pronounced emphasis on English rhetoric and on visuality in a broader aspect of Critical and Sociocultural Studies in Education. Usually, the senior academic levels completely individualize such instruction, adjust it to the students' interests and needs, and base it on the students' hands-on intermedial experiences in various cultural institutions, libraries, and media houses, as well as on consultations with theses advisers. Hereby, an importance universally attached to the learning and teaching of the English language as a media literacy promoter at any age is worth noting: be it for the sake of an individual advancement or as an upgrade to the overall sociocultural development, it opens the entirely novel possibilities in the EU, a community with more than 500 million potential media consumers, while a correlation between an official EU minority language such as Croatian and a global player such as English may theoretically educate the recipients (that is, the listeners, readers, and viewers, as well as the students in this particular case) to examine various scientific fields both in the arts, digital humanities, and social sciences.

In academia, media literacy education may be formalized and structuralized as follows:

- a core course;
- a mandatory vocational course;
- a mandatory workshop;
- an elective course.

With its new approach to the instruction outside a higher educational institution, a mandatory workshop, alternatively styled as a practicum, seminar, or webinar, may facilitate a unification of media theory and professionalism with practice while collaborating with the cultural institutions, for instance, with the archives, broadcasters, galleries, libraries, museums, publishers, theaters and the like, and media practitioners. Thereby, an education participant has an opportunity to directly encounter various forms of public communication and managerial and organizational affairs in the private and public cultural sectors. Additionally, in order to foster mobility, the departmental elective courses may be commonly combined with the non-departmental artistic or scientific ones offered by the same university.

This attitude and type of tactical methodology alleviates employability in marketing, public relations, and versatile media, educating the future successful bloggers, journalists,

magazine article writers, radio and television reporters, and so on. On this point, fluency and proficiency in one or more foreign languages, principally in English, are the two essential aptitudes of a prosperous multimedia entrepreneur. The impact of a foreign language such as English has never been dubitable; nevertheless, in a period of overall globalization and media internationalization, it is not an option but a necessity.

Accordingly, the English language in media literacy education, used as a mother-tongue supplement, may expand the rudimentary ideas of diversity and multiculturalism, plurilingualism, and polyglossia, as well as that of a more general promotion of a privately or professionally motivated foreign language acquisition. The effect may be augmented by the perception of continued education, whereby a lifelong learning concept implies an educational systematization in all life epochs and in all of its realizational forms (that is, as formal, informal, and non-formal learning). The impression is frequently being replaced by lifelong education or similar syntagmata, but it is worth emphasizing that these two phrases are not identical. While "education" denotes just an organized way of learning, "learning" is comprehended as a broader model, also involving unintentional, unorganized, and spontaneous knowledge acquisition that can be conducted throughout a life span.

During the past 50-odd years, major intermedial and technological changes have happened that influenced the labor market. In the 1960s, the so-called "lifelong learning concept" was more considerably lemmatically devised. It was initially reduced to the instrumentation of courses, seminars, workshops and other knowledge transfer forms. Foreign experts mostly participated in these organized gatherings as visiting lecturers. However, this non-formal knowledge transfer modality proved to be insufficient. Advocated was an orchestrated involvement of universities in a curricular lifelong learning design, especially when the Council of Europe identified the following eight crucial competences, enumerated in Table 1, as the core ones, necessary for all the individuals concerning their personal development, employment, realization and social inclusion:

Table 1. Core competences identified by the Council of Europe

Competence type
Native-tongue communicational skill
Foreign-tongue communicational skill
Mathematical, scientific, and technological knowledge comprehension and usage
An ability to use digital technology
Learning capacity
Civil and social skills in a multicultural environment
Entrepreneurship
Cultural communicational skill

Foreign Language Acquisition and Media Literacy. As foreign language learning is a continuous process encompassing comprehension and the acquisition of reading and writing as well as the oral competencies, all the mentioned abilities are being constantly intertwined and upgraded.

In practice, one frequently differentiates the learning of a foreign language in general and vocationally-oriented foreign language acquisition, whereby one may specifically speak of

foreign language acquisition in media literacy education. Thus, when discussing channeled learning of a foreign language such as English, one has to bear in mind that this process does not only encompass the acquisition of linguistic knowledge in the sense of certain intermedial vocabulary attainment, but it also implies a far more complex procedure. Subsequently, in this paper, "lifelong learning" is terminologically deployed to designate the acquisition and modernization of all types of capabilities, interests, knowledge and qualifications, while "lifelong education" stands for all types of formal, informal, and non-formal education.

Pursuant to the learning domains taxonomy that differentiates six levels [11, 12], knowledge, followed by understanding, application, analysis, synthesis and evaluation, is evidently necessary, but it should be enriched by an applicative value to satisfy the needs of contemporary media consumers at the aforementioned levels and educative forms. The recipients' achievements, or learning outcomes, would therefore demonstrate the clearly evinced competencies, that is, an expected degree of knowledge and necessary adroitness and capabilities. Toward the end of his or her intermedial tutelage, a media consumer would be expected to apply the acquired knowledge, skills, and attitudes in a concrete multimedia practice. The learning outcomes thus represent the expressions with which the educators formulate what a recipient or multimedia student should understand and be able to exhibit subsequent to the completion of his or her teaching process.

What is more, in a post-literate "culture of knowledge," to be linguistically competent in a multimedia environment implies a familiarity with the etiquette, a possession of adequate presentational and social skills, an ability to participate in a meeting, a capacity to hold a conversation in a foreign language, an aptitude to communicate in that language and compile a communiqué, email, a letter, and so on. All of these are the skills that have to be the components of a foreign language learning within a multi-literate education.

Nonetheless, in relation to a "digital society," it is assumed that global ICT demand nowadays represents a market in the worth of € 2,000 billion, whereby only a quarter of companies are located in Europe. Likewise, in places, Europe still lags behind the US and other countries in the field of high-speed Internet, which is necessary for full implementation of modern technology-enhanced linguistic courses, media literacy education, and distant learning in general. In turn, it exerts a negative influence on a possibility of innovations, knowledge expansion, and distribution of merchandises and services online, especially in the more remote areas.

5   Conclusion

Within an intercultural socialization process, that is, during a person's adaptation to the normed conditions of the Cyber Age and the formation of one's identity in a participatory culture, a modern hypermedia or multimedia literacy educates the audience, especially globalized juveniles, to assume a manipulation-free, mature attitude and consume interactive audiovisual contents (for instance, via radio and television) or digitized textual matters (for instance, via magazines and newspapers posted to the Internet) independently and responsibly while controlling and profiling critical thinking of their own. Since multimedia represents an extremely influential vehicle that incrementally affects the quotidian human

lifestyles throughout all phases of its senescence, from adolescence to seniority, the fact that a considerable portion of these materials is promoted in English, in addition to a native idiom, corroborates a hypothesis that such a constant exposure may auspiciously contribute not only to correct pronunciation and thesauri acquisition but that it may also supplement Information and Media Literacy (IML) comprehension in an arterial language, be it of a terminological glossary or of a palaver. Epistemologically, this is a sign, or actually a reflection, of major ontological modifications of a "digital native" [13] that pertain to the electracy of our virtualized world, that is, to the digital mashups and an "electrical literacy" [14] which we have tried to illustrate in this précis.

Nonetheless, one should observe the problematics intergenerationally and sentiently, for the institutionalized multimedia conveys the weltanschauungs, too, which necessarily do not have to comply with an ethical value system, a prevalent moral code, a public opinion or with a prescribed linguistic paradigm of a recipient society. Intermittently, specifically under the influence of a pragmatic English smartphone or website textese, other nascent dialects tend to be paralinguistically Anglicized and orthographically and prosodically abbreviated, whereby the expected syntactic elements may be replaced by emoticons, logograms, or pictograms. Thereby, the insecure adolescents seem to be most susceptible to refer to multimedia as a response authority even on the occasion of some delicate issues, so their perception of reality, which is sometimes radically different from a glamorized multimedia portrayal, may be easily jeopardized, as is their pastime, if an excessive multimedia dependency syndrome or an Internet Addiction Disorder (IAD) is already manifested.

Therefore, the acquisition of multimedia competence empowers a person to skillfully discern a right information from the potentially problematic factors and protect his or her privacy from the Internet predators, particularly in case of an anonymous cyberbullying, exemplified by harassment, intimidation attempts, or sexualization transmitted via cellphone texting, digital storytelling, emailing, photoshopping, podcasting and videocasting or via social networks' chatrooms. It also elevates his or her awareness of an interconnection between a violence sequence depicted and a risky or undesirable behavioral pattern in general.

Finally, one of the decisive assignments of media literacy education is to objectively signalize the presence of detrimental phenomena such as biased reportage or of an exaggerated reliance on online pornography, shopping, videogaming or virtual relationship establishment, while expostulating about these perils with end users. A multimedially literate (or transliterate) individual will advocate creative dignity and persistency rather than an anarchic, impersonal extravaganza or passive consumption and (lexical) uniformity, recognizing the dominance of a lingua franca such as English, but aspiring to preserve the specificities of a national verbalization as a part of its distinctive, unique character.

The Role of English. As a multidimensional media literacy points toward a continuous ability to access, analyze, communicate and eventually evaluate undistorted information to a massive and remote audience in a variety of nonprint or printed formats, it necessarily invokes the existence of a uniform coding and decoding instrument as a semantic vehicle for that purpose, as the verbal implications have to remain identical irrespective of a channelization modality applied. At the present time, the English language is recurrently deliberately selected as a consistently universal, international protagonist of an

efficient multimedia comprehension, recognition, and symbolization that complements a mother tongue. Yet, such a role of English in media literacy education may not be exhausted in a mere instruction about an Anglicized perusal and script, that is, about grammatical conventions and registers, or in a private auditive and oral adeptness—it may also implicate a critical, emotional, and esthetic rationalization about visually transmitted topics, or a cognitive construction, preparation, and production of consumable contents for multiple platforms, such as cinematography, photography, or videography [15].

As is the case with an identity-establishing maternal language [16, 17], English in media arts is, correspondingly, a pragmatic aggregate of an abstractly organized sound system (phonology), its acoustic audioception and neurophysiological production (phonetics), and of its morphology, semantics, and syntax. Characterized by its pronounced societal interactivity especially in today's assimilative commerce, education, and high technology, English is an appreciated, habitually favored idiom for consequential or instructional verbal communication, controlled valorization and stylistic phraseology, or for textualization of one's sentiments, both imprecisely or precisely, in a scripted linguistic ecology on a global scene [18].

In the face of other options and their potentials, textualization as a media product descriptor is still most frequently used, for example, in advertisements of a motion picture theatrical release, photographic captions that complement a newspaper report, radio and television program printouts, videogame or website articles, and so on, whereby an international prevalence of English is very noticeable in this aspect, too. On the other hand, in media literacy education and in media products alike, vernacular literacies (such as the Croatian one) are locally used as the expressions of authentic identities, that is, both familially, in private domains, and in (political) public domains. In the end, the relevant artistic, literary, and performative facets of a language, notably that of English, should also be mentioned, inasmuch as media literacy education also permits and supports a qualified historicosocial comparison between a printed fiction and the so-called "celluloid literature," that is, a drawing of parallels between a common physiognomy of a text and a motion picture (for example, their genres and plots, conflicts and resolutions, and the like), and a meticulous exploration of a lingo and a film-oriented visual language, with the terms such as cutting, fading, lighting, and the like.

With English being a pivotal player in the global arena dominated by the commercialization of culture and computerized multimedia, a spectrum of World Englishes in the "Gutenberg galaxy" [19, 20] has been triplicated, that is, English has simultaneously become an arterial, foreign, and second language of edutainment and infotainment that transmits the definitions, erudition, ideas and philosophy, but it has also been occasionally used for political indoctrination and manipulation, as in a voting mediacracy [21, 22]. Yet, only assisted by an appropriate media literacy education may these alphabetical codifications be expressively articulated and verbalized into pronounceable or scriptable vocables, that is, in paragraphs and sentences, or sequenced into an evocative imagery.

References

1. Journal of Media Literacy Education. http://www.jmle.org
2. Kellner, D., Share, J.: Critical media literacy is not an option. Learn. Inq. **1**(1), 55–69 (2007)
3. Buckingham, D.: Media Education: Literacy, Learning and Contemporary Culture. Reprinted edn. Polity, Cambridge (2007)
4. Jenkins, H.: Confronting the Challenges of Participatory Culture: Media Education for the 21st Century. The MIT Press, Cambridge (2009)
5. Potter, J.: Media Literacy, 7th edn. SAGE Publications Inc., Thousand Oaks (2013)
6. Wilson, J.R., Wilson, S.R.: Mass Media, Mass Culture: An Introduction, 5th edn. McGraw – Hill Higher Education, New York (2001)
7. The European Charter for Media Literacy. euromedialiteracy.eu
8. Culver, S., Hobbs, R., Jensen, A.: Media Literacy in the United States. International Media Literacy Research Forum (2010). http://www.imlrf.org/united-states
9. Livingston, S.: What is media literacy. Intermedia **32**(3), 18–20 (2004)
10. Ipri, T.: Introducing transliteracy: what does it mean to academic libraries. Coll. Res. Libr. News. **71**(10), 532–567 (2010)
11. Bloom, B.S. (ed.): Taxonomy of Educational Objects: The Classification of Educational Goals – Handbook I: Cognitive Domain. McKay, New York (1956)
12. Bloom, B.S. (ed.): Taxonomy of Educational Objects: The Classification of Educational Goals – Handbook I: Cognitive Domain, 2nd edn. Addison Wesley Publishing Company, Boston (1984)
13. Prensky, M.: Digital natives, digital immigrants. Horizon **9**(5), 1 (2001)
14. Ulmer, G.L.: Internet Invention: From Literacy to Electracy. Longman, New York (2003)
15. Graddol, D.: The Future of English: Guide to Forecasting the Popularity of the English Language in the 21st Century. The British Council, London (1998)
16. Harley, T.A.: The Psychology of Language: From Data to Theory, 2nd edn. Psychology Press Ltd./Taylor & Francis Inc., East Sussex/New York (2001)
17. Harley, T.A.: The Psychology of Language: From Data to Theory, 4th edn. Psychology Press, East Sussex (2014)
18. Crystal, D.: English as a Global Language, 2nd edn. Cambridge University Press, Cambridge (2003)
19. McLuhan, M.: The Gutenberg Galaxy: The Making of Typographic Man. University of Toronto Press Incorporated, Toronto (1962). Centennial edn. University of Toronto Press, Toronto (2011)
20. Media and Information Literacy. http://portal.unesco.org/ci/en/ev.php-URL_ID=15886&URL_;DO=DO_TOPIC&URL_SECTION=201.html
21. Phillips, K.P.: Mediacracy: American Parties and Politics in the Communications Age. Doubleday, New York (1974). 1st edn. Doubleday, New York (1975)
22. Voices of Media Literacy. http://www.medialit.org/voices-media-literacy-international-pioneers-speak

Social Media Networking Literacy and Privacy on Facebook: Comparison of Pupils and Students Regarding the Public Availability of Their Personal Information

Mirko Duić[(✉)] and Paula Džapo

Department of Information Sciences, University of Zadar, Zadar, Croatia
miduic@unizd.hr, padzapo@student.unizd.hr

Abstract. The paper presents results from the research of the personal information privacy behavior of 200 pupils and 200 university students who are members of Facebook. The content analysis method was used to quantitatively determine and compare the extent to which the various types of personal information about pupils (about 10 to 13 years old) and students (about 18 to 24 years old) are publicly available on their Facebook profiles. The qualitative content analysis was used to determine examples of potentially compromising personal information disclosed by ten pupils and ten students. An important finding was that pupils and students publish a lot of personal information available to anyone with a Facebook account. Some of this information could be harmful for them. Pupils and students mainly do not publish the most private personal information such as their political views. However, some of this information could be assumed indirectly through the other published information.

Keywords: Social media networking literacy · Privacy · Facebook · Pupils · Students

1 Introduction

Globally, social networks have become digital meeting places of a large number of people. One of the most popular social networks is Facebook, according to the Alexa web portal, the third most visited website in the world with 936 million visitors daily [1], as well as the third most visited website in Croatia [2]. There were 1,241,000 Facebook users from Croatia in the year 2010 and 56% of them were between 13 to 24 years old, according to the Facebakers.com web portal [3]. Facebook has members of all ages, but young people are especially numerous members. For example, in the USA Facebook is used by 71% of young people between 13 and 17 years old [4]. Users of Facebook share a lot of personal information with their Facebook friends. But often this information is also available to people who are not their Facebook friends. Although Facebook has a privacy setting to help users manage their information disclosures, many users do not take the effort to limit the level of availability of personal information [5]. Excessive and unwanted availability of personal information could pose a risk, especially for young

users [6]. Public availability of personal information on Facebook profiles enables various unwanted uses of that information: stalking, building a digital dossier and manipulating users [7]. As one of the characteristics of Facebook is that its users must disclose information to various audiences simultaneously, this increases the likelihood of various types of risks occurring. For example, the same Facebook message might be read by friends of the student, his professors, relatives or people he does not know [8]. Gathegi points to the problem of "oversharing": sharing of personal information that can be harmful to the user in a way that it can intrude into the privacy of users and those who are connected to them [9]. Shared information can have harmful consequences later in life. One example is given in the study, which established that personal information publicly available on Facebook does have an effect on employers' decisions about who they will hire [10]. Strong development of various information processing and data mining technologies such as face recognition technology, also opens the possibility of using the personal information from Facebook profiles for unforeseen and unwanted purposes [11].

Considering the high availability of personal information on Facebook and various possibilities to misuse this information, it is not unusual that many researchers emphasize that Facebook users should gain skills and knowledge which will help them to enhance managing access to their personal information published on Facebook. Gathegi thinks that social media network users need to have some level of literacy that will allow them to estimate the proper balance between their sharing activities, the needs for their privacy and the privacy of their contacts. He defines social media literacy "as the ability to appreciate the risks posed by social media and to make calculated decisions when dealing with such social media in order to make a careful balance between the needs for sharing, privacy, and legal compliance" [9, p. 102]. Other authors also divert attention to the importance of building skills and gaining knowledge for better privacy protection on social networks. Špiranec and Banek Zoric [12] consider that people need information literacy 2.0, the literacy that has its focus on issues related to privacy. Beutelspacher says that with the new possibilities of Web 2.0, other traditional skills like privacy or data security, become increasingly important [13]. There are opinions that information on personal data protection and guidance on web behavior needs to be introduced in the curriculum of LIS and non-LIS studies [14]. Many other authors also emphasize the skills and knowledge related to digital privacy protection as the important part of the literacy of the citizens in a digital environment [5, 15–19].

2   Studies About Privacy Behavior in Digital Environment

Gross and Acquisti explored the online behavior of more than 4000 students to determine the amount of information they disclose on Facebook and to study their usage of the site's privacy settings. This study is interesting because it is the most similar to our study regarding the research method and subjects. Also, it gives a detailed picture of personal information revelation and privacy concerns "in the wild, rather than as discerned through surveys and laboratory experiments" [7, p. 72]. Based on the research results, the authors concluded that students generously provide their personal data and that they

are quite unconcerned about their personal privacy. Another study explored student information disclosure practices on Facebook and their attitudes about privacy [20]. It was established that students publish a large amount of personal information. Contrary to the personal information privacy behavior of students, Sonia Livingstone established that teenagers are pretty concerned about their privacy - they make thoughtful decisions about what, how, and to whom they reveal personal information [21]. Danah Boyd also claimed that teens care about their privacy, "but how they understand and enact it may not immediately resonate or appear logical to adults" [22, p. 56]. She described the difference between non-mediated and mediated interpersonal conversations. In non-mediated interpersonal conversations, such as when two people are chatting in a café, the conversation remains private due to politeness social norms of strangers sitting in a near proximity. In mediated interpersonal conversations, such as conversations through social media networks, "it is far easier to share with all friends than to manipulate the privacy settings to limit the visibility of a particular piece of content to a narrower audience" [22, p. 62]. However, Boyd emphasized that teenagers restrict the visibility of content when they think that certain information is sensitive. Park found out that older users are less skillful in privacy control behavior on the Internet and that female users score lower in technical knowledge and behaviors [5]. In one of the reports published by the Pew Research Center it was established that: 60% of teen Facebook users keep their profiles private (visible to friends and followers), 25% of teens keeps their profile partially private (visible to friends, followers and friends of friends), 14% of teens keeps their profile public (visible to everyone). Authors concluded that teen social media users do not express a high level of concern about third-party access to their data [23]. Gathegi thinks that one way to improve the skills and knowledge about managing personal information privacy behavior on Facebook and other social networks, especially among young users, is to educate them about social media network literacy. He says that even at universities, users seem to be unaware of the risks of posting online. Therefore, it is important that social media users learn "quite early what inappropriate online behavior is, and what the risks of 'oversharing' are" [9, p. 106].

3 The Research Goal and Methodology

In this study, the research goal was to explore and compare the extent to which personal information of pupils (about 10 to 13 years old) and university students (about 18 to 24 years old) is publicly available on Facebook. The data from the Facebook profiles of university students and pupils were collected in March and April 2016. The research was conducted in three phases. In the first phase of study the content analysis method was used to quantitatively determine the extent to which pupils' and university students' personal information of the following data types are publicly available on their Facebook profiles: Posts, Photos, Videos, Friends, Groups, Interests (Film, Music, Books), Check-ins, Events, Religious Views, Political Views, Biographical data (Hometown, Birth Date, Relationship, Family Members). We tried to determine what is the extent of publicly available items for these data types by counting the number of all items that were publicly published on Facebook profiles of pupils and university students. The

term "publicly available item" designates a specific published personal information that is available to every Facebook user. The term that we used as a unit of measure for counting the individual occurrences of the specific data type is an "item". In the second phase of study the method of comparative analysis was used to compare the extent to which various types of personal information about pupils and students are publicly available on their Facebook profiles. We made a comparison of the percentage of pupils and students that published at least one item in a specific data type of personal information. Also, we made a comparison of the average number of items that were published by pupils and students in a specific data type.

The stratified random sampling was used to select 400 Facebook profiles for the first two research phases. One hundred profiles of male university students and 100 profiles of female university students were randomly chosen from among Facebook community "Sveučilište u Zadru" which gathers students from the University of Zadar in Croatia [24]. The majority of university students in the sample were citizens of Croatia. The university students were about 18 to 24 years old. The Facebook profiles of pupils were selected in the following way: the 100 profiles of female pupils were randomly chosen from among the pupils' Facebook community "OK je OK!"; 100 profiles of male pupils were randomly chosen from among the Facebook friends of the members of Facebook community "OK je OK!" [25]. We had to select Facebook profiles of male pupils in this way because members of Facebook community "OK je OK!" are mostly female pupils. The majority of all the pupils in the sample were citizens of Croatia as well as citizens of two neighboring countries: Serbia, Bosnia and Herzegovina. The pupils were about 10 to 13 years old. It is important to note that the age of university students and pupils of elementary and secondary school could only be approximately estimated because the data about date of birth is rarely present on Facebook profiles. Therefore, age can only be estimated based on the type of analysed Facebook communities and by looking Facebook profile photos of students and pupils, as well as other photos in which they are present. In addition, citizenship of pupils and students, as well as other demographic characteristics, could only be estimated based on indirect information, for example, the type of analysed Facebook communities or language with which members of these communities communicate with each other.

In the third phase of the study the qualitative content analysis was used to find the presence of publicly available personal information that could be harmful to Facebook users. The stratified random sampling was used to select ten Facebook profiles of pupils (five were men and five were women) and ten Facebook profiles of university students (five were men and five were women) from the sample of 400 Facebook profiles used in the first two phases of study. From the list of 100 Facebook profiles of male students which were examined in the first phase of research, we randomly selected five Facebook profiles for the qualitative content analysis, using the following method: we selected every 20th Facebook profile. We used the same procedure of selection of five profiles of female students and five profiles of female pupils, as well as five profiles of male pupils. The reason for using this kind of random selection was to get insights about the privacy behavior of examinees who are diverse with regard to their privacy protection behavior.

4   Findings

4.1   Findings from the First Phase of the Study

In the first phase of the study, we determined the extent to which pupils and university students publish items in various data types. Using the quantitative content analysis of the Facebook profiles of 200 pupils we determined the extent to which their personal information is publicly available on the profiles. Research results for the 15 most populated data types are presented in Table 1.

Table 1. To what extent pupils publish items in 15 most populated data types

Part 1: Percentage of pupils that published at least one item		Part 2: Average of items published by pupils	
Data type	Pupils	Data type	Pupils
Photos	99.5%	Friends	246.4
Gender	98%	Photos	60.46
Posts	72.5%	Music	32.01
Groups	70.5%	Sports	25.36
Music	51.5%	Movies	16.01
Friends	51%	TV shows	14.49
Sports	50.5%	Posts	6.18
Movies	48%	Groups	5.28
TV shows	45.5%	Apps & games	4.49
Apps & games	42%	Reviews	1.81
Current city	39%	Books	1.59
Hometown	38%	Check-Ins	1.48
Primary school	26.5%	Gender	0.98
Books	26%	Family members	0.64
Reviews	22%	Current city	0.39

Data types in which at least one item was published by more than a half of pupils are: Photos, Gender, Posts, Groups, Music, Friends, Sports. Considerable percentage of pupils have published at least one item in data types about their interests: Movies, TV Shows, Apps & Games. Only the interests for books were published by considerably smaller percentage of pupils. Among biographical data, the largest percentage of pupils have published at least one item in the following data types: Current City, Hometown, Primary school. If we look beyond 15 most populated data types, this is biographical data in which at least one item was published: Family Members (21%), Life events (11.5%), Interested in (8.5%), Relationship (9.5%), About You (2.5%), Birth Date (2%), Other Places (2%), Birth Year (0.5%). Also, these are the non-biographical data types in which at least one item was published: Check-Ins (21%), Videos (12%), Favorite quotes (3%). It is worth mentioning that there are no pupils or there are an extremely small number of them who have published at least one item in these data types: Mobile Phone (0.5%), Email (0.5%), Address (0%), Religious Views (0.5%), Political Views

(0%). These most private data types of personal information are mostly unavailable on student Facebook profiles. However, some of this sensitive information can be discerned indirectly through the qualitative analysis of Facebook profiles as will be shown later in the presentation of the research results from the third phase of the study.

Part 2 of Table 1 presents averages of items published by pupils in the 15 most populated data types. On average, a pupil has 246.4 friends, 60.46 published photos and 6.18 posts. On average, pupils published the largest amount of items in data types about their interests and especially about their music interests: 32.01 items. Other interests that have a high average of items are: Sports, Movies, TV Shows, Groups, Apps & games. In comparison to these interests, pupils published considerably less information about books.

Using the quantitative content analysis of the Facebook profiles of 200 university students, we determined the extent to which their personal information is publicly available on their profiles. Research results for the 15 most populated data types are presented in Table 2.

Table 2. To what extent students publish items in the 15 most populated data types

Part 1: Percentage of students that published at least one item		Part 2: Average of items published by students	
Data type	Students	Data type	Students
Photos	94%	Friends	167.35
Posts	95.5%	Photos	30.64
Groups	71.5%	Music	18.62
Gender	68%	Groups	7.29
Current city	43.5%	TV Shows	5.66
Hometown	40.5%	Check-Ins	5.32
Music	40%	Movies	5.06
Friends	37.5%	Posts	3.89
College	37%	Sports	3.68
Check-Ins	36.5%	Events	5.19
TV shows	36%	Books	1.42
Sports	35.5%	Apps & Games	1.38
Movies	31%	Restaurants	0.93
Books	29.5%	Reviews	0.76
Reviews	27.5%	Gender	0.7
Apps & games	26%	Life Events	0.46

Data types in which at least one item was published by more than half of the students are: Photos, Posts, Groups, Gender. Like the pupils, a considerable percentage of university students have published at least one item in data types about interests: Music, TV Shows, Sports, Movies, Books, Apps & Games. Only slightly more than a third of university students have published the names of their Facebook friends. Among biographical data, the largest percentage of pupils have published at least one item in the following data types: Current City, Hometown, College. If we look beyond the 15

most populated data types, here is biographical data in which at least one item was published: High School (23%), Life Events (22.5%), Workplace (12.5%), Family Members (12.5%), Interested In (12.5%), Birth Date (11%), Relationship (10.5%), Birth Year (8.5%), About You (8%), Other places (3%), Primary School (0.5%). Also, these are the non-biographical data types in which at least one item was published: Events (24%), Videos (10.5%), Favorite Quotes (8.5%). There are no university students, or there are an extremely small number of students, who have published at least one item in these data types: Website (1%), Email (0%), Mobile Phone (0%). Unlike pupils, there are slightly more university students who have published at least one item in data types Religious Views (8%) and Political Views (3%).

Part 2 of the Table 2 presents another type of research results: average of items published by university students in 15 most populated data types. On average a university student has 167.35 friends, 30.64 published photos and 3.89 posts. On average, pupils published the largest amount of items in data types Groups and Events and about their interests - especially about their music interests where the average is 18.62 items. Other interests that have a high average of items are: TV Shows, Movies, Sports, Books, Apps & Games. In comparison to these interests, books have a considerably lower average of published items.

4.2   Findings from the Second Phase of the Study

In the second phase of study the method of comparative analysis was used to compare the extent to which various types of personal information about pupils and university students are publicly available on their Facebook profiles. Table 3 presents the comparison of the percentage of pupils and university students for data types in which at least one item was published by more than 30% of pupils or university students. There is a total of 14 data types belonging to this category. In relation to university students, a higher percentage of pupils published at least one item in eight of these 14 data types. In relation to pupils, a higher percentage of university students published at least one item in six of these 14 data types. In Part 1 of Table 3 we see that among data types in which pupils published more than university students, Apps & Games is a data type in which disparity between items published by pupils and university students is greatest. 1.62 times more pupils than university students published at least one item in this data type. In the following data types about interests, more pupils than university students published at least one item: Movies, Sports, TV Shows. Also, considerably more pupils than university students published at least one item in data types Gender and Friends. In relation to university students, there is a slightly higher percentage of pupils that published at least one item in the data type Photos.

Part 2 of Table 3 presents the data types in which university students published more than pupils, regarding the average number of published items. The largest proportion, in a group of data types where students published more often than pupils, is the data type Check-Ins where, in relation to pupils, there are 1.74 times more university students that published at least one item. In the following data types more students than pupils published at least one item: Learning Institution, Posts, Current City. In relation to students, pupils published more often at least one item in data types Other Names

(proportion: 2.53) and Family Members (p:1.68). In relation to pupils, university students published more often at least one item in data types Birth Year (p:17) and Religious Views (p:16). 8.5% of university students have published at least one item about their birth year in relation to 0.5% pupils. Likewise, 8% of students have published at least one item about their Religious Views in relation to 0.5% pupils. In the following data types the university students also published more often than pupils: About You (p: 3.2), Life events (p:1.96), Reviews (p:1.25), Relationship (p:1.11). Not a single pupil published in data types Political Views and Restaurants. In comparison, 3% of university students published at least one item in data types Political views and 23% published in data type Restaurants.

Table 3. Comparison of the percentage of pupils and students for data types in which at least one item was published by more than 30% of pupils or students.

Part 1: Data types in which more items were published by pupils				Part 2: Data types in which more items were published by students			
Data type	Pupils	Students	Proportion	Data type	Pupils	Students	Proportion
Apps & games	42%	26%	1.62	Check-Ins	21%	36.5%	1.74
Movies	48%	31%	1.55	Learning institution	26.5%	37%	1.40
Gender	98%	68%	1.44	Posts	72.5%	95.5%	1.32
Sports	50.5%	35.5%	1.42	Current city	39%	43.5%	1.12
Friends	51%	37.5%	1.36	Hometown	38%	40.5%	1.07
Music	51.5%	40%	1.29	Groups	70.5%	71.5%	1.01
TV shows	45.5%	36%	1.26				
Photos	99.5%	94%	1.06				

In the second part of the analysis we made a comparison of the average of items that were published by pupils and university students in a certain data type. Table 4 presents the comparison of the average of items that were published by pupils and students in data types in which at least one item was published by more than 30% of pupils or students.

There is a total of 14 data types belonging to this category. In relation to university students, a higher percentage of pupils published more items on average for nine of these 14 data types. In relation to pupils, a higher percentage of university students published more items on average for five of these 14 data types. Sport is one of these 14 data types in which pupils published more items on average. The proportion between the average of sport items published by pupils and students is 6.89 which means that 6.89 times more items were published by pupils. In the following data types about interests, pupils published between two and three times more items on average: Apps & Games, Movies, TV Shows, Music. Also, pupils published approximately twice as many items in average for data type Photos and approximately 1.5 times more items on average for data types Posts, Friends and Gender. In relation to pupils, university students published more items on average primarily in data type Check-Ins where they published 3.59 times more items. Also, university students published considerably more items on average for data types

Learning Institution and Groups. Finally, university students published slightly more items on average for data types Current City and Hometown. In relation to university students, pupils published more items on average for data types: Reviews (proportion: 2.38), Family Members (p:1.73), Books (p:1.12). In relation to pupils, university students published more items on average for data types: Life Events (p:3.07), Favorite Quotes (p:2.67), Language (p:1.87), Interested In (p:1.67), Videos (p:1.6). The very large difference in proportion is found in Events data type were that individual university students published 5.18 items on average, while individual pupils published only 0.01 items on average.

Table 4. Comparison of the average of items that were published by pupils and students in data types in which at least one item was published by more than 30% of pupils or students.

Part 1: Data types in which more items on average were published by pupils			Part 2: Data types in which more items on average were published by students		
Data type	Pupils	Students	Proportion	Data type	Students	Pupils	Proportion
Sports	25.36	3.68	6.89	Check-Ins	5.32	1.48	3.59
Apps & games	4.49	1.38	3.25	Learning ınstitution	37	26.5	1.4
Movies	16.01	5.06	3.16	Groups	7.29	5.28	1.38
TV shows	14.49	5.66	2.56	Current city	0.44	0.39	1.13
Photos	60.46	30.64	1.97	Hometown	0.41	0.38	1.08
Music	32.01	18.62	1.72				
Posts	6.18	3.89	1.59				
Friends	246.4	167.35	1.47				
Gender	0.98	0.7	1.4				

4.3   Findings from the Third Phase of the Study

In qualitative content analysis of ten Facebook profiles of pupils and ten Facebook profiles of university students, it was found out that pupils published a lot less potentially compromising information than university students. Namely, on pupils' profiles only one compromising item was found – a photo that could be insulting to one ethnic minority group. However, pupils' profiles contain many photos of the profile owners and their friends and relatives. From these photos anybody with a Facebook account can get to know the appearance of profile owners and people close to them. This knowledge could be misused. It is worthwhile to note that pupils liked many trademarks, such as Coca-Cola and McDonalds. By exploring and data mining publicly available personal information on pupils' Facebook profiles, trade companies and other organizations can find out a lot about pupils, that is, their (potential) clients.

An important finding was that university students published much more potentially compromising information than pupils. For example, they published more potentially compromising photos. Two university students published photos of themselves with alcohol beverages in the foreground. There is a university student who published a photo

with text that can be insulting to women. The same student published a parody of curriculum vitae that could leave a bad impression to (potential) employers. There is a student who published photos in which partly nude women could be seen. Some of the students published various personal information that could be used to make inferences about their political, religious, worldview and other sensitive preferences. For example, four students liked Facebook pages with religious themes. Three of them liked a few different Facebook pages related to the same religion so the assumption could be made about the religious affiliation of these students. There is a student who liked two Facebook pages with the topic of gambling which could indicate that the student has an interest for gambling. Four students liked Facebook pages with sexually explicit names. One student liked a Facebook group with the name in which hatred against supporters of a specific football team is expressed. Four students liked Facebook pages of various politicians and political parties. One student liked a Facebook group of support for the singer whom the members of this group consider persecuted because of his political preferences. One student made visible on her profile that she is interested in the lecture related to feminism and for the lecture held by the prominent politician of one political party. Another student liked Facebook pages about: feminist magazine, anarchistic association, journalist famous for his critical attitudes. All of these Facebook pages are a strong foundation from which different attitudes and worldview of the university student can be inferred.

5   Conclusion

Through this research, we acquired various insights about the types and amount of young users' personal information available on Facebook. These insights could be helpful in advancing understanding of the privacy behavior of young Facebook users. Primarily, research results have confirmed that pupils and university students publish a lot of publicly available personal information on their Facebook profiles. This information is available to their Facebook friends, but also it is available to anyone else who opens a Facebook account. Among this personal information there is also information that could be harmful to the pupils and university students who published them. Another important finding is that pupils and university students do not publicly publish or rarely publicly publish the most private personal information such as contact information (address, telephone and mobile phone number) or religious and political views. However, this personal information discretion could be compromised by huge amounts of other types of publicly available personal information from which inferences could be made indirectly about various attitudes, beliefs and activities of the Facebook profile owners.

It is interesting to note that when the results that we acquired about Facebook privacy behavior of students from Croatia are compared with Facebook privacy behavior of Carnegie Mellon University students in USA [7], it is evident that students from USA publish considerably more publicly available, sensitive personal information. The following percentage of USA university students published personal information that is publicly available: birthday - 87.8%, address - about 50 to 55%, mobile phone - 28.8%, relationship status - about 65 to 70%, political preference - about 50 to 55%. The following percentage of students from Croatia published this same type of information:

birthday - 11%, address - 1%, mobile phone - 0%, relationship status - 10.5%, political preference - 3%. The difference in Facebook privacy behavior is substantial. A similar pattern is present in the Facebook privacy behavior of pupils from the USA and pupils from Croatia and neighboring countries.

This study provided many insights about the characteristics and possible frailties of the privacy behavior of young people. By using insights acquired through this research, more focused educational programs could be made to alleviate the most widespread, risky information disclosure behavior. One important element of these educational programs could be to raise consciousness of young people about the unwanted possibility that somebody unknown to them could determine their political, religious or other sensitive preferences by analyzing the information about their music, film or other interests. Another element of educational programs could be to raise consciousness of young people that the information they publicly publish on their profiles could unintentionally be offensive to somebody outside the circle of their Facebook friends.

References

1. Alexa: The Top 500 Sites on the Web. http://www.alexa.com/topsites
2. Alexa: Top Sites in Croatia: http://www.alexa.com/topsites/countries/HR
3. Kosić, S.: Online Društvene mreže i Društveno Umrežavanje kod Učenika Osnovne Škole: Navike Facebook Generacije. Život i Škola: Časopis za Teoriju i Praksu Odgoja i Obrazovanja **56**(24), 103–125 (2010)
4. Lenhart, A.: Teens, social media, and technology overview. Pew Research Center (2015)
5. Park, Y.J.: Digital literacy and privacy behavior online. Commun. Res. **40**(2), 215–236 (2013)
6. Trottier, D., Lyon, D.: Key features of social media surveillance. In: Fuchs, C., Boersma, K., Albrechtslund, A., Sandoval, M. (eds.) Internet and Surveillance: the Challenges of Web 2.0 and Social Media. Routledge Studies in Science, Technology and Society, vol. 16, pp. 89–105. Routledge (2012)
7. Gross, R., Acquisti, A.: Information revelation and privacy in online social networks. In: Proceedings of the 2005 ACM Workshop on Privacy in the Electronic Society, pp. 71–80. Association for Computing Machinery (2005)
8. Vitak, J., Kim, J.: You can't block people offline: examining how Facebook's affordances shape the disclosure process. In: Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing, pp. 461–474. Association for Computing Machinery (2014)
9. Gathegi, J.N.: Social media networking literacy: rebalancing sharing, privacy, and legal observance. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 101–108. Springer, Heidelberg (2014). doi: 10.1007/978-3-319-14136-7_11
10. Acquisti, A., Fong, C.M.: An experiment in hiring discrimination via online social networks (2015). http://ssrn.com/abstract=2031979 or http://dx.doi.org/10.2139/ssrn.2031979
11. Acquisti, A., Gross, R., Stutzman, F.: Face recognition and privacy in the age of augmented reality. J. Priv. Confid. **6**(2), 1–19 (2014)
12. Špiranec, S., Banek Zorica, M.: Information Literacy 2.0: hype or discourse refinement? J. Doc. **66**(1), 140–153 (2010)

13. Beutelspacher, L.: Assessing information literacy: creating generic indicators and target group-specific questionnaires. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 521–530. Springer, Heidelberg (2014). doi: 10.1007/978-3-319-14136-7_55

14. Živković, D., Horvat, A., Čučić, V.: Digital rights for digitally literate citizens. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 170–177. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_21

15. Karvalics, L.Z.: Emerging new information literacies – a conceptual outlook. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 37–46. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_5

16. Majid, S., Chang, Y.-K., Foo, S., Mokhtar, I.A., Theng, Y.-L., Zhang, X.: Strengthening information literacy competencies through incorporating personal information management skills. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 331–337. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_43

17. Santos, R., Azevedo, J., Pedro, L.: Digital divide in higher education students' digital literacy. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 178–183. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_22

18. Todorova, T., Peteva, I.: Information literacy competency of LIS students in SULSIT with a special focus on intellectual property. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 610–616. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_82

19. Torras i Calvo, M.-C., Kuzmin, E.: Productive partnerships to promote media and information literacy for knowledge societies: IFLA and UNESCO's collaborative work. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 41–47. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_4

20. Stutzman, F., Capra, R., Thompson, J.: Factors mediating disclosure in social network sites. Comput. Hum. Behav. **27**(1), 590–598 (2011)

21. Livingstone, S.: Taking risky opportunities in youthful content creation: teenagers' use of social networking sites for intimacy, privacy and self-expression. New Med. Soc. **10**(3), 393–411 (2008)

22. Boyd, D.: It's Complicated: The Social Lives of Networked Teens. Yale University Press, New Haven (2014)

23. Madden, M., Lenhart, A., Cortesi, S., Gasser, U., Duggan, M., Smith, A., Beaton, M.: Teens, social media, and privacy. Pew Research Center (2013)

24. Facebook: Sveučilište u Zadru, https://www.facebook.com/groups/7507921803/?ref=bookmarks

25. Facebook: OK je OK!, https://www.facebook.com/OK-je-OK-40771554951/

Digital Literacy as a Boost Factor
in Employability of Students

Radovan Vrana[✉]

Faculty of Humanities and Social Sciences, University of Zagreb, Zagreb, Croatia
`rvrana@ffzg.hr`

Abstract. Digital literacy is an important and evolving concept having influence on the status of current and future work force as the labor market is being transformed globally by implementation of digital technology. The existing jobs are being redefined and new jobs are being created presenting new demands for updated ICT related knowledge and skills often called digital literacy. Digital literacy is directly related to the individual's employability which is represented by the combination of factors and processes which enable people to get employed and to stay in employment or to move on in the workplace. To achieve this goal, universities around the world adapt their study programs according to the needs of the labor market. Having this in mind, this paper investigates the current state of digital literacy in the student population at the Faculty of Humanities and Social Sciences in Zagreb, Croatia (FHSS) and its relationship to their employability.

Keywords: Digital literacy · Employability · Croatia

1 Introduction

Transformation of the society from analog to digital as well as digital ubiquity have influenced almost all aspects of our lives. Areas like playing, working, socializing [1], literacy as well as educational practice [2] and, finally, the labor market have been transformed significantly. The labor market transformations are happening globally and are changing the existing jobs by redefining them and creating new ones with new demands for updated Information and Communication Technologies (ICT) related knowledge and skills. Today, "the large majority of jobs require an understanding of technology" [3, p. 4] and employees should possess "the ability to use appropriate technologies for communication, collaboration and information management" [4]. Employees must possess "the ability to manipulate a device and to find relevant content using the device" [1, p. 266]. These and related skills are called digital literacy skills and constitute an important topic in the learning programs leading to the professional qualifications [5]. Generally speaking, digital literacy skills are directly related to the concept of employability as digital literacy aims to improve "employability because it is a gate skill, demanded by many employers when they first evaluate a job application" [6] and as such, it is important to students globally who are seeking employment.

2   Digital Literacy Definitions

Digital literacy is defined in a number of different ways adding and assuming new meanings as each author defines it according to his or her view(s) of the matter. The following part of the paper will present a selection of digital literacy definitions followed by a list of extracted elements from these definitions identifying the core of each definition. Each definition has a focus on different aspects of digital literacy thus contributing to the general and evolving concept of digital literacy.

One of the first definitions of digital literacy was created by Paul Gilster [7, p. 1] who defined digital literacy as "the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers." Joint Information Systems Committee (JISC) [8] analyzed approaches to the use of open educational resources and during that effort they provided two perspectives on digital literacy: functional access to networks, devices, services, software and content that individuals require to exercise and develop digital literacy; and the contexts for these practices/skills, including the workplace, learning environments, the personal/social context and community including the concept of identity and its manifestation in social networks, lifestyles, learning and work communities.

Jones-Kavalier and Flannigan [9] described digital literacy as "a person's ability to perform tasks effectively in a digital environment, with 'digital' meaning information represented in numeric form and primarily for use by a computer. Digital literacy includes the ability to read and interpret media (text, sound, images), to reproduce data and images through digital manipulation, and to evaluate and apply new knowledge gained from digital environments." O'Brien and Scharber [10, pp. 66–67] defined digital literacy as a socially situated practice "supported by skills, strategies, and stances that enable the representation and understanding of ideas using a range of modalities enabled by digital tools. Digitally literate people not only represent an idea by selecting modes and tools but also plan how to spatially and temporally juxtapose multimodal texts to best represent ideas. Digital literacies enable the bridging and complementing of traditional print literacies with other media."

Karpati [6] chose more detailed approach to digital literacy and included the use and production of digital media, information processing and retrieval, participation in social networks for creation and sharing of knowledge, and a wide range of professional computing skills. For Visser [11], digital literacy is "the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills." Littlejohn, Beetham and McGill [12, p. 547] wrote about influence of digital literacy on life of an individual and society in general and offered the following definition of digital literacy: "the capabilities required to thrive in and beyond education, in an age when digital forms of information and communication predominate."

Hicks and Hawley-Turner [13, p. 59] saw digital literacy as an opportunity to "critically consume information, to create and share across time and space, to co-create and collaborate to solve problems, to persevere in light of setbacks, and to maintain flexibility." Park and Burford [1] investigated digital media literacy and stated that "a digitally literate person is someone who can critically process media content as well as

communicate effectively using digital media." For Gruszczynska, Merchant and Pountney [14] digital literacy was the general ability to use computers alongside a set of skills such as the ability to use word processors or database software. Finally, Boechler, Dragon and Wasniewski [15] did a literature review about the digital literacy concept and found out a number of issues including: challenges in the research base for conceptualizing digital literacy; the multiplicity of frameworks and models which attempt to situate digital literacy but lack sound theoretical origins and wide disagreement among stakeholders, disciplines as to what specific skills, knowledge and understandings should fall under the umbrella term of digital literacy.

There are so many definitions of digital literacy focusing on different skills, knowledge and competences taking into account different theoretical foundations. Some of these definitions demonstrate two extreme approaches in defining the term digital literacy: they are simple and include very few elements while others are very complex attempting to take into account everything that could be found to be related to digital literacy. Furthermore, some definitions are very concrete and detailed, while others are very general and abstract. The following table represents the constituting elements of the selected digital literacy definitions (due to the space restrictions) (Table 1).

Table 1. Elements and activities found in digital literacy definitions.

Element	Activity
Collaboration	Collaborate
Computer	Information presentation
Context	Workplace, society, learning environments, community
Data	Reproduce
Flexibility	Maintain
Formats	Multiple
ICT (more general than computer element)	Use, word processing, databases
Ideas	Represent, understand
Information	Understand, use, present in numeric form, process, retrieve, create, evaluate, find, communicate, share, consume
Knowledge	Create, share
Media	Read, interpret, complement with print media, use, produce, process content, communicate
Networks	Access to, social network
Open access	Use
Sources	Various

Though limited in number, the selected definitions are listed in a chronological order to demonstrate a variety of approaches in describing elements of the evolving digital literacy concept. Most definitions in this paper focus on information and media and media related activities, while other elements related to data or file formats, networks and different computer related activities are included less frequently and deemed less

important to authors of the selected definitions. It is expected that digital literacy definitions will add new meanings to ICT as it develops alongside with media and society in general describing details about knowledge and skills necessary for employment and professional and personal development of a modern citizen.

3   Digital Literacy and Employability

Digital literacy is a major component of employability. Employability is described as "the combination of factors and processes which enable people to progress towards or get into employment, to stay in employment, and to move on in the workplace" [16]. According to the document "Digital competence and employability" [17, pp. 4–5], (world) population aged between 16 and 74 show that 47% of the population have either "low" or "no" digital skills which makes them not considered to be functional in a digital society. Many factors influence one's employability: his or her ICT knowledge, skills, and attitudes, level of formal education, social networks, a region or community's economic viability, social class, caste, gender stereotypes, learning styles, and labor market dynamics [18, p. iv]. Board of Studies New South Wales in Australia published a document "Employability Skills in Information and Digital Technology" [19] in which they enumerated eight skills which would improve employability: communication, teamwork, problem-solving, initiative and enterprise, planning and organizing, self-management, learning and technology. Technology skills were further divided into: having a range of basic IT skills, applying IT as a management tool, using IT to organize data, being willing to learn new IT skills, having the knowledge to apply technology, having the appropriate physical capacity. JISC [20] presented digital literacy in the form of a model with seven elements aiming to improve employability: media literacy, communications and collaboration, career and identity management, ICT literacy, learning skills, digital scholarship and information literacy. OECD saw digital skills as something necessary for most jobs today as well as for future jobs for youth who will be included in labor market [21]. All these skills and factors are important in achieving employability and are part of many job requirements. As a result, students must be up to date with the required skills and plan their future employment and career development having job specific skills in mind. The next part of the paper presents results from the research study about digital literacy and employability of students.

4   Digital Literacy and Students' Employability Research Study

To discover current perceptions and views about digital literacy and related topics in the students' population (future work force) at the Faculty of Humanities and Social Sciences in Zagreb, Croatia (the FHSS), a research study was initiated. The purpose of the research was to get an insight into the understanding of digital literacy among students participating in the research and its relation to their employability. The objective of the research was to identify potential challenging areas regarding understanding of the digital literacy concept among students which could still be improved during their education at the university. The hypothesis of the research was that students have

developed awareness of the importance of their employability as a result of their learning in digital literacy. An online (Web) survey with fifteen closed type questions was chosen as the principal research method in this study for collecting data from students at the FHSS. The research study was initiated on May 17, 2016 by sending an e-mail invitation to the students' mailing list and by publishing the invitation on the main Web page of the FHSS. The online survey was closed on May 26th, 2016 with the total of 128 student participants.

4.1 Findings

Due to the space restrictions, only partial research study results will be presented here. The first part of the results presents general data about the respondents.

Gender (N = 127). Nearly 80% (79.4%, N = 97) of the respondents were female and 23.6% (N = 30) were male students.

Year of the Study (N = 126). The respondents were divided into groups according to year of the study as follows: first year of the undergraduate study – 28.6%; second year of the undergraduate study – 4%; third year of the undergraduate study – 11.1%; fourth year of the undergraduate study – 0.8%; first year of the graduate study – 10.3%; second year of the graduate study – 18.3%; advanced university student – 15.1%; not a student of a reformed study program – 7.9% and postgraduate study – 4%. The invitation for the participation in the research was sent to all student at the FHSS. The number of responses is different for each year of the study as students decided to participate in the research on their own as the sample was not a stratified but a convenient one.

Most Frequently Used Devices in Students' Daily Activities. The results indicate that laptop computers were most frequently used in education, smartphones in personal life and desktop computers at job. The most diverse use of devices of all types could be found in category "Personal life" in which all of the offered devices were used more often than in categories "Education" and "Job". While decline in use of desktop computers was expected (due to presumed mobility of students) and laptop computers

Table 2. Use of devices in daily students' activities (one answer per category possible).

	Education	Personal life	Job (part time or full time)
Laptop	63	41	10
Desktop computer	38	16	31
Smartphone	19	90	1
Tablet	14	31	0
Digital camera	4	39	4
"Dumb" phone	3	22	6
MP3 player	3	38	1

guarantee mobility of students, it is still surprising to see smartphones and tablets used infrequently in education in 2016. Being an employee at the same Faculty (the FHSS) at which the research study was conducted, the author can assume that there are two reasons for this situation: inadequate quantity of educational material prepared for use on mobile devices (and small screens) and still a small number of students owning a mobile device (Table 2).

Basic Knowledge about ICT (N = 128).   The results in this question indicate that the education system is coming short when it comes to teaching ICT related knowledge and skills. Almost half of the respondents or 48.4% (N = 62) were self-taught about ICT and another 19.5% (N = 25) were taught about ICT as late as at the university. Twelve point five percent (N = 16) of the respondents started to acquire ICT related knowledge in elementary school (which is excellent), 7% (N = 9) in high school, 7% (N = 9) used family supported learning, 3.9% (N = 5) took a course outside university, 0.8% (N = 1) used friends supported learning and 0.8% (N = 1) learned in some other way. There is an evident need for a change in the educational system in which individuals would start to acquire ICT related knowledge and skills as early as possible.

Estimation about Inclusion of ICT Related Topics in Individual's Education at the Present Time.   According to the respondents' estimation, theoretical aspects of education of ICT were sufficiently covered in the current study programs at the FHSS while students felt a deficiency of practical ICT related knowledge. Due to the research limitations, the issue of particular practical topics students would like to participate in was not researched further. However, the results do suggest students' familiarity with the theoretical aspects of ICT which form a basis for becoming a digitally literate individual (Table 3).

Table 3. Estimation about inclusion of ICT related topics in individual's education at the present time (1 = insufficiently included, 5 = sufficiently included).

	1	2	3	4	5
Theoretical topics	17	21	18	38	32
Practical topics	26	29	32	27	11

Willingness to Learn about ICT in the Long Term (N = 128).   Willingness to learn about ICT in the long term is related to the continuing education after the graduation from the university for the respondents (as they have already reached higher education level, for younger generations this willingness should start earlier). These results are very optimistic and indicate students' willingness to continue their educational development, which is encouraging given the situation that they possibly will not be offered to improve their ICT related knowledge and skills on equal terms once they are employed (Table 4).

Table 4. Willingness to learn about ICT in the long term (1 = not ready at all, 5 = completely ready).

	1	2	3	4	5
N	2	6	15	38	67
%	1.6	4.7	11.7	29.7	52.3

During the Last Job Seeking Period, Have Your ICT Related Knowledge and Skills Been Tested? (N = 128). While the students in the research study already confirmed that they received sufficient theoretical knowledge about ICT and that they wanted to develop more practical skills, only 9% of the respondents (N = 12) were tested for ICT related skills in an actual job interview, 53% of the respondents (N = 68) were not tested for ICT related skills. One should take into account that 38% of the respondents (N = 48) have not sought a part or full time job yet. It is expected that more students will be tested for their actual ICT skills in future and this will have direct influence on their employment.

To Which Skills Do You Relate the Term Digital Literacy? (N = 127). This question tried to associate theoretical and conceptual skills related to digital literacy. The association is different among the respondents but they put independent work with ICT, use of ICT for various purposes and understanding concepts of ICT highly on the list in this research study as three most important skills. Independent use of ICT is most highly ranked perhaps because students who participated in this research study were usually self-taught and were accustomed to being independent in their work (Table 5).

Table 5. Skills related to digital literacy.

	N	%
Independent work with ICT	112	88.2
Use of ICT for access, evaluation, processing and synthesizing information from various resources	102	80.3
Understanding concepts of ICT	96	75.6
Use of ICT for increase of personal productivity	78	61.4
Use of ICT for solving complex problems in real world	60	47.2
Ethical use of ICT in social life	59	46.5
Ethical use of ICT in private life	49	38.6
Communicating ideas outside immediate (academic, business, personal) environment	49	38.6

Which of the Following Competences Do You Relate to Digital Literacy? (N = 128). This question offered a more practical view of the digital literacy concept. Competences in the table are ranked according to daily activities of students during which they relied on the use of the internet and worked with various types of software in different ICT supported activities. Due to the space restrictions, only the top ten competences are listed (Table 6).

Table 6. Competences related to digital literacy (Top ten).

	N	%
Safe use, communication and retrieval of information on the internet	108	84.4
Use of digital devices	95	74.2
Word processing	91	71.1
Presentation design	84	65.6
Search for information supported by ICT	84	65.6
Discovery and protection from spam and other malicious software	82	64.1
Spreadsheet design	77	60.2
Use of social software for cooperation with other individuals	72	56.3
Creation of information by support of ICT	67	52.3

Use of Acquired Knowledge and Skills (N = 128). Students are aware of the importance of knowledge and skills they acquired at the university for their immediate future (after graduation) both in future jobs and in private life. Self-employment is positioned rather low as students in this research study did not see the digital literacy concept to be related to this type of employment (Table 7).

Table 7. Use of acquired knowledge and skills.

	N	%
In future job	117	91.4
In private life	115	89.8
In education at university	109	85.2
For self-employment	59	46.1
Other	2	1.6

Estimation of Level of Acquired Digital Literacy (N = 127). Students' estimation of their level of acquired digital literacy was good to very good, which is an excellent result with prospects to become excellent as long as they will continue to update their digital literacy related knowledge and skills. The results can be attributed to the formal education received so far accompanied by self-education (Table 8).

Table 8. Estimation of level of acquired digital literacy (1 = insufficient, 5 = excellent).

	1	2	3	4	5
N	1	4	49	57	16
%	0.8	3.1	38.6	44.9	12.6

Estimation of Importance of Digital Literacy for Students' Employability (N = 128). Results of this question revealed an acknowledgment of the importance of digital literacy for students' employability. Most of the respondents considered digital literacy to be very important or most important for their employability. By being digitally literate students increase their chances for employment (Table 9).

Table 9. Importance of digital literacy for students' employability (1 = not important at all, 5 = most important).

	1	2	3	4	5
N	0	6	13	46	63
%	0	4.7	10.2	35.9	49.2

5   Conclusion

Digital literacy is an important and evolving concept directly related to one's employability and prospects for keeping the job in the long term. Since the first definition of digital literacy appeared, the labor market has changed significantly demanding from researchers, educators, employers and students to advance their understanding of digital literacy and related skills. The results are many views on digital literacy and its different applications in education, at work and in private life. Today, when an increased number of jobs has moved online, educational systems worldwide are coping with changes in order to respond to the current needs of their national and global labor market. The research study conducted at the FHSS showed that students were aware of the importance of the digital literacy concept for boosting their chances of employment. Furthermore, the research study confirmed their awareness of the existence of the relationship between digital literacy and their employability. Grounds for this conclusion can be found in the results of the same research study which revealed that students estimated that they possess a significant quantity of ICT related competences described in digital literacy definitions in the first part of the paper. As a conclusion, we can say that mastering digital literacy skills will boost students' employability and will help employers to acquire digitally literate work force.

References

1. Park, S., Burford, S.: A longitudinal study on the uses of mobile tablet devices and changes in digital media literacy of young adults. Educ. Media Int. **50**, 266–280 (2013)
2. Bhatt, I.: Digital literacy practices and their layered multiplicity. Educ. Media Int. **49**, 289–301 (2012)
3. Digital Competence and Employability. Telecentre Europe, Brussels (2014)
4. Hack, C.J.: developing an open education resource to develop digital literacy skills for employability in the life and health sciences. J. Educ. Innov. Partnersh. Change **1** (2015)
5. Hall, M., Nix, I., Baker, K.: Student experiences and perceptions of digital literacy skills development: engaging learners by design? Electron. J. e Learn. **11**, 207–225 (2013)
6. Karpati, A.: Digital Literacy in Education. UNESCO, Moscow (2011)
7. Gilster, P.: Digital Literacy (1997). https://www.ncsu.edu/meridian/jul99/downloads/diglit.pdf
8. Joint Information Systems Committee. Digital Literacy Anatomised: Access, Skills and Practices (2011). http://jiscdesignstudio.pbworks.com/w/file/fetch/40474828/Digital%20literacies%20anatomy.pdf
9. Jones-Kavalier, B.R., Flannigan, S.L.: Connecting the digital dots: literacy of the 21st century, educause quarterly (2006). http://er.educause.edu/~/media/files/article-downloads/eqm0621.pdf

10. O'Brien, D., Scharber, C.: Digital literacies go to school: potholes and possibilities. J. Adolesc. Adult Literacy **52**, 66–68 (2008)
11. Visser, M.: Digital literacy definition (2012). http://connect.ala.org/node/181197
12. Littlejohn, A., Beetham, H., McGill, L.: Learning at the digital frontier: a review of digital literacies in theory and practice. J. Comput. Assist. Learn. **28**, 547–556 (2012)
13. Hicks, T., Hawley Turner, K.: No longer a luxury: digital literacy can't wait. Engl. J. **102**, 58–65 (2013)
14. Gruszczynska, A., Merchant, G., Pountney, R.: Digital futures in teacher education: exploring open approaches towards digital literacy. Electron. J. e-Learn. **11**, 193–206 (2013)
15. Boechler, P., Dragon, K., Wasniewski, E.: Digital literacy concepts and definitions: implications for educational assessment and practice. In: Gamification: Concepts, Methodologies, Tools, and Applications. Information Science Reference, Hershey (2015)
16. Government of Scotland. Defining Employability. Communication from the Scottish Government and the Scottish Center for Healthy Living (2012). http://www.healthyworkinglives.com/advice/employability/what-is-employability.aspx#definition
17. Digital Competence and Employability. Telecentre Europe (2014). http://www.telecentre-europe.org/wp-content/uploads/2015/02/TE_DIGCOMP-policy-paper_FINAL_PDF.pdf
18. Garrido, M., Badshah, A., Coward, C.: Deconstructing ICT skills and employability. Inf. Technol. Int. Dev. **5** (2009). http://itidjournal.org/index.php/itid/article/download/356/157
19. Employability Skills in Information and Digital Technology. Board of Studies NSW, Sydney (2012)
20. Developing Digital Literacies, JISC (2014). https://www.jisc.ac.uk/guides/developing-digital-literacies
21. OECD Skills Outlook 2015: Youth, Skills and Employability. OECD, Paris (2015)

Accessibility of Digital Information: Standards, Frameworks, and Tools Related to Information Literacy and Information Technology

Valentina Kirinić[(✉)]

Faculty of Organization and Informatics, University of Zagreb, Varaždin, Croatia
`valentina.kirinic@foi.hr`

Abstract. One important aspect of information literacy is accessibility of information and adjustment of information to users with different abilities. Accessibility to both digital information and information technology (IT) in general is well supported in related international standards and recommendations. Common software products for creating digital documents have built-in features for checking accessibility, and there are many free resources to test accessibility in web pages. The goal of this study was to investigate, using in-depth content analysis, how accessibility is addressed in information literacy documentation and information technology standards, recommendations, models and frameworks, and how it is supported by tools when creating digital information content. The outcomes of the study are represented as a set of skills, attitudes and knowledge needed to facilitate inclusion of people with disabilities through accessible (digital) information.

Keywords: Information literacy · Information technology · Accessibility · Digital information · Standard · Framework · Tool

1 Introduction

One aspect of information literacy is awareness of a broad range of different information users, their abilities, characteristics and needs. Access to information and information services is a basic human right, the prerequisite for equality and equal opportunities emphasized in Convention on the Rights of Persons with Disabilities [1]. Putting this awareness in practice means including in it people with disabilities. However, besides the general definition of the term 'accessibility of information' as the ability to reach information, this term actually has a deeper meaning and a higher importance in the context of people with disabilities. In this sense it denotes the capability of information to be perceivable, understandable, user-friendly and available to people with all types of disabilities (including visual, auditory, physical, speech, cognitive, and neurological disabilities), as well as to older people whose abilities are changing due to aging and those using different types of assistive technologies.

Blind persons, partially sighted persons and visually impaired persons (those not seeing at all, or having poor vision quality or/and quantity, such as colour-blindness) would need

assistive technologies such as Braille, text-to-speech screen readers, or possibility to adjust (digital) information to their need(s), for example, adjust text/background contrast, or enlarge text. Auditory problems are present with people who are totally deaf or hard-of-hearing (having an average hearing loss of between 20 or 25 dB and 90 dB). In order for them to acquire information presented in audible format, they would require a sign language interpreter, some type of hearing aid, audio-recordings (to repeat audio as long as needed), speech-to-text technology, and/or titled videos. Physical disabilities may be classified as motor skills disorders (difficulties with movement, handling objects and similar ailments – such as cerebral palsy or myopathy) or chronic diseases, and people suffering from them would need various types of assistive and adaptive technologies (for example, enlarged computer keyboards, speech recognition devices) to manage digital information. People experiencing speech and language difficulties may use digitized speech, talking (predictive) word processors to overcome their problems. Cognitive disabilities include a range of disabilities ranging from autism and Down Syndrome to less severe conditions such as attention deficit disorder (ADD), dyslexia (reading difficulty), dyscalculia (difficulty with numbers), and learning disabilities in general. Persons with dyslexia would benefit from information/text being divided for them into smaller subsections, written using sans serif font and using spacing between lines of 1.5 or double space. Persons with some other neurological disorders - for example epilepsy - should avoid bright, flashing lights/images and other visual stimuli when using computer/information communication technology, digital information.

According Henry, Abou-Zahra and Brewer [2] ""accessibility" has historically referred to design that enables people with disabilities to interact with buildings, products, services, etc". Strong importance of digital environments (for learning, work, entertainment) in our everyday lives brings a new aspect of digital accessibility/inaccessibility to be addressed/overcome. Lazar, Goldstein and Taylor [3] emphasized the discriminatory impact of digital inaccessibility and argued for "same time, same content, same price" assuring that people with disabilities get access to (accessible) digital information/content at the same time as people without disability (as time delay in access is itself a kind of discrimination) without additional expenses (for the same price).

In information literacy standards, models, and frameworks accessibility of information and adjustment to users with different abilities has been mostly embraced in parts dealing with information scope and access [4], information content creation and presentation [5], and information having value [6], but there is no strong, clear emphasis made. Nowadays, accessibility to both digital information and information technology (IT) is generally well supported in international standards and recommendations for IT and other related professionals [7]. Different aspects of accessibility have been addressed - issues of ergonomics, adaptability and accessibility of workplace and learning environment, IT assistive technology, accessibility of user interfaces and information/web content [8], among others. Besides IT professionals' communities, all IT users creating digital information content should be familiar with and use common, simple, and easy procedures and tools to check and ensure at least a minimal level of digital information accessibility. It is easier as some common software products for creating digital documents – texts, presentations, spreadsheets - have built-in features for checking accessibility, and there are many free resources available for testing web accessibility.

2 Study Goals and Methodology

The goals of the study presented in this paper are to investigate how the accessibility of information is addressed in information literacy documents and information technology standards, recommendations, models, and frameworks, and how it is supported by tools when creating digital information content. In-depth content analysis and descriptive method of the mentioned documents were used in achieving this goal.

In performed content analysis of information literacy standards, models and frameworks, information literacy elements and descriptors such as knowledge, skills, or outcomes were explored to find aspects of accessibility of information, inclusion and information fitting user abilities, as well as awareness of information needs of users with disabilities. The core of information literacy standards, models, and frameworks investigated has been built upon and selected from the lists found on web pages of the Chartered Institute of Library and Information Professionals (CILIP) [9] and the Association of College & Research Libraries (ACRL) [10]. Altogether, eight information literacy documents were analysed.

Nowadays, information and communication technology/devices have become a necessary everyday tool for all people, regardless of their age, physical and mental/cognitive (dis)abilities. The importance of accessibility issues and accessibility of digital information/content has been increasingly recognised and addressed in IT international standards. As the International Organization for Standardization (ISO) is a well known organization which takes care of providing manufacturers, service providers, designers, and policy makers with specifications and guidelines on how to design products and services that are accessible to all [11], the author decided that the ISO catalogue would be the perfect starting point to search and build the list of recent standards related to accessibility. When analysing information technology, international standards and their purposes/aims were extracted and described/specified (not presented in the paper), and then mapped to information literacy context.

Every common IT user could and should put at least minimal effort in providing at least some accessibility of digital information and content to various disadvantaged user groups, such as persons with disabilities. The paper presents two ways of doing that, as well as checking accessibility of digital information/content. For the purpose of analysing tools for creating common digital documents to assure accessibility of its information, rules/recommendation on how to do that were extracted first.

The findings of said content analyses were the basis for the study outcomes represented in the set of skills, attitudes and knowledge necessary in order to facilitate inclusion of people with disabilities through accessible (digital) information.

3 Findings

3.1 Accessibility Addressed in Information Literacy Standards, Models, and Frameworks

The following information literacy documents were analysed to find aspects of accessibility: CILIP Information Literacy model [12]; SCONUL Seven Pillars of Information

Literacy [4]; ANCIL A New Curriculum for Information Literacy [13]; Scotland National Information Literacy Framework [14]; ACRL Framework for Information Literacy for Higher Education [6]; ACRL Information Literacy Competency Standards for Higher Education [5]; ACRL Objectives for Information Literacy Instruction [15]; ACRL Information Literacy Standards for Teacher Education [16].

In CILIP Information Literacy model [11] accessibility aspect was mentioned when discussing:

- "a need for information" – "it (information) may or may not be conveniently close to hand and easily accessible…";
- "understanding availability" – "access channels to information resources may vary according to who or where you are";
- "understand the need to evaluate results" – "examine:… access and use (documentation, accessibility, comparison with other sources)";
- "understand how to work with or exploit results" – "analyse and work with the information to provide accurate, presentable research results…";
- "understand how to communicate or share your findings" – "the ability to communicate/share information in a manner or format that is appropriate to the information, the intended audience and situation".

In SCONUL Seven Pillars of Information Literacy [4] "The ability to communicate/ share information in a manner or format that is appropriate to the information, the intended audience and situation" is emphasized. There are some elements which could be recognized as accessibility related too:

- In the Pillar "Scope" – understanding of "Issues of accessibility" and "What services are available to help and how to access them";
- In the Pillar "Manage" – understanding of "The importance of storing and sharing information and data ethically. The role of professionals, such as data managers and librarians, who can advise, assist and support with all aspects of information management." and being able to "Demonstrate awareness of issues relating to the rights of others including ethics, …";
- In the Pillar "Present" – being able to "Analyse and present data appropriately" and "Communicate effectively using appropriate writing styles in a variety of formats".

In ANCIL - A New Curriculum for Information Literacy [13] in "Strand 8 Presenting and communicating knowledge: Communicating your findings appropriately" there is the learning outcome "choose an appropriate writing style, level and format for your intended audience" and an example assessment "write different short pieces communicating the same information to different audiences for different reasons".

Scotland National Information Literacy Framework [14] emphasize that information literacy "…is part of the basic human right of lifelong learning" and "… there are several assumptions that affect this right: … as technology improves access to information will become easier and therefore negate the need for information literacy …". Some of its accessibility related (specific) skills are:

- ability to "… communicate/share findings in a manner or format that is appropriate to the information, the intended audience and situation…";

- "ability to understand the issues affecting accessibility of sources";
- "ability to locate and access information";
- "access and use (documentation, accessibility, comparison with other sources)".

As stated in the ACRL Framework for Information Literacy for Higher Education [6] "The value of information is manifested in various contexts, including publishing practices, access to information, the commodification of personal information, and intellectual property laws". Furthermore, knowledge practices related to the frame "Information Has Value" within the framework are "understand how and why some individuals or groups of individuals may be underrepresented or systematically marginalized within systems that produce and disseminate information", "recognize issues of access or lack of access to information sources" and "decide where and how their information is published". In the frame "Searching as Strategic Exploration" it is stated that "encompassing inquiry, discovery, and serendipity, searching identifies both possible relevant sources as well as the means to access those sources" and "experts realize that information searching is a contextualized, complex experience that affects, and is affected by, the cognitive, affective, and social dimensions of the searcher".

In ACRL Information Literacy Competency Standards for Higher Education [5], there is Standard One, where the "access the needed information effectively and efficiently" is emphasized, and Standard Four - "The information literate student communicates the product or performance effectively to others" - deals more with accessibility of information. Its outcomes include:

- Choosing "a communication medium and format that best supports the purposes of the product or performance and the intended audience";
- Using "a range of information technology applications in creating the product or performance";
- Incorporating "principles of design and communication";
- Communicating "clearly and with a style that supports the purposes of the intended audience".

There are two information literacy documents closely related to ACRL Information Literacy Competency Standards for Higher Education: ACRL Objectives for Information Literacy Instruction [15] and ACRL Information Literacy Standards for Teacher Education [16]. As the Standard Four in ACRL Information Literacy Competency Standards for Higher Education best fits the concept of accessibility of information, it was understandable that it would be present in the mentioned two documents [15, 16].

In ACRL Objectives for Information Literacy Instruction [15], Standard Four is not addressed as "its Performance Indicators and Outcomes are best addressed by the course instructor, rather than by librarians". "Course instructor" refers to an individual other than a librarian who has instructional responsibility for a class or a workshop, such as faculty, adjunct faculty, instructor, lecturer, Web-course developer, information technology staff person. It may be concluded that training in communicating "the product or performance effectively to others" and consequently assuring information content accessibility are up to the course instructor, not the librarian.

In the ACRL Information Literacy Standards for Teacher Education [16] in:

- Standard One: "The information literate teacher education student defines and articulates the need for information and selects strategies and tools to find that information." for performance indicator "Selects tools to find information." outcomes include "determining the availability, accessibility, and usability of information sources";
- Standard Two: "The information literate teacher education student locates and selects information based on its appropriateness to the specific information need and the developmental needs of the student." for performance indicator "B. Selects information." outcomes include "determining the intellectual and professional aspects of choosing information sources that meet the information need appropriate for the intended audience" and one of the examples is "selecting topical information for a lesson plan that aligns to specific state or national standards for a specific age group;
- Standard Four: "The information literate teacher education student synthesizes, processes, and presents the information in a way that is appropriate for the purpose for which information is needed." in performance indicator "Presents information" outcomes include "choosing a communication medium and format that best supports the learning outcomes of the task, product, performance, or practice as well as learning styles of the intended audience" and "determining if the information representation is appropriate, sensitive, and responsible for the diversity (e.g., class, cultural, disability/ability, ethnicity, race, religion, sexual orientation, etc.) represented in the intended audience";
- Standard Six: "The information literate teacher education student knows how to ethically use and disseminate information." for the performance indicator "Ethically uses and disseminates information." outcomes include "understanding the ethical, legal, and socio-economic issues surrounding information and information technology" and among the given examples there is the Individuals with Disabilities Education Act (IDEA).

3.2 Accessibility Addressed in Information Technology Related Standards and Recommendations

The aim of some information technology international standards is to provide guidance in improving information accessibility for a wide range of people - persons with disabilities, older persons - when they use personal computers/ information/communication technology (ICT) equipment and services, software, interactive systems/information services.

According to ISO 9241-20 [17] accessibility addresses a widely defined group of users including "people with physical, sensory and cognitive impairments present at birth or acquired during life; elderly people (a growing percentage of the population), who can benefit from new products and services but who experience reduced physical, sensory and cognitive capacities; people with temporary disabilities, such as a person with a broken arm or someone without his or her reading glasses; and people who experience difficulties in particular situations, such as a person who works in a noisy environment or has both hands occupied by other activities."

The results of content analysis of selected IT standards are presented in Table 1. In the first column there are standards which some people (librarians, educators, common

users of IT creating digital information content, …) may (and/or should) find interesting in the context of information literacy and understanding of information needs of users with disabilities. More extensive lists of accessibility related international standards can be found in [18].

Table 1. Accessibility-related information technology standards and recommendations

(ISO) standard	Information literacy context
User needs	
ISO/IEC TR 29138-1:2009 Information technology-accessibility considerations for people with disabilities-Part 1: user needs summary [24]	Understanding of accessibility needs of ICT users and accessibility barriers which people with different disabilities encounter when interacting with ICT systems
ISO/IEC TR 29138-2:2009 Information technology-accessibility considerations for people with disabilities-Part 2: standards inventory [25]	Awareness of accessibility aspects defined by standards: hardware/equipment, software, user capabilities, environment, communications services, etc.
ISO/IEC TR 29138-3:2009 Information technology-accessibility considerations for people with disabilities-Part 3: guidance on user needs mapping [26]	Identification of standard materials that address particular accessibility-related user needs
ISO/IEC 24756:2009 Information technology-framework for specifying a common access profile (CAP) of needs and capabilities of users, systems, and their environments [27]	Understanding access issues in interactions between users and (IT) systems
(ICT) equipment and services	
ISO 9241-20:2008 Ergonomics of human-system interaction-Part 20: accessibility guidelines for information/communication technology (ICT) equipment and services [17]	Planning, designing, developing, acquiring, and evaluating information/communication technology (ICT) equipment and services
ISO/IEC 29136:2012 Information technology-user interfaces-accessibility of personal computer hardware [28]	
User interface	
ISO 9241-171:2008 Ergonomics of human-system interaction-Part 171: guidance on software accessibility [29]	Specifying, designing, developing, evaluating and procuring software platforms and software applications
ISO/IEC 24786:2009 Information technology-user interfaces-accessible user interface for accessibility settings [30]	
ISO/IEC TS 20071-11:2012 Information technology-user interface component accessibility-Part 11: guidance for alternative text for images [31]	
ISO/IEC TS 20071-21:2015 Information technology-user interface component accessibility-Part 21: guidance on audio descriptions [32]	
ISO/IEC TR 19766:2007 Information technology-guidelines for the design of icons and symbols accessible to all users, including the elderly and persons with disabilities [33]	
Content/media	
ISO/IEC 40500:2012 Information technology-W3C web content accessibility guidelines (WCAG) 2.0 [34]	Providing accessible web content

3.3 Accessibility Supported by Tools When Creating Digital Information Content

In today's digital world we produce mostly digital information using various software tools. Regarding digital information content, exploration centred on broadly used format types – (office tools) documents, presentations, spreadsheets, and web pages.

Table 2 contains some common rules for creating accessible text documents, presentations, and spreadsheets [19], as well as recommendations for web content accessibility [8].

Table 2. Digital content creation rules/accessibility recommendations by format

Office tool formats (text documents, presentations and spreadsheets)	Web content (web pages - HTML)
Do	*Ensure*
Add alternative text to images and objects	1 Perceivable web content
Include closed captions for any audio or video	1.1 Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language
Avoid using floating objects	
Avoid image watermarks	
Avoid using repeated blank characters	
Ensure all heading styles are in the correct order	1.2 Provide alternatives for time-based media
Use short titles in headings	1.3 Create content that can be presented in different ways (for example simpler layout) without losing information or structure
Use styles in long documents	
Ensure that all slides have unique titles	
Ensure that the reading order of each slide is logical	1.4 Make it easier for users to see and hear content, including separating foreground from background
Give all sheet tabs unique names	2 Operable web content
Increase visibility for colour-blind viewers	2.1 Make all functionality available from a keyboard
Use simple table structure	
Structure layout tables for easy navigation	2.2 Provide users enough time to read and use content
Specify column header information in tables	2.3 Do not design content in a way that is known to cause seizures
Specify column header rows in tables	
Avoid using blank cells, rows, or columns for formatting	2.4 Provide ways to help users navigate and find content, and determine where they are
Use meaningful hyperlink text	3 Understandable web content
	3.1 Make text content readable and understandable
	3.2 Make web pages appear and operate in predictable ways
	3.3 Help users avoid and correct mistakes
	4 Robust web content
	4.1 Maximize compatibility with current and future user agents, including assistive technologies

Common software products for creating such digital documents – texts, presentations spreadsheets - have built-in features for checking accessibility (such as MS Office Accessibility Checker [20]), and many free resources exist for testing accessibility available in web pages [21]. Every person creating digital content and considering himself/herself being information literate should be aware of easy ways to check and assure (better) accessibility.

Knowledge acquisition on accessibility, skills, and practices of assuring accessibility of digital information content should not depend (only) on personal motivation, initiative

and effort. These should be fostered on an institutional level. The most effective way would designate higher education institutions (as sources of initial education for professionals in different fields), to serve gaining additional awareness, knowledge, skills and motivation for assuring accessibility (not only of information, but also of products, services, and environments). This could be achieved through activities of offices for students with disabilities, such as workshops on accessibility issues for teaching and administrative staff (example: [22]). Another way would be to engage a faculty accessibility specialists whose role would be to [23]: increase disability awareness amongst staff responsible for curriculum; support production teams to embed accessibility in curriculum design and production; help to deliver individual adjustments for content; and advise faculties and support teams.

4   Conclusion

It has been already emphasized that in the broader sense, accessibility in information literacy related documents means ability to reach information, while the term accessibility of information has a deeper meaning and a higher importance in the context of people with disabilities. Based on the findings, the following initial information literacy skills related to the accessibility of information could be formulated as being able to:

- Describe (information) needs of users with different (dis)abilities;
- Recognize the importance of accessible information for users with different (dis)abilities;
- Identify ways and barriers to fulfilling information needs of users with different (dis)abilities;
- Show different ways to provide effective and efficient access to information for users with different (dis)abilities;
- Present information in a way accessible to users with different (dis)abilities;
- Apply tools to achieve and check accessibility of information;
- Recognize economic, legal, social and ethical aspects/issues of accessibility of information to users with different (dis)abilities, i.e. inclusion.

Accessibility of digital information and accessibility in general should be the focus of both librarians (information service professionals), IT professionals dealing with IT systems and tools used to create, store and manage information, and common IT users generating digital information/content to foster inclusion of people with disabilities. It is promising that accessibility-related skills are recognized as skills of a range of professions, [35] covering subjects as: the principles of accessibility, the potential of related technologies, and the need for e-Inclusion legislation; understanding who the users are and how they handle the technology used; guidelines and standards on accessibility; techniques and tools for implementing accessibility. Therefore, being familiar with, practicing and providing accessibility of digital information content should be one of the attributes of any information-literate person.

References

1. United Nations (UN): A convention on the rights of persons with disabilities (2006). http://www.un.org/disabilities/convention/conventionfull.shtml
2. Henry, S.L., Abou-Zahra, S., Brewer, J.: The role of accessibility in a universal web. In Proceedings of the 11th Web for All Conference, W4A 2014, Seoul, Republic of Korea, 7–9 April 2014 (2014)
3. Lazar, J., Goldstein, D.F., Taylor, A.: Ensuring Digital Accessibility Through Process and Policy. Morgan Kaufmann, Waltham (2015)
4. Society of College, National and University Libraries (SCONUL): The SCONUL seven pillars of information literacy - core model for higher education (2011). http://www.sconul.ac.uk/sites/default/files/documents/coremodel.pdf
5. Association of College & Research Libraries (ACRL): Information literacy competency standards for higher education (2000). http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/standards.pdf
6. Association of College & Research Libraries (ACRL): Framework for information literacy for higher education (2015). http://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/infolit/Framework_ILHE.pdf
7. International Organization for Standardization – ISO: Bringing down barriers. http://www.iso.org/iso/bringing_down_barriers-infography_final.pdf
8. W3C: Web content accessibility guidelines (WCAG) 2.0 (2008). http://www.w3.org/TR/WCAG20/
9. Chartered Institute of Library and Information Professionals (CILIP): Models and frameworks. http://www.informationliteracy.org.uk/definitions/il-models/
10. Association of College & Research Libraries (ACRL): Guidelines, standards, and frameworks. http://www.ala.org/acrl/standards
11. International Organization for Standardization – ISO. http://www.iso.org/iso/home/news_index/iso-in-action/accessibility.htm
12. Chartered Institute of Library and Information Professionals (CILIP): Information literacy model (2012). http://www.cilip.org.uk/sites/default/files/documents/Information%20literacy%20skills.pdf
13. Secker, J., Coonan, E.: Arcadia Project, Cambridge University Library: a new curriculum for information literacy - ANCIL (2011). http://ccfil.pbworks.com/f/ANCIL_final.pdf
14. Irving, C., Crawford, J.: National information literacy framework (Scotland) (2007). http://www.educationscotland.gov.uk/Images/information_literacy_framework_draft_tcm4-433724.pdf
15. Association of College & Research Libraries (ACRL): Objectives for information literacy instruction: a model statement for academic librarians (2001). http://www.ala.org/acrl/standards/objectivesinformation
16. Association of College & Research Libraries (ACRL): Information literacy standards for teacher education (2011). http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/ilstandards_te.pdf
17. ISO 9241-20:2008 Ergonomics of Human-system Interaction - Part 20: Accessibility Guidelines for Information/Communication Technology (ICT) Equipment and Services
18. Kirinić, V., Kozina, M., Vidaček-Hainš, V.: Accessibility of information: international standards, recommendations and practices. In: Book of Proceedings: 13th International Scientific Conference on Economic and Social Development, Barcelona, pp. 47–56 (2016)
19. MS Office: Accessibility tutorials. https://www.microsoft.com/enable/training/office2013/

20. MS Office: Check for accessibility issues. https://support.office.com/en-US/article/Check-for-accessibility-issues-A16F6DE0-2F39-4A2B-8BD8-5AD801426C7F
21. Web Accessibility Initiative (WAI): Web accessibility evaluation tools list. https://www.w3.org/WAI/ER/tools/index.html
22. University of Zagreb, Office for Students with Disabilities: Activities. http://www.unizg.hr/uredssi/index.php/lang-en/aktivnosti
23. Slater, R., Pearson, V.K., Warren, J.P., Forbes, T.: Institutional change for improving accessibility in the design and delivery of distance learning – the role of faculty accessibility specialists at The Open University. Open Learn. J. Open Distance e-Learn. **30**(1), 6–20 (2015)
24. ISO/IEC TR 29138-1:2009 Information Technology - Accessibility Considerations for People with Disabilities - Part 1: User Needs Summary
25. ISO/IEC TR 29138-2:2009 Information Technology - Accessibility Considerations for People with Disabilities - Part 2: Standards Inventory
26. ISO/IEC TR 29138-3:2009 Information Technology - Accessibility Considerations for People with Disabilities - Part 3: Guidance on User Needs Mapping
27. ISO/IEC 24756:2009 Information Technology - Framework for Specifying a Common Access Profile (CAP) of Needs and Capabilities of Users, Systems, and Their Environments
28. ISO/IEC 29136:2012 Information Technology - User Interfaces - Accessibility of Personal Computer Hardware
29. ISO 9241-171:2008 Ergonomics of Human-system Interaction - Part 171: Guidance on Software Accessibility
30. ISO/IEC 24786:2009 Information Technology - User Interfaces - Accessible User Interface for Accessibility Settings
31. ISO/IEC TS 20071-11:2012 Information Technology - User Interface Component Accessibility-Part 11: Guidance for Alternative Text for Images
32. ISO/IEC TS 20071-21:2015 Information Technology - User Interface Component Accessibility-Part 21: Guidance on Audio Descriptions
33. ISO/IEC TR 19766:2007 Information Technology - Guidelines for the Design of Icons and Symbols Accessible to All Users, Including the Elderly and Persons with Disabilities
34. ISO/IEC 40500:2012 Information Technology - W3C Web Content Accessibility Guidelines (WCAG) 2.0
35. Miesenberger, K.: What is important is in the curriculum. In: Developing e-Accessibility as a Professional Skill – G3ict (2014). http://www.g3ict.org/resource_center/publications_and_reports/p/productCategory_whitepapers/subCat_7/id_321

Visual Literacy in Library Practice: Use of Images on the Facebook Pages of Croatian Public Libraries

Mirko Duić[(✉)]

Department of Information Sciences, University of Zadar, Zadar, Croatia
`miduic@unizd.hr`

Abstract. The goal of the research was to explore the specific phenomenon from the field of visual literacy: use of images on the Facebook pages of the ten Croatian public libraries. Using the content analysis, we created "image type" categories and subcategories of images that are posted by librarians and determined their shares in relation to the total number of analyzed image posts. Also, content analysis was used to determine the various roles of these images in communication with user community gathered around these Facebook pages. We created "image communication role" categories and subcategories and determined their shares in relation to the total number of analyzed image posts. While presenting the shares of "image type" and "image communication role" categories and subcategories, we also described examples of good practice with regard to the use of images in image posts.

Keywords: Visual literacy · Croatian public libraries · Images · Facebook

1 Visual Literacy

In the last 20 years, personal computers, Web 1.0 and, finally, Web 2.0 and social media applications have become ubiquitous. These technologies enable fast and reliable transfer of huge quantities of digital images to the most remote parts of the world. With the help of digital technologies, images have inundated various aspects of everyday life. Image editing applications such as Gimp or Photoshop, as well as social media applications such as Facebook, allow the democratization of digital image production, modification and distribution [1]. Many amateurs, professionals and organizations, create and distribute increasing amounts of images to effectively communicate and achieve their goals [2]. In view of these circumstances, visual literacy becomes one of the most important types of literacies [3–5]. Considering visual literacy in the digital age, Messaris focused on two major technological changes in visual media that have caused significant cultural transformations. One technological change is the development of powerful techniques for the digital manipulation and creation of images. The second important change is "the increasing availability of digital networks for the dissemination of images and for public commentary about those images" [6, p. 101]. According to Messaris, both of these technologies helped to raise levels of visual literacy in society, and "the ability to create, manipulate, and disseminate images by means of computers and digital networks has become ubiquitous" [6, p. 105]. Considering new literacies, including visual literacy, Lankshear and Knobel emphasized the importance of new or more widely accessible technological resources that support the creation,

communication and negotiating of encoded meanings. Many different digital tools and online publishing venues that are available today are changing the field of publishing, which is no longer limited to text and images on paper, but can include various digital media artefacts: voice and music recordings, animations, video files, digitally created and retouched images, etc. By virtue of these circumstances, "ordinary people" are now in a much better position to create, modify and consume high-quality media artefacts [7]. Yamada-Rice stated that it has become widely accepted that the advent of new technologies and media has redirected development of communication and meaning-making skills from print into the visual Web 2.0 era, which is characterised by the growth of popular online communities such as Facebook, Flickr, MySpace and Wikipedia. They believed that library and information science practice is based on notions that have to be revised in relation to a changing world of information and services [8]. From the librarian point of view, Rockenbach and Fabian examined visual literacy as an important new literacy. They claimed that in a culture dominated by images, visual literacy skills or competencies are of special importance [4]. Spalter and Van Dam defined digital visual literacy as the ability to create and to understand visual materials created with a computer. They expressed the opinion that digital visual literacy is essential in many daily life and workplace tasks and in all visually oriented disciplines. These authors emphasized intellectual challenges related to appreciating and acquiring digital visual literacy in schools and at colleges: the interdisciplinary nature of visual studies and a historical suspicion of images from Plato onward [5]. Another challenge is emphasized by Yamada-Rice who wrote that the visual mode is still seen as simplistic in comparison to the written mode and that current means of visual description and analysis are outdated. They need to be revised for the visual mode of new media [8]. Avgerinou thought that the pervasiveness of visual mass media is abundantly obvious and that "we live in an era of visual culture, the so-called 'bain d' images' (image bath), which influences enormously our perception of self and the surrounding world, our attitudes, beliefs, values, and general life-style". However, he emphasized that the majority of people does not necessarily have a conscious recognition of this image bath. Children are singled out by this scholar, because although they are born in the age of TV and computer images, they do not naturally possess sophisticated visual literacy skills. Left to their own devices, without formal education related to visual literacy, Avgerinou is concerned that children cannot be active receivers of visual messages able to make a critical selection between the necessary and the unnecessary, that they cannot recognize the different functions of visual media (to inform, persuade, instruct, entertain) and that they are not able to distinguish superficial, glamorous and pseudo-sophisticated messages from the truly meaningful ones [9]. Although Avgerinou spoke about children, surely, the same doubts could be raised in relation to visual literacy of adults. When visual literacy is not a standard part of formal education, it is not an unfounded concern.

2   Social Networks, Libraries and Use of Images

In a rapidly changing information environment, there is a constant need for libraries to adapt their old services and introduce new services. They need to continuously identify, learn and introduce new technologies if they want to stay relevant as knowledge and information

intermediaries. The growth in popularity of social media applications has lead to the creation of Library 2.0. Casey and Savastinuk remarked that the heart of Library 2.0 is user-centered change, a model for library service that attempts to reach new users and better serve current ones through improved customer-driven offerings. They pointed out that technological advances in the past several years have enabled libraries to create new services that before were not possible [10]. Social networks are a good example of the technologies which can give additional value to existing library services and to serve as communication infrastructure for establishing new services. In his review of the landscape of social networks for libraries, King described the most important social networks: Facebook, Twitter, YouTube, LinkedIn, Instagram, Tumblr, Pinterest, SnapChat, Vine, Google Plus, Flickr. He said that there are two main types of content that libraries are sharing on Facebook: library news and fun stuff. He also gave suggestions on how libraries should post to social networks. The main rule is that they create interesting and useful content for the users. According to King, libraries should post the following content on Facebook: information about what is happening in the library; tips and shortcuts for using library services; photos and videos; entertainment and fun content [11]. In 2007, a period when Facebook was less popular than today, Charnigo and Barnett-Ellis made a study in which 126 academic librarians were surveyed about their attitudes toward Facebook. Findings suggested that librarians are overwhelmingly aware of the "Facebook phenomenon." However, the majority of librarians considered Facebook outside the domain of professional librarianship [12]. In the meantime, this attitude has changed. A few years ago, in 2011, Facebook and other social media applications became a standard library inventory, as is visible in a study by Mahmood and Richardson. According to that study, libraries often used Facebook and various other Web 2.0 applications, such as: blogs, RSS, instant messaging, other social networking sites, podcasts. These tools were used for: sharing news, marketing library services, providing information literacy instruction, providing information about print and digital resources, soliciting user feedback [13]. We did not find any studies which explored publishing of visual content on library Facebook pages. Although it does not explore library Facebook pages, the study that is in some degree similar to our study is one in which a content analysis of Facebook profile photos was conducted. Namely, Hum et al. examined identity construction and gender roles in social networking sites by studying and comparing the profile photographs of male and female Facebook users. Number of photos in the profile album and the content of the main profile picture were studied by coding specific pictures and determining if the content and amount of profile pictures differ significantly by gender [14]. There is one more study that has some similarities with our research, although it concerns the social network Tumblr. Bourlai and Herring explored multimodal communication by analyzing emotional aspects of Tumblr posts. A dataset was constructed of posts with text and images, as well as text only posts. The study is a micro-level analysis of multimodal communication in a social media platform and that is one of the characteristics that makes it similar to our study [15]. There is also one interesting study which explored styles and types of humor in memes, i.e., picture-based posts on Facebook. This study analyzed the rapid spreading of 1000 humorous memes in Facebook regarding the type of humor of a specific post. Also, the study presents a list of various types of humor which could be used as categories of content analysis of Facebook posts [16]. Among other aspects, in our study,

we will also explore the presence of humor in image posts, although we will not go into such detail as Taecharungroj and Nueangjamnong did.

Based on the literature research, it seems that studies with content analysis of image-based Facebook posts are very rare. We hope that our study will be incentive to focus more attention on that aspect of Facebook activity which is related to visual literacy.

3   The Research Goal and Methodology

In this study, the research goal was to explore use of images on the Facebook pages of Croatian public libraries. This was done by determining how many images of certain image types are posted by librarians. Also, we determined what are the various roles of these images in communicating with the user community gathered around these Facebook pages. The content analysis method was used to explore use of images on the Facebook pages of public libraries from ten Croatian cities: Zagreb, Rijeka, Osijek, Split, Pula, Čakovec, Zadar, Koprivnica, Dubrovnik, Vinkovci. From the Facebook page of eachpublic library included, we analyzed 100 posts published immediately before the 13 March 2016 and including this date. The total sample was 1000 posts. During the analysis we created the categories and subcategories of image types for categorising images found in the posts and for determining the shares of these categories and subcategories in relation to the total number of image posts. Also, using content analysis, we determined what is the role that each image has in communicating with the Facebook user community. To this end, we created categories and subcategories for the communication roles of images and determined the shares of these categories and subcategories in relation to the total number of image posts. While presenting the shares of "image type" and "image communication role" categories and subcategories, we described examples of good practice with regard to the use of images in image posts.

It is important to note that from the sample of 1000 Facebook posts, only those posts which contained images created or published by librarians were included in the analysis. For example, we included posts in which there were images created by librarian using photo and video camera or using an image editing program to make a poster, illustration or photo collage. We also included posts in which there is an image which is not created by a librarian (poster, illustration, postcard…) but that was chosen and published on Facebook by a librarian. But we didn't include posts that contain images not created or selected by a librarian who published that post.

4   Findings

4.1   "Image Type" Categories and Subcategories

At the beginning of the analysis, we determined that among the 1000 posts in the sample only 645 are image posts. It means that they contain static or moving images. It is important to note that they can also contain text, either written on the image or text written in the text area of Facebook post in which Facebook users can write a text. The next step of the analysis was a more detailed exploration of these 645 image posts. In the first phase of

study, we used the content analysis of 645 image posts to create "image type" categories and subcategories. As its name suggests, "image type" category and subcategory designates a type of the image. After content analysis, 52 "image type" subcategories were created. After analysis of these 52 subcategories, nine main categories were created that contain subcategories. Each of the nine main categories contains only those subcategories that designate similar image types. The only exception is the category Miscellaneous which contains subcategories which are unique regarding their image type and therefore could not be grouped in a larger category.

Table 1 presents the percentage of image posts in a specific "image type" category and subcategory. In Part 1 of Table 1 the following main categories of image types are listed: Photo, Photo Album, Poster, Illustration, Moving Image, Miscellaneous, Cover Image, Scanned Image, Profile Image. The largest number of image posts is in the Photo category (24.2% or 156 images) which contains photos selected for publishing by librarians or made by them. The average number of photos published by each library in the analysed period is 15.6. The second most popular category is a Photo Album (22% or 147 photo albums). A photo album published in a Facebook image post usually contains more than one photo. There is a total number of 2059 photos accessible through 147 photo albums published by ten libraries. The largest number of Photo Album photos were published by the public library in Rijeka - 557 photos, and the smallest number were published by the public library in Zagreb - 30 photos. The average number of photos published by each library is 205.9 which means that this image type is frequently used in libraries. We did not analyze in detail the content of these photos, but it seems that the vast majority of them present activities held at libraries. The third most frequent image type is a Poster (22% or 142 posters) and we categorised as a poster every image that contained text. The average number of posters published by each library is 14.2. After these three image types that are convincingly most frequent, in fourth place is an image type, Illustration (7% or 45 illustrations). In this study, we define illustrations as drawings, i.e., non-photo visual content that does not contain any text. The average number of illustrations published by each library is 4.5. As well as illustrations, there is the same share of images in the category Moving Image (7% or 45 moving images), which contains videos and various types of animations. In sixth place, regarding the frequency of publishing, are images in the category Miscellaneous (6% or 39 images), which contains items such as photo collages, logos, postcards. Cover image (5.1% or 33 cover images) is the next category of image types and it designates images that are placed on the top part of the Facebook page. By virtue of their visually dominant location on the Facebook page, cover images have a great influence on the impressions of Facebook page visitors. Only one cover image at a time can be visible on top of the Facebook page. Each library has changed the cover image approximately three times during the analysed period. If we take into account their visual prominence, then profile images are similar to cover images because they are also located on the top of the page, positioned at the left edge of the cover image. The Profile Image category is the least popular with 1.2% or 8 profile images published by libraries. Cover and profile images can be photos, illustrations, posters or any subcategory of images from the Miscellaneous image type. They can also be scanned images. Scanned Image is another "image type" category that we established. By its

frequency - 4.7% or 30 scanned images - this category follows after the Cover Image category. All the scanned images that we encountered during the analysis were scanned book covers. The main function of these images is to promote specific books in the library.

Table 1. Percentage of image posts in a specific "image type" category and subcategory

Part 1: Percentage of image posts in a specific "image type" category		Part 2: Percentage of image posts in a specific "image type" subcategory	
Image type category	Percentage	Image type subcategory	Percentage
Photo	24.2	Photo Album (Facebook Phot.)	21.2
Photo Album	22.8	Regular Photo	20.6
Poster	22	Poster (Illustration)	11.6
Illustration	7	Poster (Photo)	7.3
Moving Image	7	Illustration	7
Miscellaneous	6	Video	4.8
Cover Image	5.1	Scanned Image (Illustration)	2.8
Scanned Image	4.7	Poster (Text)	2.6
Profile Image	1.2	Cover Image (Photo)	2
		The remaining 44 subcategories	20.1

Part 2 of Table 1 presents 9 subcategories of image types with the largest amount of image posts. The most populated subcategory is Photo Album (Facebook Photos) with the share of 21% in the total number of image posts (645). Apart from this "image type" subcategory which designates photo albums stored on Facebook, we established another subcategory for the photo albums stored on Flickr, a picture gallery site. However, the share of Flickr photo albums in image posts is significantly lower (0.5% or just 3 photo albums) and only the library in Koprivnica is storing albums on Flickr. The second most frequent image type is Regular Photo (20.6% or 133 photos) and it designates photos made by librarians or non-librarians without added text and illustrations. There are also Regular Photo variants; for example, there is a Photo (Installation) image type which designates regular photos with a specific content: arranged objects in the photographed scene. One example is a library card inserted between book pages on the library shelf. This photo is accompanied with the text in which library membership is promoted. Other variants of Regular Photo image type are photos with specific content: poster on the wall, exhibition billboard, book text, newspaper text, scene from TV screen, paper drawing. But there are very few photos in these variants of Regular Photo image type and therefore they are not individually presented in Part 2 of Table 1. Poster (Illustration) is a subcategory of image type which is very frequent - it is in third place, according to the frequency of the images of this type (11.6% or 75 posters). As its name suggests, these images are posters (images with text) and the most significant image content of these posters are illustrations. There are other variants of Poster image type: Poster (Photo) which are posters that have photos as its most significant image content (7.3% or 47 posters); Poster (Text) which are posters that contain only text without images (2.6% or 17 posters); Poster (Mix) which are posters that have photos and illustrations as its most significant image content (0.5% or 3 posters). Illustration is more popular image type (7% or 45 illustrations) and, as we already mentioned, it is the image which contains drawings,

i.e. non-photo visual content, and that does not contain any text. Video (4.8% or 31 videos) is one of the subcategories of the category Moving Image. Other subcategories of the Moving Image category are significantly less popular than the Video subcategory: Regular Animation (0.8%), GIF Animation (0.5%), Image Presentation (0.5%), Animated Text (0.3%), Animated Photos (0.2%). GIF animation is animation stored in GIF file format; it is usually short and continuously repeats itself. Image Presentation is a sequence of images with or without accompanying sound and text. Animated Photos is a sequence of photos with or without accompanying sound and text. The camera zooms in and out around these photos. Among popular subcategories of image types are also two variants of scanned images: Scanned Image (Illustration), 2.8%, and Scanned Image (Photo), 1.4%. The former subcategory designates images of scanned book covers whose most significant image content is presented with illustration(s), and later subcategory designates scanned book covers whose most significant image content is presented with photo(s). Among popular subcategories are also two variants of cover images: Cover Image (Photo), 2%, and Cover Image-Poster (Illustration), 0.9%. Former subcategory designates cover images whose most significant visual content is presented with photo(s), and later subcategory designates cover images that are posters whose most significant visual content is presented with illustration(s). Photo Collage (1.9%) is another „image type"subcategory, which designates images of many small photos arranged as one photo. Some of the more popular categories are Logo (1.7%) and Comic Book (1.1%). The former subcategory designates logotypes of various institutions or events, and the latter subcategory designates comic book frames. For example, in one of these frames a comic book character is reading a book while sitting on the airplane wing. In the text area of the Facebook post, a librarian wrote a comment about this image: "Imagination can do anything!". Apart from the nine most populated subcategories, which contain 79.9% of image posts, the remaining 44 subcategories contain just 20.1% of image posts.

4.2   "Image Communication Role" Categories and Subcategories

In the second phase of the study, we used the content analysis of 645 image posts to create "image communication role" categories and subcategories. As its name suggests, "image communication role" category and subcategory designates a communication role of the image. After content analysis, 58 subcategories were created. After analysis of these 58 subcategories, six main categories were created that contain these subcategories. Each of the six main categories contains those subcategories that perform similar communication roles. The only exception is the category Miscellaneous which contains subcategories which are unique with regard to their communication role and therefore could not be grouped in some larger category. It is important to note that each image post can have more than one communication role. In that case the same image post will be categorised in more than one "image communication role" subcategory. Therefore the sample for this part of the analysis was not the total number of the image posts (645) but the sum total of all instances when image posts were categorised in a specific "image communication role" subcategory(826).

Table 2 presents the percentage age of image posts in a specific "image communication role" category and subcategory. In Part 1 of Table 2 six main categories of communication roles are listed.

Table 2. Percentage of image posts in a specific "image communication role" category and subcategory

Part 1: Percentage of image posts in a specific "image communication role" category		Part 2: Percentage of image posts in a specific "image communication role" subcategory	
Im. Communication role category	Percentage	Im. Communication role subcategory	Percentage
Book promotion by librarians	27.4	Presentation of activity in library	9.1
Presentation of various activities	23.6	Presentation of non-librarian activity in library	8.7
Announcement of various activities	18.3	Announcement of activity in library	8.5
Anniversaries	13.9	Announcement of non-librarian activity in library	6.4
Miscellaneous	12.1	Anniversary (general)	4.8
Library information by librarians	4.7	Humorous comment	4
		Scanned book cover	3.3
		Anniversary of death	3.1
		The remaining 50 subcategories	52.1

The largest number of image posts is in the "Book promotion by librarians" category (27.4% or 226 images). This category contains image posts with a communication role to promote books, reading and learning. The second most popular category is "Presentation of various activities" (23.6% or 195 images). This category contains image posts with a communication role to present various activities of librarians and non-librarians in the library and outside the library. Similar to this category is the category "Announcement of various activities" (18.3% or 151 images) which contains image posts with a communication role to announce various activities of librarians and non-librarians in the library and outside the library. In fourth place is the "Anniversaries" category (13.9% or 115 images) which contains image posts with a communication role to bring attention to specific phenomena (persons, events, places) through various types of anniversaries (birth date, date of death, important event). We already mentioned that the "Miscellaneous" category (12.1% or 100 images) contains subcategories which are pretty unique regarding their communication role. The "Library information by librarians" is the least popular category (4.7% or 39 image instances). It contains image posts with a communication role to inform about various aspects of library services and development, such as: library membership promotion, working hours, borrowing conditions.

Part 2 of Table 2 presents eight subcategories of "image communication roles" with the largest amount of image posts. The four most populated subcategories are announcements and presentations of librarian and non-librarian activities in libraries. Together, these subcategories comprise 32.7% or 270 image posts. In fifth place (4.8%) is "Anniversaries (General)" subcategory, which designates image posts about different types of anniversaries, excluding birth, death and specific day, week and year anniversaries. For example, in this subcategory are image posts about the anniversary of the establishment of the organization "Matica Hrvatska" or the anniversary of the establishment of the city of New York. Next, there is the "Humorous comment" subcategory and it designates image posts which

use humor to inform and comment on books, reading, bookworms and various similar topics. In these image posts we often found a very skillful combination of image and text. For example, there is a post with an image in which the American Statue of Liberty reads a book. The following text is written on the image: FREADOM. The letters "READ" in this word are painted with a different color than other characters. Therefore, the visual message of this text-image is that reading is the road to freedom. Humorous effect in image posts is often achieved when the librarian publishes an image and writes an accompanying text. For example, there is an image post with an image of a handsome young man sitting between library shelves and reading a book. A librarian wrote the following accompanying text: "Girls, if you are looking for quality content, drop in to our library. Walk around shelves and you will find everything". We also found out that in different libraries there is a large difference in the frequency of use of image types with the same communication role. For example, while one library published humorous image posts ten times, six libraries did not publish that kind of image post or published it just one or two times. Apart from the eight most populated "image communication role" subcategories, there are 50 other subcategories, which comprise 52.1% of image posts. Among them is "Librarians inviting users to join projects" subcategory (2.3% or 19 posts). In one of these projects – "Blind date with books" - librarians connect users with books in the following way: a book is wrapped in paper which prevents the user from identifying the book. However, a citation for the book is written on the wrapping paper. The user must rely on this citation to select an unknown book for reading. This project is presented with text and photos of the wrapped books with citations. Apart from individual photos of books there is also a Facebook post in which a photo collage is published, composed of photos of wrapped books, the project poster and photos of users examining wrapped books. Another interesting subcategory is "Placing books and reading in positive context" (2.2% or 18 image posts). An example of the image post in this subcategory is an image post containing a photo of Bob Marley reading a book in a bus. A librarian wrote an accompanying text: "Always with book and guitar…". There is a subcategory "Reading benefits" which designates image posts in which the diverse types of reading benefits are promoted, including: literacy, empathy and personality development; acquiring of knowledge and ideas; the connection between kindred spirits; cure for lonesomeness; reading as a connection with handsome persons. An interesting finding is that the following reading benefit has been by far the most frequently accentuated benefit in image posts: reading as the solution for bad weather. There are 16 image posts that suggest to library users to read or visit a library and find a book to read when the weather is bad. Another interesting subcategory is "Citations of famous people". It designates image posts containing images with citations of famous writers, philosophers or other people from other professions. Finally, there is a subcategory "Curiosities in libraries". Image posts in this subcategory are mainly photos which present interesting situations in the library. For example, there is an image post containing a photo with a scene of two dogs in the library. A librarian wrote an accompanying text: "We think that we should open a new department for this crew…". There are many other interesting subcategories, but unfortunately there is not enough place to present them in more detail.

5   Conclusion

Through the research in this study, we acquired various insights about a specific phenomenon from the field of visual literacy: use of images on the Facebook pages of the ten Croatian public libraries. These insights could be helpful to advance understanding of the visual literacy skills and practices of Croatian librarians. Using content analysis, we determined "image type" categories and subcategories of images that are posted by librarians and their shares in relation to the total number of image posts that were analyzed. After content analysis, 52 "image type" subcategories were created. Nine main categories were created that contain these subcategories: Photo, Photo Album, Poster, Illustration, Moving Image, Miscellaneous, Cover Image, Scanned Image, Profile Image. The results clearly show that in communication with the Facebook community, photo is by far the most used image type - 24.2% of image posts contained photos and 22.8% of image posts contained photo albums. This could be an indication that librarians have sufficient knowledge and skills to create and use photos to communicate with users. However, concerning the huge popularity of photos in library Facebook pages, librarians could benefit from educational programs in which advanced skills of photo creation, modification and use are taught. These educational programs could raise their knowledge and skills to a higher level. Some topics of this educational programs could be: use of manual settings of photo camera; use of lighting equipment to make better photos; knowledge of resolution, bit depth, digital formats, organisation and storage of photos; techniques for enhancing the appearance of photos: contrast and color regulation, sharpening and blurring, retouching, resizing, compression. Posters are the next most popular image type used for communication with users - 22% of image posts contain posters. We categorised as a poster every image that contains a text. This means that to produce a poster the librarian needs to know how to combine text and images. The poster could also contain a combination of more than one image; therefore, to produce a poster the librarian also needs to know how to combine images. To be able to do that, they need to know how to use software tools in which posters could be made, for example, free, open source software GIMP and Scribus, or proprietary software Photoshop. They should also become acquainted with various examples of well done posters. Therefore, they would benefit from educational programs about poster design and history. It is important to note that 52.7% of posters found in analysed image posts, contained illustrations. Additionally, the illustrations were also contained in 7% of all image posts. Therefore, the knowledge and skills related to the creation, modification and combination of illustrations could also be beneficial to librarians. For that purpose, they should learn to use software tools for creation and manipulation of illustrations such as Inkscape (free, open source), Illustrator (proprietary), as well as GIMP or Photoshop. There are not many videos (7%) and animations (less than 1%) in image posts. The educational programs that present the knowledge and skills to find and use this kind of media content could also be beneficial to librarians.

Content analysis was used to determine the various roles of images in communicating with the user community gathered around library Facebook pages. We determined "image communication role" categories and subcategories and determined their shares in relation to the total number of image posts that were analyzed. After content analysis, 58 subcategories were created. Six main categories were created that contain all of these subcategories: Book promotion by librarians, Presentation of various activities, Announcement of

various activities, Anniversaries, Miscellaneous, Library information by librarians. So many categories and subcategories are convincing proof of rich, thematically diverse communication of librarians with Facebook users. For example, there are many diverse subcategories in the category "Miscellaneous", including: Humorous comment, Curiosities in libraries, Local history, Eros. Image posts in each of these subcategories are evidence of specific communication messages that librarians communicate to their users. For example, in the subcategory "Humorous comment", librarians are communicating humorous comments which are often related to books, libraries and reading. In that way librarians can enhance their relationship with library users and help to create an attractive and positive public image of the library. In communicating with users, image posts in various other "communication role" subcategories support various goals of libraries: to educate, to inform, to entertain. Sometimes the same image post can support two or more library goals. The "image communication role" categories and subcategories that were created in this study could be helpful for librarians to become acquainted with rich existing communication practice of libraries on Facebook, and also to think about the various types of communication messages they could create in their own practice. We also described "examples of good practice" with regard to the use of images and text in image posts. These specific examples of good practice could also be inspirational to enrich the Facebook activities of other librarians. When we talk about "examples of good practice", we think about examples of specific Facebook image posts in which text and images are skilfully used to communicate to users some specific messages. They are models that could help other librarians create more effective and interesting Facebook content.

We hope that many findings from this study will be valuable for better understanding of visual literacy practices in library Facebook pages and that they will serve as an incentive and foundation for further research. For example, the "image type" and "image communication role" categories and subcategories that we created could be used for analysis in other similar studies. These categories and subcategories can also be a foundation for the refinement and further development of a system for categorisation of images and image posts on Facebook and other social networks or various image publishing systems.

References

1. Sadik, A.: Improving pre-service teachers' visual literacy through flickr. Procedia Soc. Behav. Sci. **1**(1), 91–100 (2009)
2. Radcliff, S.: Teaching ınformation literacy using argument, alternative perspectives, and ımages. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 474–483. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_50
3. Callow, J.: Show me: principles for assessing students' visual literacy. Read. Teach. **61**(8), 616–626 (2008)
4. Rockenbach, B., Fabian, C.A.: Visual literacy in the age of participation. Art Documentation: J. Art Libr. Soc. North Am. **27**(2), 26–31 (2008)
5. Spalter, A.M., Van Dam, A.: Digital visual literacy. Theory Into Pract. **47**(2), 93–101 (2008)
6. Messaris, P.: Visual "Literacy" in the digital age. Rev. Commun. **12**(2), 101–117 (2012)
7. Lankshear, C., Knobel, M.: 'New' Literacies: Technologies and Values. Teknokultura. Revista de Cultura Digital y Movimientos Sociales 9(1), 45–71 (2012)

8. Yamada-Rice, D.: New media, evolving multimodal literacy practices and the potential impact of increased use of the visual mode in the urban environment on young children's learning. Literacy **45**(1), 32–43 (2011)
9. Avgerinou, M.D.: Re-viewing visual literacy in the "Bain d'Images" era. TechTrends **53**(2), 28–34 (2009)
10. Casey, M.E., Savastinuk, L.C.: Service for the next-generation library. Libr. J. **131**(1), 40–42 (2006)
11. King, D.L.: Landscape of social media for libraries. Libr. Technol. Rep. **51**(1), 10–15 (2015)
12. Charnigo, L., Barnett-Ellis, P.: Checking out Facebook.com: the impact of a digital trend on academic libraries. Inf. Technol. Libr. **26**(1), 23–34 (2007)
13. Mahmood, K., Richardson Jr., J.V.: Adoption of web 2.0 in US Academic libraries: a survey of ARL library websites. Program **45**(4), 365–375 (2011)
14. Hum, N.J., Chamberlin, P.E., Hambright, B.L., Portwood, A.C., Schat, A.C., Bevan, J.L.: A picture is worth a thousand words: a content analysis of facebook profile photographs. Comput. Hum. Behav. **27**(5), 1828–1833 (2011)
15. Bourlai, E., Herring, S. C.: Multimodal communication on tumblr: i have so many feels! In: Proceedings of the 2014 ACM Conference on Web Science, pp. 171–175. Association for Computing Machinery (2014)
16. Taecharungroj, V., Nueangjamnong, P.: Humour 2.0: styles and types of humour and virality of memes on facebook. J. Creative Commun. **10**(3), 288–302 (2015)

How Primary Teachers in Greece Seek Information: Use and Initial Appraisal of Information Resources

Emmanouel Garoufallou[1,2], Stavroula Antonopoulou[2,3], Ioanna-Ersi Pervolaraki[1,2(✉)], Rania Siatri[1], Georgia Zafeiriou[1], and Sirje Virkus[4]

[1] Department of Library Science and Information Systems,
Alexander Technological Educational Institute (ATEI) of Thessaloniki, Thessaloniki, Greece
{mgarou,gzafeiri}@libd.teithe.gr, ersi212004@yahoo.gr,
rsiatri@gmail.com
[2] Alcala University, Alcalá de Henares, Spain
santon@afs.edu.gr
[3] American Farm School, Perrotis College, Thessaloniki, Greece
[4] School of Digital Technologies, Tallinn University, Tallinn, Estonia
sirje.virkus@tlu.ee

Abstract. During the last decade methods and tools for information seeking (IS) have changed dramatically. In order to help students in their IS process teachers should be information literate themselves. There is a lack of research on teachers' perceptions and patterns of IS. Only a few studies have focused on teachers' information seeking behavior (ISB). The aim of the current study is to explore primary school teachers' perceptions of information literacy (IL), their IL skills, the sources and tools they use to share information and their usage of libraries. The study contributes to the understanding of ISB of primary school teachers and identifies the main problems and challenges they face, and the knowledge and skills needed to teach IS. Furthermore, it provides an understanding of teachers' views and beliefs concerning IL, the tools that they employ in order to educate students, the problems they encounter, as well as their perceptions about libraries.

Keywords: Information seeking behaviour · Primary teachers · Evaluation information resources · Teachers' perceptions · Digital skills · Information literacy · Digital literacy · Information retrieval · Media literacy

1 Introduction

One major goal of 21st century teachers of all grades is to be able to teach information literacy (IL) skills to students. Although to be in a position to help their students, teachers must be qualified with IL skills. There are not many studies exploring teachers' information seeking behavior (ISB) and patterns [1, 2]. For example, the research of Bredenoort [3] proved that Dutch primary teachers are not familiar with teaching IL skills to students. However, Fogget [4] argues that students should have already acquired IL skills from their primary education. New generation's children use technological media extensively outside school but there is a gap in education. Most of the teachers do not integrate new media into

the curriculum [5]. So, IL instruction is important for teachers in order to provide better IL knowledge and skills to their students.

The paper is divided into three sections. The first section provides a literature review. The second describes the methodology used in this study and provides the results of the study. Finally, the conclusions are presented.

2   Literature Review

2.1   Digital Information Literacy as a New Challenge for Primary Teachers

The development of new technologies has totally changed the way people learn. Before we discuss the ISB of primary teachers it is important to understand the terms IL and digital literacy (DL). According to ALA [6] (1989) IL is a set of abilities: "To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information… Information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand."

Moreover, in 2001, ACRL [7] stated that "Information literacy encompasses more than good information-seeking behavior. It incorporates the abilities to recognize when information is needed and then to phrase questions designed to gather the needed information. It includes evaluating and then using information appropriately and ethically once it is retrieved from any media, including electronic, human or print sources."

Furthermore, DL is "the skills, knowledge and understanding that enables critical, creative, discerning and safe practices when engaging with digital technologies in all areas of life" [8, p. 19]. The ability to find, and evaluate reliable and relevant information is a dimension of DL [8].

According to Frailon, Schulz and Ainley [9] IL is described as "an individual's ability to use computers to investigate, create and communicate in order to participate effectively at home, at school, in the workplace and in society" (p. 17). Authors mention that IL is assisted by three abilities: knowing about and understanding computer use, assessing and evaluating information, and managing information (p. 19).

2.2   Teachers' Information Literacy Skills and Information Seeking Behavior

Most of the studies focus either on specialized categories of teachers such as geography teachers or on secondary and higher education teachers [1, 10–12]. Bisto and Fourie [11] surveyed prospective geography teachers in Lesotho and found that their information seeking behavior is confined to traditional information sources because teachers had limited literacy skills. Similarly, Probert [10] investigated 148 teachers' understanding of IL in New Zealand. The majority of the participants connected IL only with ICT. Only a few had a good understanding of the concept, though even fewer mentioned having that IL improved the skills of students.

Lee, Reed and Laverty [13] studied 524 graduating pre-service teacher's knowledge of IL concepts, the teaching methods of IL and the role of the library and teacher-librarian. The participants had low IL skills, and as expected were not feeling prepared to teach IL to students. Concerning the library, the majority of the participants used it as the place to select books and not as a place for teaching specific research or information skills.

On the other hand, Merchant and Hepworth [14] found that teachers in two UK schools were information literate due to their personal interest in information and the role it can play in teaching. Although, they were not able to transfer their skills and attitude to their students in order to create information literate pupils. Finally, the study of Diekema and Olsen [15] is one of a few that studied the practices of 24 primary and secondary (K-12) teachers on finding, keeping and re-defining information. The majority of the participants used Google search engine to acquire information for teaching. So, from all of the above, it is clear that there is an urgent need for investigation of primary teachers' IL skills and ISB. In the next section we present the methodology and the results of our research.

3   Current Study

3.1   Methodology

A literature search was carried out to identify previous studies and to provide background to this research. A questionnaire was used as a method to collect data on primary school teachers' ISB. The questionnaire consisted of open, closed-ended and Likert scale questions and was divided into four sections: (a) demographics, (b) the use of computers and libraries as tools to search, locate, and retrieve information, (c) use and evaluation of sources, and (d) the use of online IL programs. Also, micro-qualitative data was collected from teachers.

In order to carry out the survey, researchers randomly selected two Greek regions, the Region of Crete (http://www.crete.gov.gr/) and Central Macedonia (http://www.pkm.gov.gr/), from the total of thirteen regions of Greece. These two regions collectively have more than 2000 primary schools with more than 14,000 teachers (see the available information at http://kmaked.pde.sch.gr/site/ and http://kritis.pde.sch.gr/, as of 9th of May 2016). The questionnaire was distributed randomly to teachers in eight primary schools, four in each region, after obtaining access from the authorities. The total population of the eight primary school teachers was 72 teachers of whom 59 (81,95%) responded to the survey. Data collection was accomplished from February to May 2016. SPSS vs 20.0 was used for the data analysis.

3.2   Results

Description of Participants Characteristics
The Use of Computers and the Role of Libraries in Searching and Retrieving Information. Data analysis showed that teachers are not experts in the use of computers. 13.5% (8) stated that they are novices or beginners (13,8%, 8). 32,2% (19) stated that they have good knowledge of how to use computers. Only 37,3% (22) stated that they have a very good

knowledge of using computer devices, while 3,5% (2) reported that they are expert users (Tables 1 and 2).

Table 1. Participants' age and gender

Variable	Group	%	N
Gender	Male	32,2	19
	Female	67,8	40
Age	25–35	33,9	20
	36–45	39,0	23
	46–55	20,4	12
	56–65	6,7	4

Table 2. Participants' education and work experience

Variable	Group	%	N
Education level	University	71,2	42
	Master	25,4	15
	Ph.D.	3,4	2
Working experience	Less than 10 years	37,3	22
	10–20 years	47,5	28
	21–35 years	15,2	9
Faculty	Teacher	69,5	41
	English	13,5	8
	Music	10,2	6
	Arts	6,8	4
Class grade	1st	15,3	9
	2nd	13,5	8
	3rd	11,9	7
	4th	15,3	9
	5th	13,5	8
	6th	11,9	7
	all	18,6	11

Most of the teachers (67,8%, 40) do not visit libraries at all. Some of them stated that from time to time they use online library services like its website, or the online catalog, or look up information in library social media profiles. 3,5% (2) visit a local library once or twice per year and 13,5% (8) visit a library two to three times in a semester. On the other hand, no one visits a library weekly and only 15,2% (9) of them two, to a maximum of three times per month. Teachers who visit libraries stated that sometimes they learned new ways of looking for information and that library staff was helpful in teaching them how to use services for retrieving information. Only a handful of people mentioned that either "*I did not learn anything new*" or "*the info that I've got were not up to date*".

37,3% (22) of teachers use a library online catalog, while 62,7 (37) do not. Teachers revealed that when they use an online catalog they are not familiar with the tool; they feel that they need training and they search only for fiction:

"*I try to use my local library catalog but it seems to me that it comes from a different time. Too old, to difficult to use it and always wonder if it is worth using it*" (female, 29)

"*…librarians always are helpful… I need them (librarians) to come to school and not visit the library. When you have Google, then you have to think differently in order to persuade teachers to use library's online catalog…*" (female, 34)

"*…does still exists (the catalog)? I thought that in our days everything are on the Web!*" (male, 36)

When it comes to searching for information, most participants preferred the Web. However, they also needed guidance in using the Web, as well as in using library catalogues properly:

"*I prefer the Web. Easy to use and always I find something useful*" (female, 41)

"*Retrieving current information from the library catalog is not easy. I lack in knowledge to use it. I need someone to guide me how to search, retrieve and evaluate information. I should seek guidance how to use the Web as well. I feel relaxed when I am using a library catalog while anxious when I have to seek information from the Web that I do not trust*" (female, 47)

54,3% (32) of respondents learned to use, search, retrieve and evaluate electronic information resources by themselves, while 25,4% (15) learned during their studies. 13,5% (8) asked help and guidance from their colleagues, while 6,8% (4) attended seminars. Teachers stated that *"keeping in touch with the local library"*, *"build relations with librarians"* and *"seeking advice from the experts (librarians)"* is the best way to learn and advance their knowledge in the subject.

Finally, teachers feel that when it comes to searching for information, search engines and the Web are their first options since they do not know where else to seek information (79,7%, 47). 78% (46) mentioned that they believe search engines are reliable tools for retrieving information; 67,8% (40) said that they became a routine of their everyday life, and that search engines are convenient to use (61%, 36).

Use and Evaluation of Sources.   Data analysis revealed that 20.4% of teachers did not use online journals at all, 39% used them to a small extent, 15.2% to some extent, and 25.4% to moderate extent. 35.6% did not use libraries and printed materials at all. 35.6% used them to a small extent, 16.9% to some extent, and 11.9% to a moderate extent. 47.5% did not use online databases at all; 23.7% used them to a small extent. 23.7% used them to some extent, and 5.1% used them to a moderate extent. The Web was used to some extent by 35.6% of teachers, to a moderate extent by 25.4% and to a large extent by 39% of the teachers. 33.9% of teachers did not use social media at all. 15.2% used it to a small extent, 40.7% to some extent, 5.1% to a moderate extent, and 5.1% to a large extent. 5.1% of the teachers did not use friends as information sources. 23.7% used them to a small extent, 40.7% used them to some extent, 25,4% to a moderate extent and 5.1% to a large extent (see Fig. 1).

Source evaluation was assessed by the teachers in the following ways: 11.9% considered reference catalogues somewhat important; 59.3% considered them quite important; 5.1% thought they are very important; and 23.7% found them extremely important.
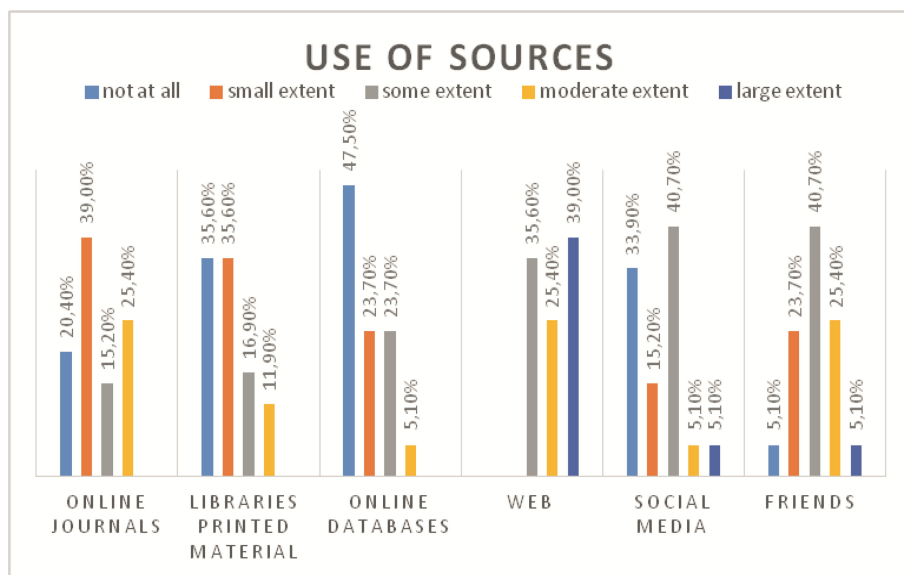
Fig. 1. How often you use these information sources to find material

Information objectivity was assessed in the following way: 5.1% - somewhat important; 23.07% - quite important; 39% - very important; 32.2% - extremely important. The date of publication was somewhat important for 47.5% of the teachers, quite important for 23.7%, very important for 16.9% and extremely important for 11.9%. Clarity and organization was somewhat important for 1.6%, quite important for 40.7%, very important for 47.5% and quite important for 10.2%. The teachers considered author reliability in the following ways: unimportant - 3.4%; somewhat important - 15.2%; quite important - 5.1%; very important - 35.6%; and, extremely important - 40.7% (Fig. 2).

Teachers stated five main points they take into account when they evaluate a source from the Web. These are: the existence of references and a bibliography (they tend to trust information when they see a list of references or/and a bibliography); Information objectivity; the date of publication of the source (they look for current publications); the clarity of information and organization structure of the source; and, they stated as extremely important, the author reliability factor.

Only a small number of teachers mentioned that reasons for trusting sources on the Web include the owner of the website, the organization that hosts the source, authors or site communication details, how reliable is the organization and the use of adverts in the page source.

Most of the teachers prefer to search information on the web by using keywords (84,8%, 50), browsing by subject (69,5%, 41), using Phrase in Quotations (49,2%, 29), using Boolean operators (6,8%, 4), and truncation (6,8%, 4). The vast majority of teachers (93,2%, 55) search within the first page of results retrieved from a search engine.

Even though teachers reach a dead end by using keywords, their first option to refine their search strategy is to change keywords and perform the search again. The majority
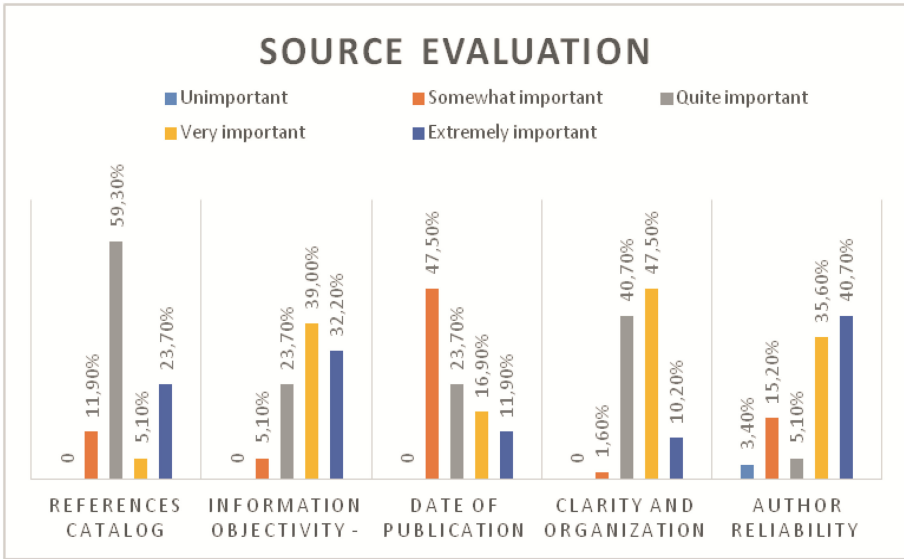
Fig. 2. Evaluation of a source (what is most important)
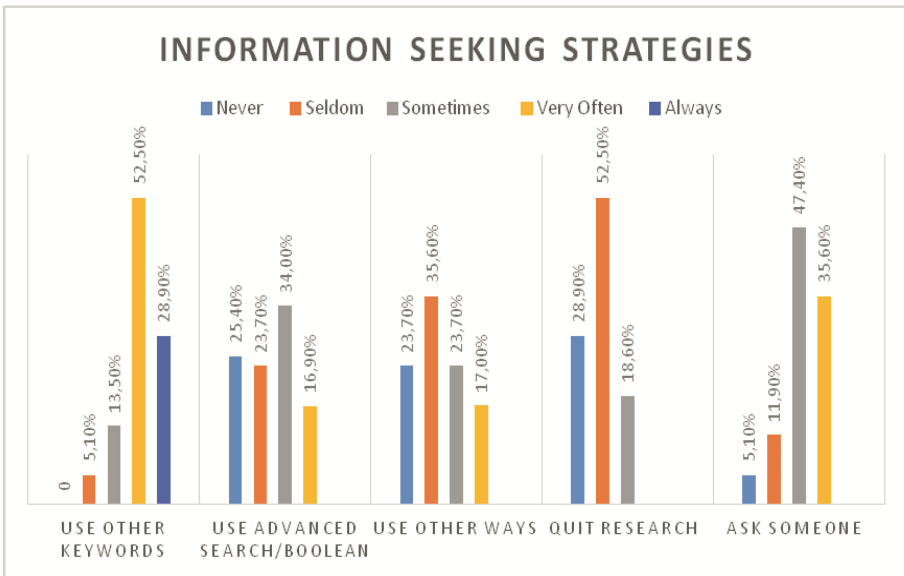
Fig. 3. Information seeking behavior: strategy in case of no results

of them, as shown in Fig. 3, very often or always use other keywords and restart their search in order to find the required information. It is obvious that there is a lack of knowledge and approach of how to build a research strategy, how to search effectively and retrieve the required information.
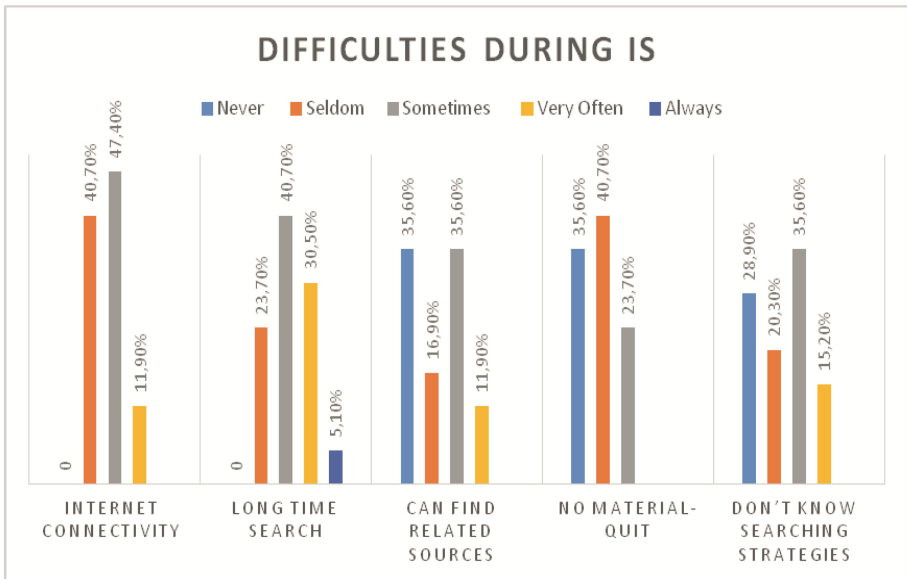
Fig. 4. Difficulties you face during information seeking

Teachers who stated that they use Boolean operators, also stated that in case of no results, sometime or very often they use advanced search techniques and Boolean operators to refine their search.

Many teachers use "other ways" if they fail to retrieve information such as use of the library website, the online catalog, databases search, search portals and repositories that the Ministry of Education has developed, as well as some mention of the sites of the National Documentation Centre and the Educational Authorities portals. Also, teachers revealed that most often they ask for help and assistance from colleagues, followed by friends and family members (Fig. 4).

The main difficulties faced during the IS process varied. For example, Internet connectivity was sometimes a problem for 47.4% of the teachers, seldom for 40.07% and very often for 11.9%. Long search time was faced sometimes by 40.7%, very often by 30.5%, always by 5.1% and seldom by 23.7%. Teachers also reported that they could not find related sources (35.6%) and 23.7% quit when relevant materials were not found. 15.2% felt that very often they do not know relevant search strategies.

The Use of Information Literacy (IL) Programs. 15,2% (9) of the teachers do not know exactly what information literacy is and how they can assist people in libraries or any other settings. 71,2% (42) never heard of any information literacy programme or a website that provides information about IL. They stated that they can use a programme, website or service that offers IL tools as far as it is easy to use and can meet their needs.

20,4% (12) mentioned that they know the Callisto IL service (http://callisto.lib.teithe.gr/) of the Library of the Alexander TEI of Thessaloniki and stated that whenever a need arises they use it. Those using this service stated that it is very useful

but it is designed for university students and it is difficult to teach it to primary school children.

The most common syntax tool for Bibliographic references is APA, used by 54,3% (32), followed by Harvard by 39% (23). It is worth mentioning that 28,8% (17) of teachers mentioned that they do not know any bibliographic reference system. Some of them stated that

"there is not a need to use, so I did not learn…",
"I used to use one during my studies but since then never needed".

Teachers who used a bibliographic reference system mentioned that they would like to use a bibliographic reference tool to help them as far as it is provided for free from their educational authority or any other educational body. Regarding the question asking if they seek advice from the library or search a library website to find a bibliographic tool, only a very few people stated that they did so in the past.

4   Conclusions

The results of the study showed that primary school teachers have quite fragmented understanding and skills of information literacy. Most of the teachers do not visit libraries and they are not experts in the use of computers. The Web was the most preferred source for looking for information. They also used library websites, online catalogs or social media as a source for information, but they needed training for that. The majority of teachers learned to use, search, retrieve and evaluate electronic information resources by themselves. However, they also mentioned that they learned these skills during their studies, ask help and guidance from their colleagues, and some of them also attended seminars. The majority of teachers believed that search engines were reliable and convenient tools for retrieving information and were part of their everyday life.

The main criteria for evaluating Web information sources were: the existence of references and a bibliography, information objectivity, date of publication, clarity of information and organization structure of the source, and the author reliability factor. Most of the teachers preferred to search information on the web by using keywords, browse by subject, use 'phrase in quotations', Boolean operators and truncation. Teachers mentioned that most often they ask for help and assistance from colleagues, followed by friends and family members.

The main difficulties faced during the IS process varied. For example, Internet connectivity was sometimes a problem; sometimes they faced long search times, or they couldn't find relevant sources. Several teachers did not know exactly what information literacy is and how they can assist people in libraries or any other settings. The majority of them were not familiar with information literacy programmes or websites. APA and Harvard were the most used bibliographic reference systems, but teachers' knowledge and skills needed improvement here as well. The study revealed that there is an urgent need to support the development of primary school teachers' information literacy skills that they can help students to become information literate.

References

1. Bitso, C., Fourie, I.: An investigation of information-seeking behaviour of geography teachers for an information service intervention: the case of Lesotho. Inform. Res. Internat. Electr. J. **17**(4) (2012)
2. Alexandersson, M., Limberg, L.: Changing conditions for information use and learning in swedish schools. Hum. IT **11**(2), 131–154 (2012)
3. Bredenoort, E.: Integrating Information Literacy in Dutch Language Education: Developing Learning Materials for Information Literacy in Primary Education (Doctoral Dissertation) (2016). http://essay.utwente.nl/69537/
4. Foggett, T.: Information literacy at the primary school level? Austral. Libr. J. **52**(1), 55–63 (2003)
5. Burnett, C., Dickinson, P., Myers, J., Merchant, G.: Digital connections: transforming literacy in the primary school. Cambrid. J. Educ. **36**(1), 11–29 (2006)
6. ALA: American Library Association: Presidential Committee on Information Literacy: Final Report, American Library Association, Chicago, IL (1989). http://www.ala.org/acrl/publications/whitepapers/presidential
7. ACRL: Association of College and Research Libraries: Objectives for Information Literacy Instruction: A Model Statement for Academic Libraries (2001). http://www.ala.org/acrl/standards/objectivesinformation
8. Hague, C., Payton, S.: Digital Literacy Across the Curriculum. Futurelab, UK (2010)
9. Fraillon, J., Schulz, W., Ainley, J.: International computer and information literacy study: assessment framework (2013). http://research.acer.edu.au/ict_literacy/9/
10. Probert, E.: Information literacy skills: teacher understandings and practice. Comput. Educ. **53**(1), 24–33 (2009)
11. Bitso, C., Fourie, I.: Information-seeking behaviour of prospective geography teachers at the national university of Lesotho. Inform. Resear. **19**(3), 151 (2014)
12. Oladapo, O.S.: Information needs and information seeking behaviour of pre-service secondary school geography teachers in Oyo State. Nigeria. Internat. J. Adv. Acad. Res. Soc. Sci. Educ. **1**(2), 1–14 (2015)
13. Lee, E.A., Reed, B., Laverty, C.: Preservice teachers' knowledge of information literacy and their perceptions of the school library program. Behav. Soc. Sci. Librarian **31**(1), 3–22 (2012)
14. Merchant, L., Hepworth, M.: Information literacy of teachers and pupils in secondary schools. J. Librarian. Inform. Sci. **34**(2), 81–89 (2002)
15. Diekema, A.R., Olsen, M.W.: Teacher personal information management (PIM) practices: finding, keeping, and re-finding information. J. Assoc. Inform. Sci. Tech. **65**(11), 2261–2277 (2014)

Reading Preference: Print vs Electronic

The Academic Reading Format International Study (ARFIS): Investigating Students Around the World

Diane Mizrachi[1](✉), Joumana Boustany[2], Serap Kurbanoğlu[3], Güleda Doğan[3],
Tania Todorova[4], and Polona Vilar[5]

[1] University of California, Los Angeles, USA
mizrachi@library.ucla.edu
[2] Université Paris Descartes, Paris, France
jboustany@gmail.com
[3] Hacettepe University, Ankara, Turkey
{serap,gduzyol}@hacettepe.edu.tr
[4] University of Library Studies and Information Technologies, Sofia, Bulgaria
t.todorova@unibit.bg
[5] University of Ljubliana, Ljubljana, Slovenia
polona.vilar@ff.uni-lj.si

Abstract. This paper presents results from the Academic Reading Format International Study (ARFIS), the largest investigation of university students' behaviors and attitudes towards reading their academic texts on electronic screens and print. These questions are examined: '*When engaging with their academic material, do students' format preferences and behaviors vary across cultures?; How do their behaviors and attitudes compare among an international sample?; And how does the language of the reading impact format preferences?*' Amalgamated results from nearly 10,000 students in 19 countries show a consistently strong preference for print format, and most respondents do not feel the language of the text impacts their format preference, but an examination of country responses helps illustrate the subtle differences between them. This topic has special relevance to librarians and educators as we search for the correct balance of print and electronic resources in our collections and syllabi.

Keywords: Print reading · Electronic reading · Academic reading · International studies · College students' readings

1 Introduction

Current discussions among many educators, administrators, policy makers, and the media often assume that digital technology will soon replace paper-based media in a historical progression from clay tablets and parchment. However, most studies of students' reading format preferences show that they still prefer print over digital for their

---

The original version of this chapter has been revised. After publication of the original paper it came to the authors' attention that the Chinese translation of question 10: "I prefer electronic textbooks over print textbooks," was inverted to read "I prefer print textbooks over electronic textbooks." Therefore, Figure 3 and the related discussions on pages 220–221 and 227, were incorrect. The erratum to this chapter is available at DOI: 10.1007/978-3-319-52162-6_72

academic readings. They believe their comprehension and retention of the subject matter are greater when they read their assignments in print, but generally like the convenience and accessibility of electronic.

This study investigates whether students' reading format preferences vary or maintain consistency across multi-national student populations. It presents results from the first round of the Academic Reading Format International Study (ARFIS 1) which includes responses from 9,279 graduate and undergraduate students in all fields of study from 19 countries on four continents. Researchers in over a dozen additional countries are currently collecting data for an expanded study (ARFIS 2) to be analyzed in 2017.

This study investigates the following research questions:

- When engaging with their academic material, do students' format preferences and behaviors vary across cultures?
- How do their behaviors and attitudes compare among an international sample?
- How does the language of the reading impact format preferences?

2   Review of the Literature

There are many studies in the literature on students' reading format preferences at individual institutions. This section reviews some of the international comparative studies, and the background to the current study.

Liu and Huang explored gender differences of format attitudes among Chinese students in their study of 203 graduate and undergraduates in various disciplines [1]. They found that both males and females preferred print, but females' print preference was much stronger – 73.2% to 51.3% respectively. They also found that both genders annotated their print documents much more often than electronic documents. They then compared their results to Liu's earlier study of American students [2] and found that while both cultural groups preferred print over electronic, the Americans' preference was more pronounced (89.4%), than the Chinese (64.5%) [1].

Content analysis was applied to essays produced by a sample of 24 graduate students at the University of Udine, Italy, on the advantages and disadvantages of reading and writing in print and electronically [3]. Students described several facets of paper's advantages: easier to focus, easier to annotate, produces less eyestrain, is more portable and allows "more freedom of movement and postures" [3, p. 47]. A major advantage of reading electronically is the ease of searching and locating specific terms and topics within the text. Overall, students reported that reading on paper is a much more multi-sensorial experience than reading electronically.

Aspects of Fortunati and Vincent's study [3] were replicated in Finland [4], Germany, and the United Kingdom [5] with very similar results. These studies do not look exclusively at academic reading but include a very broad definition and context for reading and writing. All authors suggest that format preference is dependent on the purpose of the specific task and therefore caution against adopting a "dichotomy of paper vs. screen or pen vs. keyboard" [5, p. 419]. Acknowledging this observation, the current study looks specifically at format preferences and behaviors when reading materials for *academic tasks*.

Linguistics Professor Naomi Baron has written extensively on the impact of modern technologies on reading and educational practices, most comprehensively in her book *Words onscreen: The fate of reading in a digital world* [6]. She reports results from her surveys of American students in 2010 and in 2013, and compares them to data collected on the attitudes of students in Japan and Germany. Across all samples she found preferences for reading in print when doing schoolwork, reading for pleasure, and reading long texts (academic and pleasure) [6, pp. 84–85]. When asked for their preferences if cost were not a factor, results showed an overwhelming preference for print among students in all three countries [6, p. 86]. When asked how likely they were to multi-task when reading digitally and in print, again, results showed tendencies for more effective focus when reading print [6, p. 88].

The current study is based on earlier research performed by Mizrachi. Her interviews of 41 UCLA students in 2009 revealed that most, if given a choice, preferred academic texts in print rather than online. They felt they could focus and learn better when reading in print, but they liked the convenience and often the lower cost of accessing the material electronically [7]. Five years later she created an online survey based on these findings to test whether attitudes had changed in light of more advanced technologies [8]. Nearly four hundred undergraduates at UCLA indicated that format preference could depend on specific contexts and circumstances, and they were more likely to prefer print when the reading was over five pages long, particularly complex, or important to the course. Students also showed a tendency to engage more actively with material in print format through their highlighting, note-taking, annotating, and reviewing behaviors. Overall, results again showed a very strong preference for reading academic texts in print rather than electronically.

3   Methodology

After Mizrachi presented her original study at ECIL 2014 there was a great interest in replicating it internationally. Mizrachi, Boustany, and Kurbanoglu, the study coordinators, slightly modified the original survey instrument to include seventeen five-point Likert-style statements on preferences and behaviors with the possible responses of Agree, Strongly Agree, Disagree, Strongly Disagree, and Neither Agree nor Disagree. There are also six demographic questions and a prompt for further comments. Researchers for the ARFIS team were recruited from an existing multinational network and professional contacts[1]. Each researcher was responsible for the accuracy of their translated questionnaire and its local distribution. Qualified participants were recruited either through targeted or random emails depending on the institution. LimeSurvey, an online survey tool, was used to collect the data. To simplify analysis and preserve uniformity, all students' majors and fields of study were categorized according the Web of Science subject list[2]. UCLA's Office of Human Research Protection Program reviewed and approved the research plan. This paper reports on the amalgamated results and compares country results – individual researchers may report their own country data

---

[1] http://tinyurl.com/ARFISteam.
[2] http://incites.isiknowledge.com/common/help/h_field_category_wos.html.

Table 1. The ARFIS sample distribution by country and research team members

Country	n	%	Contact researcher(s)	Institution(s)
Bulgaria	476	5.1	Tania Todorova	ULSIT, Sofia
China	1163	12.5	Pan Yantao; Jiuzhen Zhang	Sun Yat-Sen University; Peking University
Croatia	231	2.5	Daniela Živkovic	University of Zagreb
Finland	666	7.2	Terttu Kortelainen	Oulu University
France	1520	16.4	Joumana Boustany	Université Paris Descartes - IUT
Israel	134	1.4	Judit Bar-Ilan	Bar-Ilan University
Italy	876	9.4	Elena Collina	Universita di Bolognà
Latvia	1186	12.8	Liga Krumina	Latvijas Universitate
Lebanon	125	1.3	Hanady Geagea	Lebanese University
Moldova	212	2.3	Silvia Ghinculov	Academy of Economic Studies
Norway	1007	10.9	Ane Landoy; Almuth Gastinger	Bergen University; University of Science and Technology
Peru	204	2.2	Aurora de la Vega	Catholic University of Peru
Portugal	261	2.8	Ana Lúcia Terra	Oporto Polytechnic Institute
Romania	184	2.0	Angela Repanovici	Transylvania University
Slovenia	256	2.8	Polona Vilar	University of Ljubliana
Switzerland	156	1.7	René Schneider	Haute Ecole de Gestion
Turkey	212	2.3	Serap Kurbanoglu	Hacettepe University
UK	44	0.5	David Bawden	City University
US	366	3.9	Diane Mizrachi	University of California Los Angeles
Total	**9,279**	**100.0**		

as they wish. Table 1 lists all of the participant countries, their sample size and percentage, the contact researchers, and their institutions.

Most of the respondents were female (n = 6248; 70.1%), and though ages ranged from under 19 to over 40, more than half (55%) were 20–24 years old. Distribution of student status was fairly even among first through third year undergraduates (19.5, 19.1, and 18.3% respectively), with another 12.8% fourth year students, even though not all undergraduate programs include a fourth year. The sample also included 21.7% masters students, 5.6% doctoral students, and another three percent who listed 'other.' Social Science students were the largest grouping by major (n = 5,061, 54.5%). About a third of the respondents were science students (n = 2,929, 31.6%), and 13.9% were arts and humanities or other.

4   Results

Statements on this questionnaire are in random order and cover four categories: Format preferences (eight questions); Learning engagement (five questions); Language impact (three questions); and Devices used for e-reading (one question). Below are the amalgamated results and country answers. Chi-squared tests were performed on each question by the country variable and indicated the possibility of an association between country and many of the results. However, the ratio of sample sizes to total student populations must be taken into account before generalizations can be made, and these analyses will be done later. For the sake of space, we are illustrating selected descriptive highlights and have collapsed responses into three categories: Disagree/Strongly disagree, Agree/Strongly agree, and Neither Agree or Disagree.

4.1   Devices Used for E-Reading

Question 16 of the survey asked students to mark all of the devices they use for reading their electronic course material, and laptop computers (n = 7441, 80.2%) was the most common response. This preference was true across all countries. It was followed by mobile phones (n = 3535, 38.1%), desktop computers (n = 2900, 31.3%), iPads/tablets (n = 2605, 28.1%), e-readers (n = 699, 7.4%), and audio application (n = 203, 2.2%). Three hundred eighty-nine respondents (4.2%) stated they do not read course material electronically. Table 2 displays the ranges by percentage of individual country samples. For example, even though students in all countries reported using laptops more than any other device for reading their e-course material, students in the United States showed the highest percentage of laptop use, Moldova the lowest percentage, and all other participant countries fell in between.

Table 2. Electronic reading devices (ranges in percent)

Device	Highest (Country) %	Lowest (Country) %	Median %
Laptop	89.3 (U.S.)	59.4 (Moldova)	81.8 (Croatia)
Phone	73.9 (China)	21.3 (Norway)	36.0 (Finland)
Desktop	53.9 (Moldova)	16.1 (U.S.)	32.7 (Latvia)
i-Pad/Tablet	50.0 (U.K.)	14.8 (Slovenia)	27.0 (U.S.)
E-reader	23.7 (China)	2.6 (Finland)	5.6 (Croatia)
w/Audio	7.7 (China)	0.0 (Portugal, Switzerland, U.K.)	1.05
Don't read e-format	10.1 (France)	0.0 (U.K.)	3.8 (U.S.)

4.2   Format Preferences

Questions 3 and 13 specifically ask about format preference for course readings. Amalgamated results for both show that approximately two-thirds of all the students prefer their material in print over electronic. Country responses show less uniformity; for example, only 44.5% of the Finish students agreed/strongly agreed they preferred print for all their course material and 40.4% disagreed/strongly disagreed. In the radial graphs

below, countries are listed clockwise in alphabetical order, and their results are graphed along the concentric circles which represent a percentage range from 0–100. Comparisons among country results for the same responses can be gleaned by following the circumferences. The radial graphs also allow comparisons of opposing responses (Agree/Strongly agree and Disagree/Strongly disagree). Figures 1 and 2 below list amalgamated results on the left side, and the radials illustrate country responses by percentage for Question 3 (I prefer to have all my course materials in print format), and 13 (I prefer to read my course readings electronically).

Amalgamated Results

Agree/Strongly agree
 n=5960; 64.2%

Neither agree or disagree
 n=1440; 15.5%

Disagree/Strongly disagree
 n=1879; 20.3%

Fig. 1. I prefer to have all my course materials in print format

Amalgamated Results

Agree/Strongly agree
 n=1214; 13.1%

Neither agree or disagree
 n=1897; 20.4%

Disagree/Strongly disagree
 n=6168; 66.5%
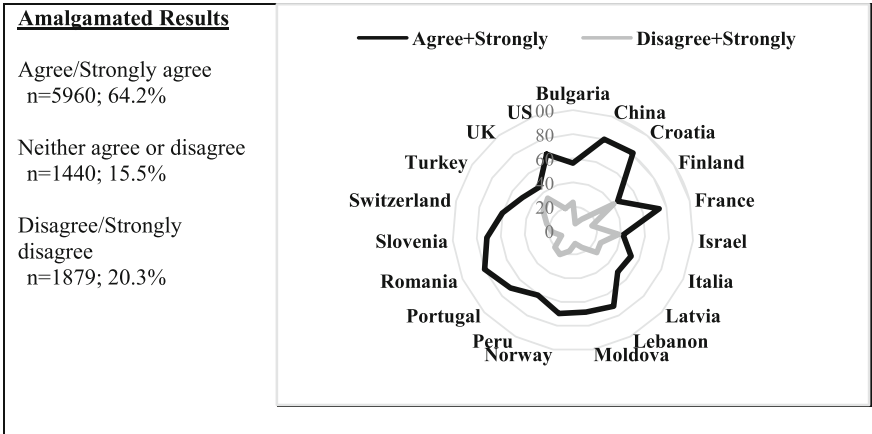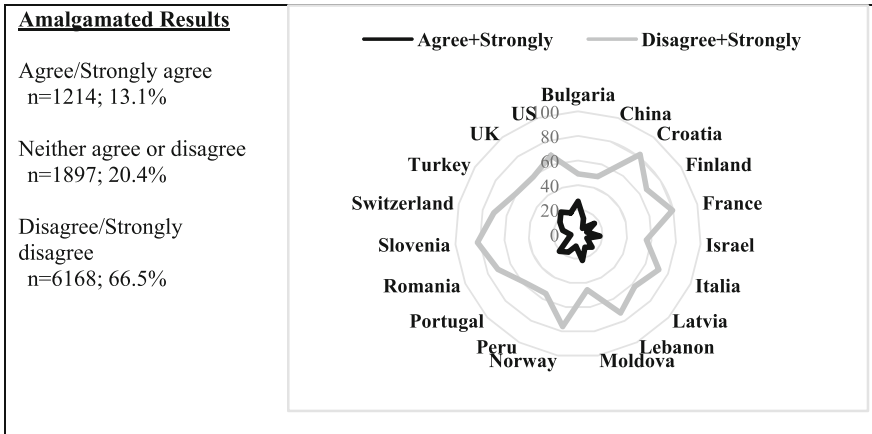
Fig. 2. I prefer to read my course readings electronically

Electronic textbooks. With more libraries investing in electronic textbooks, it is important to understand our students' attitudes towards using them. Overall, nearly 69%
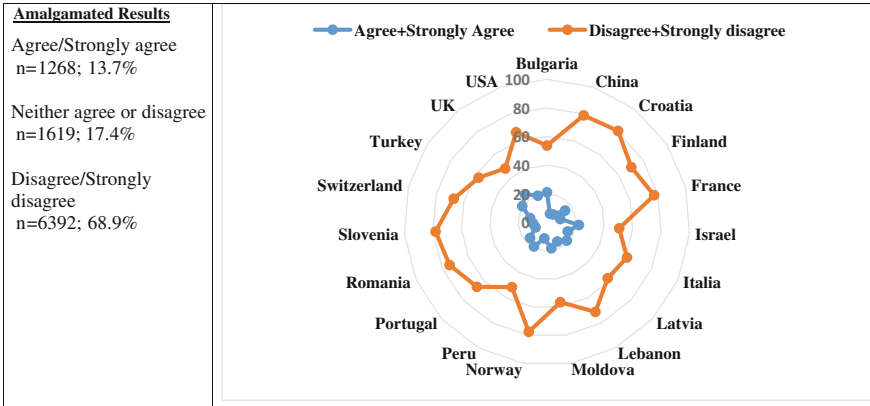
Fig. 3. I prefer electronic textbooks over print textbooks

of the students disagreed with preferring e-textbooks. Figure 3 shows amalgamated results and country percentages for Question 10.

Printing Out Readings; Digitizing Material. Printing out material for reading rather than reading them on screen adds another step, and possibly an expense to the studying process, but 68.9% of the students agreed that they prefer to do so, very close to the 67.1% median of country responses. Figure 4 show amalgamed results and country percentages for this question.
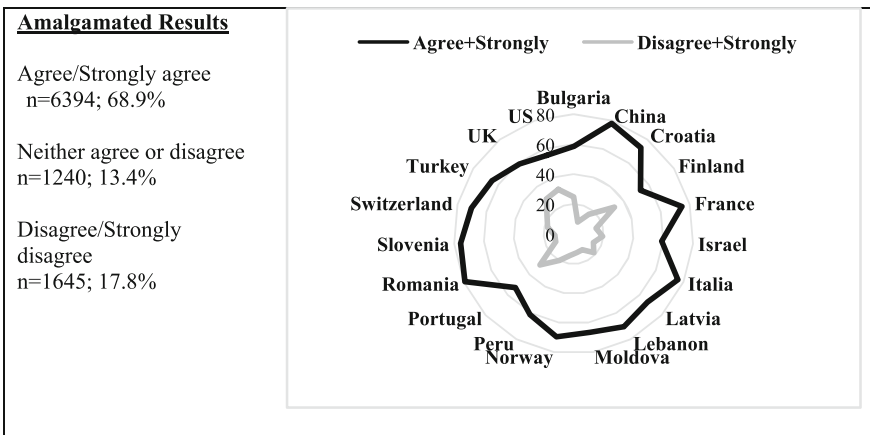
Fig. 4. I prefer to print out my course readings rather than read them electronically
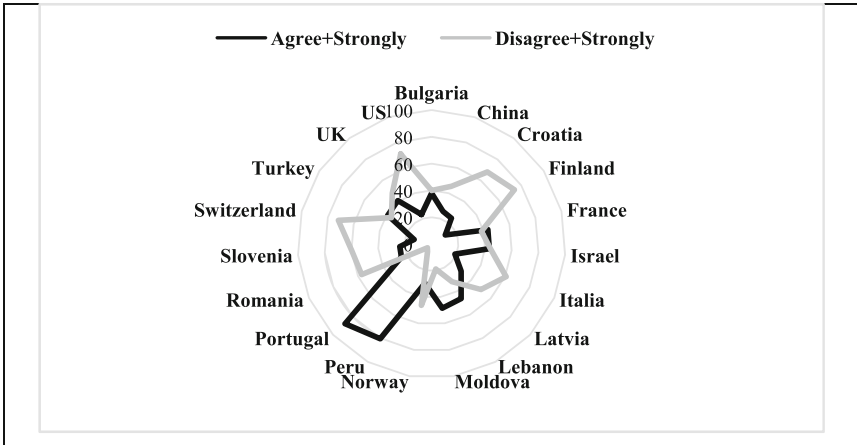
Fig. 5. I like to make digital copies of my printed course materials.

Students may digitize material for reading or archival purposes. Amalgamated responses to this inquiry were the most evenly distributed of any question: 31.9% agreed/strongly agreed; 47.8% disagreed/strongly disagreed; and 20.3% replied neither. Figure 5 displays answer percentages by country to Question 6.

Convenience. Students in many studies comment on how much more convenient it is for them to access and read their academic material on their electronic devices. However, most of the respondents to this survey disagreed/strongly disagreed with this statement. As seen in Fig. 6, all country responses were under 50% except for the U.K., and the Chinese students' replies were fairly even.
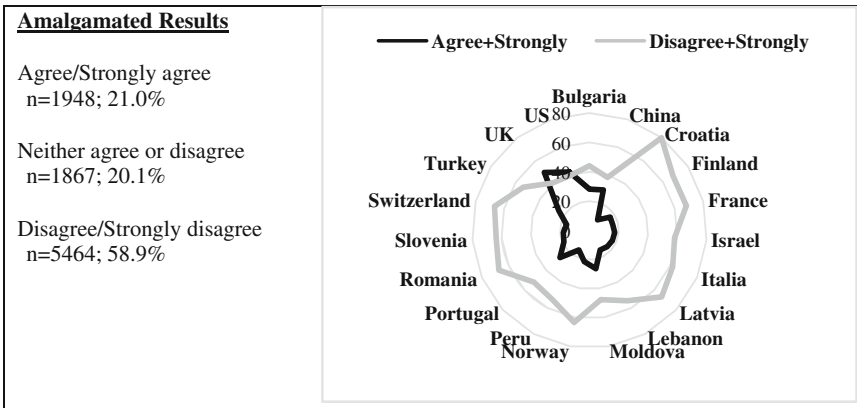
Fig. 6. It is more convenient to read my assigned readings electronically than on print.

Impact of Length on Format Preference. Based on comments from students in earlier studies who stated that their format preference depended on the length of the reading, Questions 4 and 8 sought to quantify this idea. As shown below in Figs. 7 and 8, most students prefer print when the material is seven pages or more (63%), but students do not show preference for e-format when material is under seven pages either.
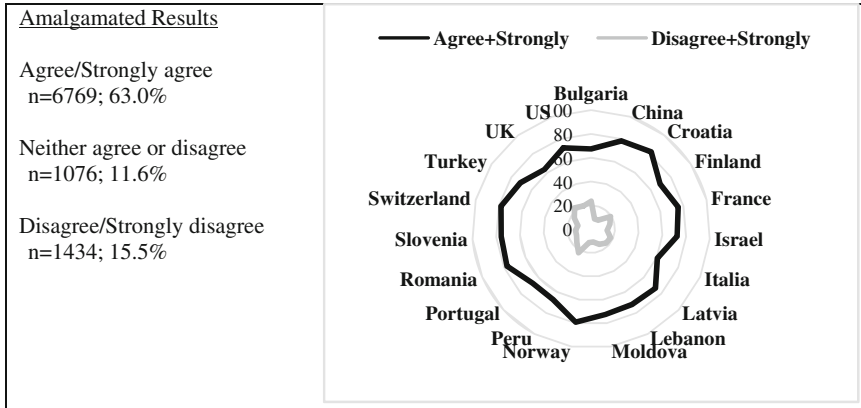
Fig. 7. If an assigned reading is 7 pages or more, I prefer to read it in print
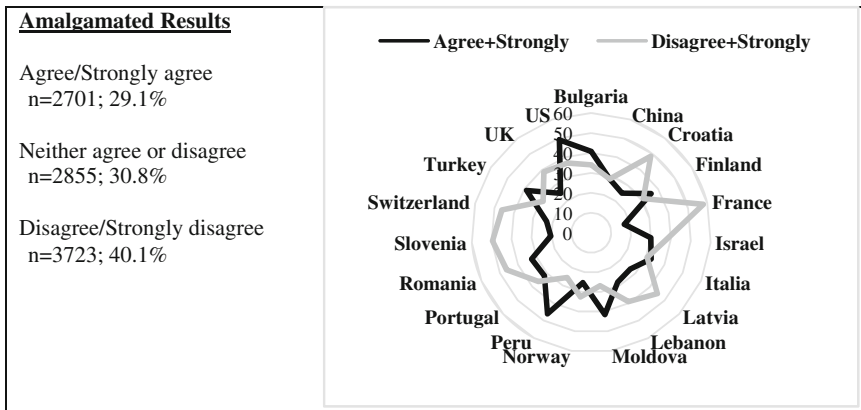
Fig. 8. If an assigned reading is less than 7 pages, I prefer to read it electronically

4.3 Learning Engagement

Five questions asked students about the degree of their learning engagement and learning behaviors in electronic and print formats. Responses to Question 12 overwhelmingly show that students feel they can focus best using print material (81.5%, median country score 80.4%). Over 70% also believe they remember material best in print (median country score 74.4%). Highlighting and notating are important learning engagement

behaviors and 83.1% agreed that they do so with print material, but only 24.7% agreed that they highlight and notate their electronic readings. Over 70% of the students agreed that they are more likely to review material in print than e-format. Figures 9, 10, 11, 12 and 13 show results of the learning engagement questions and percentages of country responses.
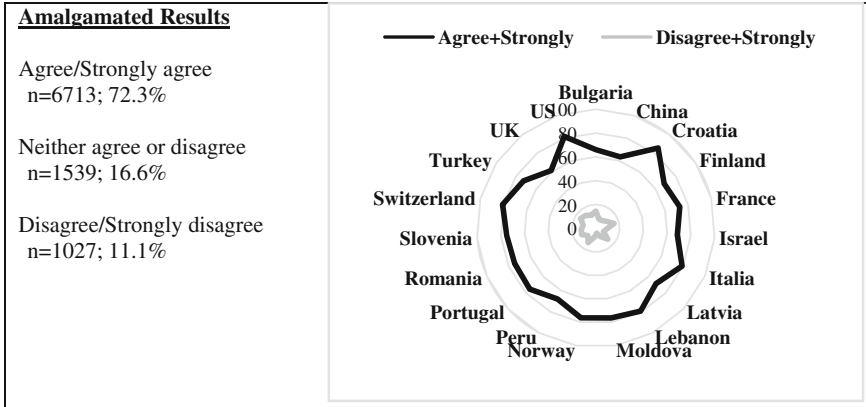
Fig. 9. I remember information best when I read course readings from printed pages.
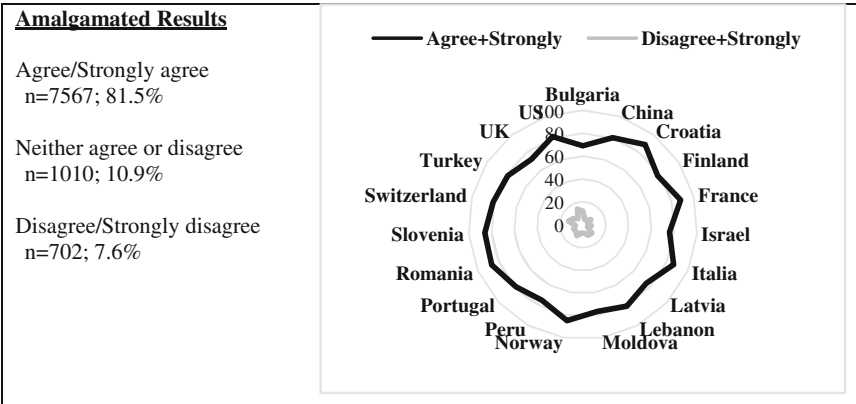
Fig. 10. I can focus on the material better when I read it in print
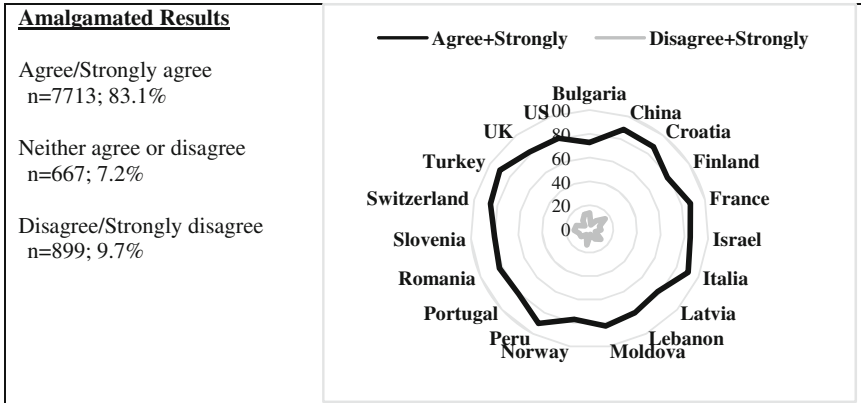
Amalgamated Results

Agree/Strongly agree
n=7713; 83.1%

Neither agree or disagree
n=667; 7.2%

Disagree/Strongly disagree
n=899; 9.7%

Fig. 11. I usually highlight and notate my printed course readings

Amalgamated Results

Agree/Strongly agree
n=2296; 24.7%

Neither agree or disagree
n=1326; 14.3%

Disagree/Strongly disagree
n=5657; 61.0%

Fig. 12. I usually highlight and annotate my electronic readings

Amalgamated Results

Agree/Strongly agree
n=6847; 73.8%

Neither agree or disagree
n=1331; 14.3%

Disagree/Strongly disagree
n=1101; 11.9%
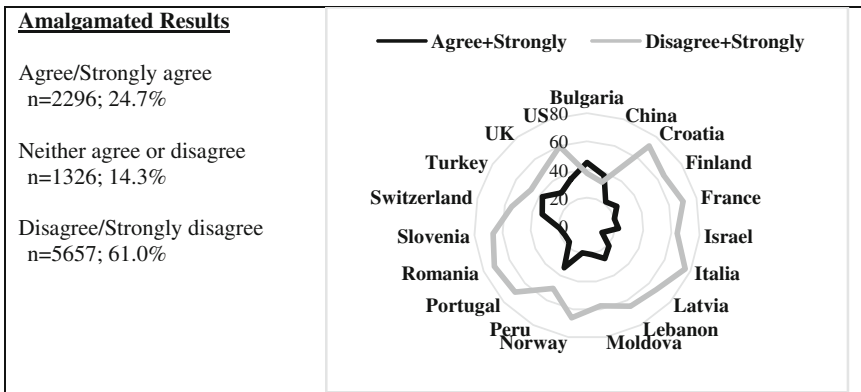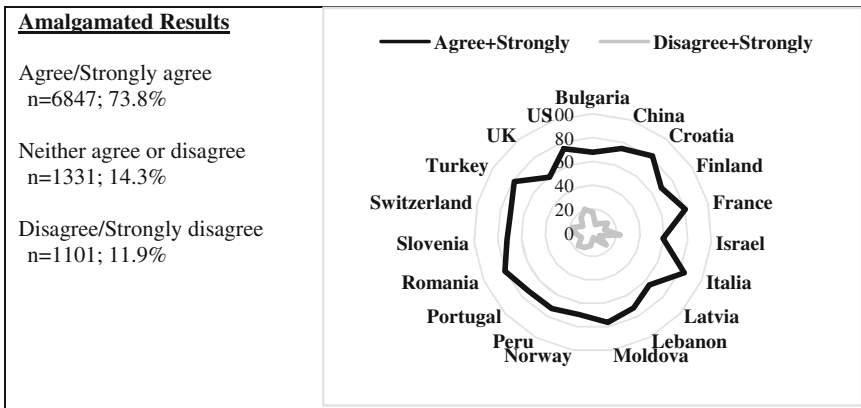
Fig. 13. I am more likely to review my course readings when they are in print

4.4   Impact of Language

Course readings in many countries and institutions are not always in the language of instruction or the students' native language. Three questions sought to discover if the language of the material impacted students' format choice. Responses to Questions 14 and 15 (*I prefer to read course readings which are in my native language electronically rather than print; I prefer reading foreign language material in print than electronic*) indicate that students prefer print for their native language, but this may just be a reflection of their overall print preference, not an indicator of language impact. Question 17 inquires specifically about language impact and results show that for most students (57.3%), the language of the material does not impact their format preference. These questions were not included in the original U.S. survey, therefore there are no U.S. data and the total sample here is n = 8913. Figure 14 displays amalgamated results and country percentages for Question 17.

Amalgamated Results

Agree/Strongly agree
n=1447; 16.2%

Neither agree or disagree
n=2352; 26.4%

Disagree/Strongly disagree
n=5114; 57.3%
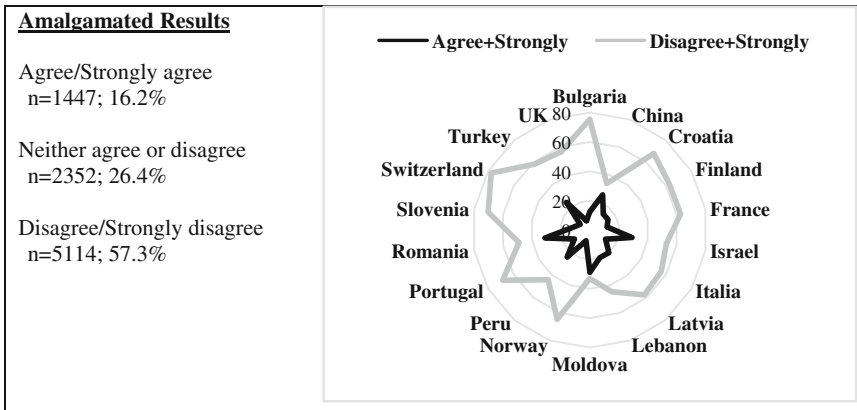
Fig. 14. My preferred reading format depends on the language of the reading

5   Discussion

This international study is currently the most expansive performed on college and university students' reading format preferences and behaviors. Nearly 10,000 students in 19 countries responded to the survey, and the amalgamated results indicate a *general preference for print*. Results of the learning engagement inquiries show particular agreement that print format is more conducive for focusing and remembering material, and students across the globe are more likely to engage in their print material through highlighting, notating, and reviewing. It also appears that the language of the reading does not impact students' format preferences. More students in this international sample use laptops for reading digital material than any other device, with a difference of only 7.5% points between the country with the highest response and the median. Phones and desktops are also commonly used, but the disparity is much more pronounced. When students are asked about their preference for reading in print or e-format, there is general

agreement for print preference. This includes textbooks as seen by the majority of responses by students in all countries to this inquiry. Most students in all countries also agree that they would rather read an assignment of seven pages or more in print.

Academic libraries and educators everywhere face the question of how, and how much, to integrate electronic resources into their collections and syllabi. Results from this study show that even though students in general prefer print for their academic readings, the degree to which e-readings should be utilized can vary among countries. Thus policy decisions should be based on data collected at the country or institution level in order to distinguish these variances and nuanced differences.

The data generated from this study provides an abundance of opportunities to explore further the commonalities and varieties among students' attitudes and behaviors. This paper highlights the general trends from the findings and answers the research questions, but more revelations will become available as statistical analysis is continued. Incorporating the data analysis from ARFIS 2, the second stage of this study, with a number of additional countries, will further the depth of our understanding of this phenomenon.

References

1. Liu, Z., Huang, X.: Gender differences in the online reading environment. J. Documentation **64**(4), 616–626 (2008)
2. Liu, Z.: Print vs. electronic resources: a study of user perceptions, preferences, and use. Inf. Process. Manage. **42**, 583–592 (2006)
3. Fortunati, L., Vincent, J.: Sociological insights on the comparison of writing/reading on paper with writing/reading digitally. J. Telematics Inform. **31**(1), 39–51 (2014)
4. Taipale, S.: Bodily dimensions of reading and writing practices on paper and digitally. J. Telematics Inform. **32**, 766–775 (2015)
5. Farinosi, M., Lim, C., Roll, J.: Book or screen, pen or keyboard? A cross-cultural sociological analysis of writing and reading habits basing on Germany, Italy and the UK. J. Telematics Inform. **33**, 410–421 (2016)
6. Baron, N.: Words Onscreen: The Fate of Reading in a Digital World. Oxford University Press, New York (2015)
7. Mizrachi, D.: Undergraduates' academic information and library behaviors: preliminary results. J. Ref. Serv. Rev. **38**(4), 571–580 (2010)
8. Mizrachi, D.: Undergraduates' academic reading format preferences and behaviors. J. Acad. Librarianship **41**, 301–311 (2015)

Print vs. Digital Preferences. Study Material and Reading Behavior of Students at the University of Iceland

Ágústa Pálsdóttir[✉] and Sigríður Björk Einarsdóttir

Department of Information Science, University of Iceland,
Gimli v/Sæmundargötu, 101, Reykjavík, Iceland
{agustap,sbe}@hi.is

Abstract. The study examined preferences for printed or electronic course material by students at the University of Iceland The questionnaire was adapted from the Academic Reading Questionnaire by Mizrachi. Data was collected as an online survey and response rate was 6%. The main result of the study is that participants were more likely to prefer course material in printed format than electronic. The participants were found to vary somewhat in their preference for reading format by sex and their field of study.

Keywords: Academic reading · Electronic format · Printed format · Iceland

1 Introduction

The possibilities of using electronic class reading material have changed considerably in the past years. Educational material that previously were confined to a printed version is now increasingly available in electronic format. University students rely heavily on reading for their studies. Knowledge of their attitude toward reading formats and how it affects their learning engagement is important for the organization of courses and curriculum development, as well as for building a collection that suits the students needs. This paper presents results from the Icelandic part of an international survey, based on the work of Mizrachi [1, 2]. The study which was conducted among students at the University of Iceland examined their preferences for course material in printed or electronic format.

Previous studies have repeatedly found university students to prefer printed material rather than electronic [1–7]. Li et al. [3] examined the use of electronic textbooks compared to textbooks in print and found that 49% preferred printed books, as opposed to 34% who wanted electronic books. In a study by Baron [7], 56% reported that they would be more likely to read their course material if it was in print and only 6% that they would be more likely to read electronic material; 38% said that the format did not matter. Furthermore, when asked how they would prefer to read the material if it was available online, 55% wanted to read it electronically, whereas 39% said that they printed online material before reading it, and 6% read it online and then printed it out. Likewise, Ji, Michaels and Waterman [8] reported that, although students preferred to have the material available online, about 65% had printed out at least some of the electronic

material required for reading, while almost half of the material was read online. Hence, when it comes to reading the course material students may be likely to favour the printed format, although they also value the option of having online access to it. There are also indications that the length of the text is of relevance. Studies reported that students use electronic material to read a short text on a screen but when they need to engage in reading a longer academic text, they want to have it in print [1, 5–7, 9].

It appears that students appreciate the convenience of electronic material, such as the possibility of accessing the material when and where it suited them. Portability and mobility was mentioned as favourable attributes of electronic material [3, 10], but interestingly, students felt that the same factors were among the advantages of printed material [3]. Being able to search inside and across electronic material was also considered an advantage [3], as was the possibility to get electronic material free of charge instead of having to pay for printed textbooks [8, 10].

A recent study [10] sought to examine the influence of the format of textbooks on various factors related to university students' learning engagement. The findings indicated that student who used electronic textbooks had higher perceived psychomotor and affective learning than those who used printed textbooks. In relation to other aspects of learning, such as time spent on reading textbooks, cognitive learning and course grades, the groups did not differ. The findings, furthermore, revealed that the students overwhelmingly favoured printed textbooks. Among the explanations were, that they could highlight text in them, mark the pages by "dog-earing" them and make handwritten notes about the reading on paper. Nevertheless, students who used electronic textbooks were more likely to make notes directly into the text, than those who used printed books. In addition, the latter group was more likely not to make notes at all than those who use electronic books. Thus, the students may feel that there are certain advantages connected to the printed format, although they do not make much use of it. These findings were partly supported by Mizrachi [2] who found that over 80% of students in her study highlighted and annotated printed material, while only about one third of them do so with their electronic material. Reviewing the course material is an important aspect of learning engagement. According to Mizrachi [2], the majority of students (over 75%) considered themselves to be more likely to review printed material.

Kaznowska, Rogers and Usher [4] found that the level of available electronic sources was related to students' opinion of courses. Courses with more electronic material were considered better organized than courses with fewer electronic sources. The students interest in courses was, however, not connected to the amount of electronic sources offered.

Knowledge about how demographic factors relate to format preferences is scarce. However, there are indications that male students are more likely to prefer electronic course material than female students [11], while female students are more prone than male students to prefer printed material rather than electronic [12]. Likewise, more knowledge is needed about format preference by students' study discipline. Li et al. [3] found that students of arts and humanities (57%) preferred printed material most and that students in life and health science (35%) had the lowest preference for print, whereas there is almost no difference across students in social science (49%) and physical science and engineering (48%). The findings reported by Dukić and Strišković [11] are not quite

consistent with this. They found students in social science to be most in favour of electronic material and reported that students in humanities had the lowest tendency to use it.

The aim of the current study is to investigate the format preferences for study material among students at the University of Iceland. The following two main research questions are asked: Do the students prefer their class reading material in print or electronic format? How does the students' learning engagement reflect their preferences for reading material format?

2 Method

This is an international online survey conducted among students at the University of Iceland. The online system Lime Survey, which is an open source software, was used for data collection. The survey was sent by email through the Registration Office in February and March 2016, to 11,147 students' at the University of Iceland, at an undergraduate, masters and doctoral level. Response rate was 6% (n = 674).

Of the participants, 77.89% were women and 22.11% were men. A total of 38.58% participants were younger than 25 years, 29.08% were from 25 to 34 years old and 32.34% were 35 years old or older. The participants' major field of study was coded into three categories as defined by the Web of Science. Most participants, or 56.23%, are from social science, 26.26% are from science, 15.43% from arts and humanities, and 2.08% claimed that they did not know what their major field of study was. The largest group of participants (23.44%) are in their first year of study. After that come those who reported that they are in Masters study (21.36%). Participants in their third year and second year of study constitute 20.03% and 19.88% respectively. Those in their fourth year of study constitute 10.83% and in PhD study, 2.68% (1.78% replied unknown).

The same questionnaire, adapted from the Academic Reading Questionnaire created by Mizrachi (2014), was used by all participating countries. The questionnaire was translated from English to Icelandic. The measurement instrument consisted of 16 five point Likert scale statements (Strongly agree – Strongly disagree), emphasizing preferences for reading format, reading behaviour and study engagement, as well as one question about the electronic devices used for reading digital material. In addition, the questionnaire consisted of five background questions, and one open question for comments.

As it is not possible within the constrains of this paper to investigate all the questions, the focus will be on 12 of them: one question that examines the preference for reading format in general, six questions that measure reading format preferences in more detail, and five questions that measure learning engagement in connection with reading format preferences. The analysis of the data is descriptive and involves the distribution by sex and fields of study for the questions about general reading format preference and learning engagement.

3   Results

The chapter starts by presenting results about the participants' preferences for reading format in general, as well as analysis by their sex and study discipline. This will be followed by results about aspects that may have influence on the preference for printed or electronic format. After that, results about learning engagement, and division by sex and study discipline, will be presented.

3.1   Printed or Electronic Reading Format

Figure 1 presents results about the participants favor of print or electronic material.
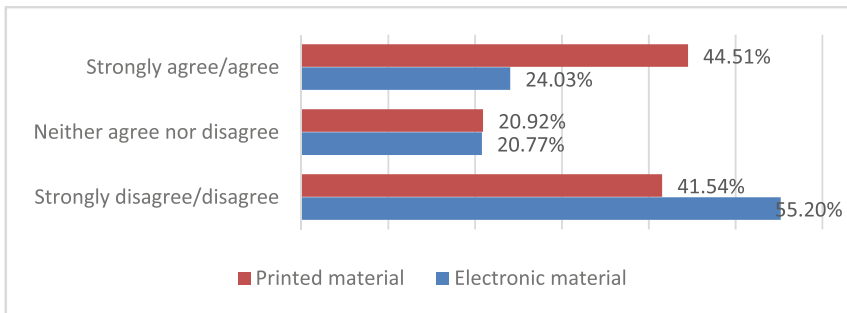
Fig. 1. Preference for printed or electronic course reading format

Figure 1 shows that the participants were more likely to prefer course materials in print format than electronic. Their opinion about printed material was, however, not decisive, as the combined share of those who either strongly agree or agree (n = 300) that they prefer to have all course material in printed format, is quite similar to the share of those who strongly disagreed or disagreed with it (n = 280). The results about electronic material, on the other hand, revealed that the majority of the participants strongly disagrees or disagrees that they prefer to read their course material electronically (n = 372), and only about a quarter of them strongly agreed or agreed with it (n = 162).

When the preferences for study material was examined by sex, men and women were found to differ somewhat in their opinion (Fig. 2).

Figure 2 reveals that women preferred to have their reading material in printed form rather than electronic. The majority among them (n = 310) did not want to read their material electronically and close to half of them (n = 245) preferred to have all course material in print. The opinion was not as conclusive for men. The majority of them (n = 87) was against having all their material in printed form. However, the share of those who preferred to have all material in print (n = 55) was almost the same as those who preferred to read it electronically (n = 54).

Preference for printed material varied somewhat by the participants' field of study. The rate of those who were in agreement with having all material in print was highest in art and humanities (49.04%, n = 51) and lowest in science (39.55%, n = 70), while students in
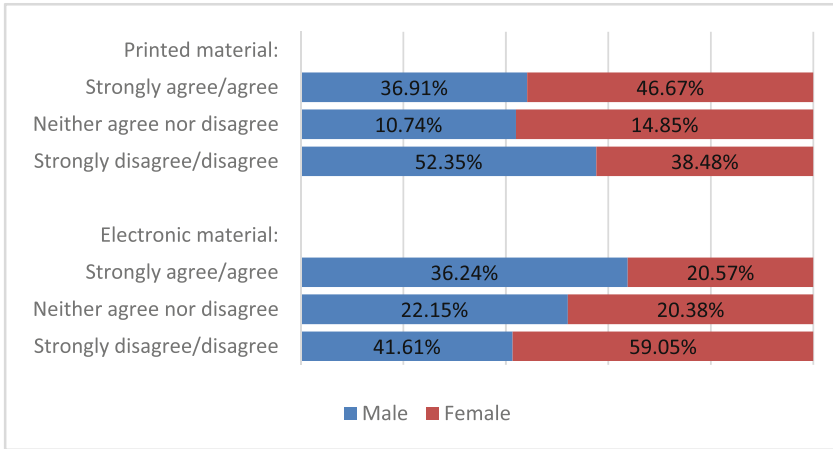
Fig. 2. Preference for printed or electronic reading format – division by sex

social science (45.91%, n = 174) were inbetween. Their opinion about electronic material was more even. The rate of those who agreed that they preferred to read electronically was 27.89% (n = 39) in art and humanities, 27.68% (n = 49) in science, and 22.16% (n = 84) in social science.

Figure 3 presents results from six questions that measured the participants reading format preferences in more detail, by examining the influence of the role of the language, the length of the text and type of reading material (textbook).

Figure 3 shows that the participants were more likely to favour printed reading material than electronic. When asked if they preferred to have their textbooks in electronic format rather than in print, the majority of the participants (n = 392) were against it. More than half of the participants (n = 355) were of the opinion that a text that is seven pages long or more calls for printed format, while a considerably smaller rate of participants (n = 235) preferred to read a text that is shorter than seven pages electronically. The influence of the course materials' language on the participants' format preferences was examined by asking three questions. Although, the majority of them (n = 389) opposed the idea that the preferred reading format depended on the language, they still wanted reading material in foreign languages to be in print (n = 307). Interestingly, a similar share of participants (n = 287) disapproved of the idea that they wanted material in their own language to be in electronic format.

3.2 Learning Engagement

The participants' opinion about their learning engagement was explored by five statements. Four of them reflect the participants' learning engagement with course material in printed format, but one statement is about electronic material. The results are presented in Fig. 4.

As can be seen from Fig. 4, the majority of the participants strongly agreed or agreed with four of the statements, although to a varying degree. The rate of those who said
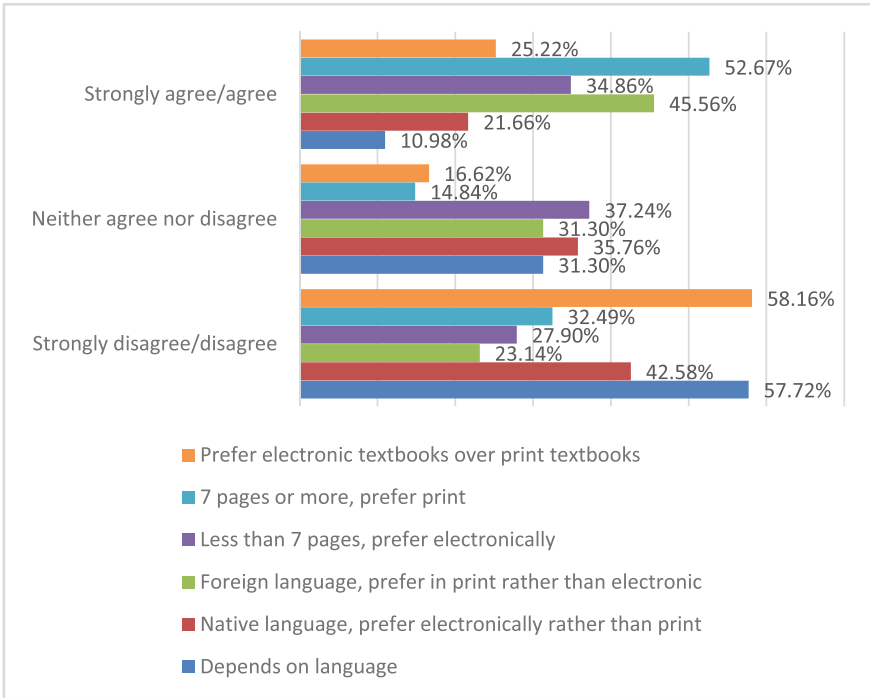
Fig. 3. Preference for reading format – textbooks, length of text, language

that they usually highlighted and notated in their printed material (n = 502) is highest. This is followed by those who believed that they can focus better on the course material if they read it in print (n = 463), and after that that they remember information from their course readings best when they read it from print (n = 416). The rate of those who believed that they were more likely to review their course readings (after they have read them at least once) when it is in print was lowest (n = 366). As opposed to this, when asked if they usually highlighted and annotated electronic readings, more than half of the participants strongly disagreed or disagreed with it (n = 353).

Opinions about learning engagement were analyzed according to the participants' sex and the results are presented in Fig. 5.

Figure 5 shows that women had a stronger opinion on the statements than men. The majority of women were in agreement with all four statements that claimed that printed material is likely to support learning engagement. Although, the majority of men agreed that they focused better on printed material, and that men usually highlighted or notated printed course material, the rate was lower than for women. In addition, almost half of men were in favor of the statement that they remembered information best when they read it from print. The opinion of men on whether or not they are more likely to review their course readings when it is in print was not as distinct. Even though the rate of men who were in agreement with this was higher than men who disagreed, the difference is much smaller than for the other three statements. As opposed to the results about printed
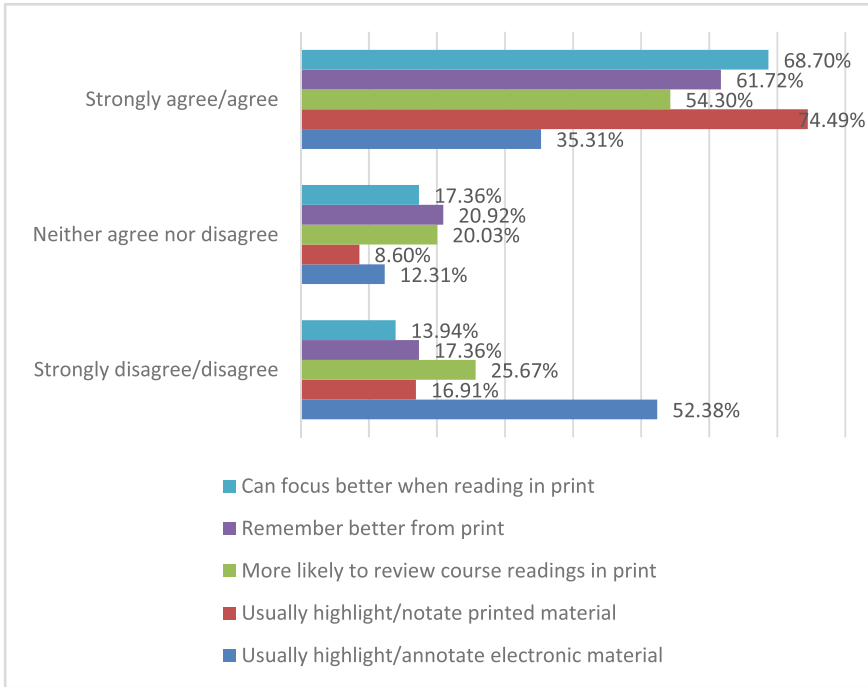
Fig. 4. Learning engagement

material, the rate of men and women who disagreed with the statement that they usually highlighted or annotated electronic reading material is higher than the rate of those who were in agreement with it.

An analysis by the participants' field of study revealed that the majority of students from all three fields of study agreed with the statements about printed material, although those who are in the field of science were somewhat less in agreement than students in arts and humanities and in social science. The highest rate of agreement was for the statement that they usually highlighted and notated their printed course readings. The rate of those who were in agreement with this was highest for social science (78.63%, n = 298); after that came arts and humanities (72.12%, n = 75) and then science (66.10%, n = 117). This was followed by the results that the students can focus better on the material when they read it in print. The rate of those who were in agreement with this was similar in arts and humanities (72.11%; n = 75), science (69.50%; n = 123) and social science (67.81%; n = 257). When asked if they remembered information best if they read it from print, students in arts and humanities (68.27% strongly agree/agree; n = 71) and social science (strongly agree/agree 63.85%; n = 242) were more in agreement than students in science (55.36% strongly agree/agree; n = 98).

The lowest rate of agreement was for the statement that the students were more likely to review their course readings when it is in print. The majority of students in arts and humanities (59.62%, n = 62) and in social science (58.04%, n = 220) agreed with this.
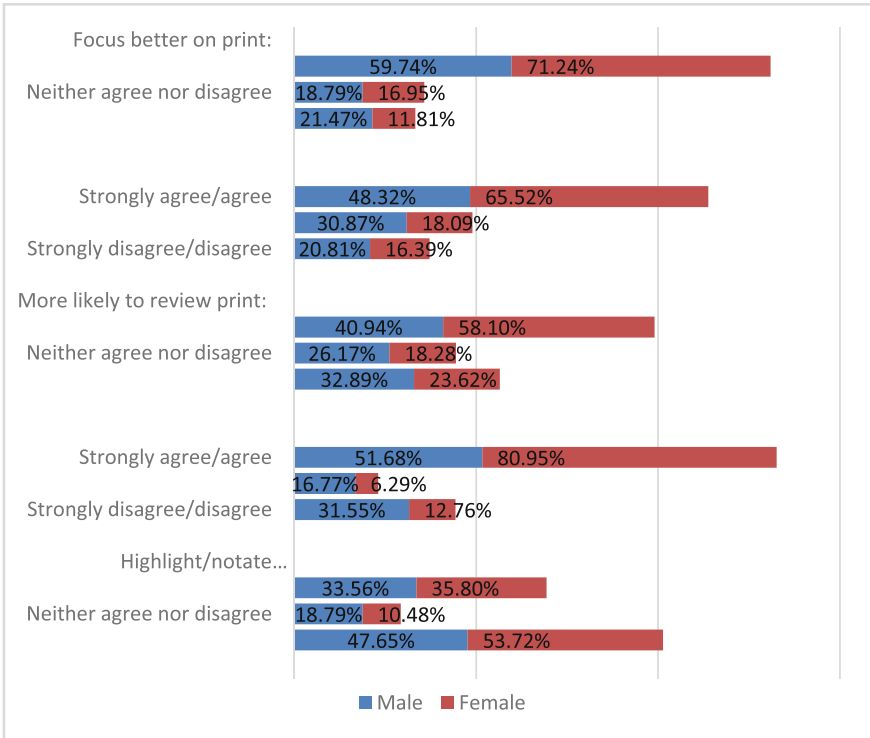
Fig. 5. Learning engagement – division by sex

Although not to the same extent, students in science were more likely to agree with this statement (43.50%, n = 77) than to disagree (32.21%, n = 579).

When asked if they usually highlighted and annotated electronic readings, 66.34% (n = 69) of students in arts and humanities did not agree with it. Students in social science were not as opposed to it, although 51.45% (n = 195) strongly disagreed or disagreed, students in science were least in disagreement, or 48.03% (n = 85).

4   Discussion

The main result of the study is that participants were more likely to prefer course material in printed format than electronic. This supports the findings in the study by Mizrachi [1]. However, there is a certain difference, as students at the University of California were more likely to value the printed format (strongly agree/agree 67.7%) than students at the University of Iceland (strongly agree/agree 44.51%). In addition, students at the University of California were more likely to be against reading their course material electronically (strongly disagree/disagree 68.7%) than Icelandic students (strongly disagree/disagree 55.2%).

An examination of the influence of language and length of text on format preference strengthened further the results that the students preferred printed format rather than

electronic. Findings about text length were also in line with former studies [1, 5–7, 9]. Furthermore, the majority of participants were against having electronic textbooks.

The students varied somewhat by sex and their field of study. Women were more inclined to prefer printed material rather than electronic, which is in line with previous results [12]. Men did not want to be confined to the printed format but this did not mean that they valued electronic material more than print. The finding that students in arts and humanities and students in science differed in their opinion of printed format supports previous results [12]. Almost half of arts and humanities students would like to have all their course material in print, whereas students of science were least in favour of this. The opinion of electronic sources was more even and the main conclusion is that students in all three disciplines valued the printed format more than the electronic.

Results about the approach to factors that reflect learning engagement, depending on the print or electronic format of the material, are quite similar to the results in Mizrachi's study [1]. The majority of participants in both studies strongly agree or agree that they focused better on the material, remembered better what they read, that they were more likely to highlight and notate the text and to review the material. Whereas, only about one third of participants in both studies strongly agreed or agreed that they highlighted or annotated electronic material.

Thus, taken together, the results suggest that despite technological progress which offers the possibility to use electronic course material, participants in the study were still convinced of the advantages of printed reading material. It needs, however, to be kept in mind that the response rate in the study was very low and that the findings cannot be generalized to all students at the University of Iceland. Nevertheless, the results may provide important understanding about university students' preferences for educational material, whether they chose to read it in print or electronic format. By furthering the knowledge of students´ attitudes and reading behaviour, the study can provide university professors with the means to design better educational procedures, and academic library personnel to make decisions about collection development, taking into account the students' wishes and needs.

References

1. Mizrachi, D.: Online or print: which do students prefer? In: Kurbanoglu, S., Spiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) Information Literacy, Lifelong Learning and Digital Citizenship in the 21st Century, pp. 733–742. Springer, Heidelberg (2014)
2. Mizrachi, D.: Undergraduates' academic reading format preferences and behaviors. J. Acad. Libr. **41**, 301–311 (2015)
3. Li, C., Poe, F., Potter, M., Quigley, B., Jacqueline Wilson, J.: UC Libraries Academic e-Book Usage Survey. University of California Libraries, California (2011)
4. Kaznowska, E., Rogers, J., Usher, A.: The State of E-Learning in Canadian Universities, 2011: If Students are Digital Natives, Why Don't They Like E-Learning? Higher Education Strategy Associates, Toronto (2011). http://higheredstrategy.com/wp-content/uploads/2011/09/InsightBrief42.pdf
5. Taipale, S.: The affordances of reading/writing on paper and digitally in finland. Telemat. Inf. **31**, 532–542 (2014)

6. Baron, N.S.: Do mobile technologies reshape speaking, writing, or reading? Mob. Media Commun. **1**(1), 134–140 (2013)
7. Baron, N.S.: Redefining reading: the impact of digital communication media. PMLA **128**(1), 193–200 (2013)
8. Ji, S.W., Michaels, S., Watermanc, D.: Print vs. electronic readings in college courses: cost-efficiency and perceived learning. Internet High. Educ. **21**, 17–24 (2014)
9. Foasberg, N.M.: Student reading practices in print and electronic media. Coll. Res. Libr. **75**(5), 705–723 (2014)
10. Rockinson-Szapkiw, A.J., Courduff, J., Carter, K., Bennett, D.: Electronic versus traditional print textbooks: a comparison study on the influence of university students' learning. Comput. Educ. **63**, 259–266 (2013)
11. Dukić, D., Strišković, J.: Croatian University students' use and perception of electronic resources. Libr. Inf. Sci. Res. **37**, 244–253 (2015)
12. Liu, Z., Huang, X.: Gender differences in the online reading environment. J. Doc. **64**(4), 616–626 (2008)

Print or Electronic? Estonian Students' Preferences in Their Academic Readings

Mai Põldaas[(✉)]

Institute of Social Studies, University of Tartu, Tartu, Estonia
`mai.poldaas@ut.ee`

Abstract. Results of this study inform universities and their libraries about students' preferences in their academic readings. They help academic staff, while preparing course reading lists and librarians in making collection development decisions. They can assist in the larger policy decision context of developing educational policy, as well. The aim of the study is to investigate Estonian students' preferences of academic reading formats. Results show that Estonian students prefer their course materials in print. By their own evaluation they remember course materials, focus and review them better, when reading from printed pages. The study is part of a multinational research project *Academic Reading Format International Study* (ARFIS).

Keywords: Academic readings · Reading preferences · Higher education · University students · Estonia

1 Introduction

Estonia is known as a small progressive country, which has a strong information technology sector. Estonia gets mentioned as the most wired country in Europe and is famous for its e-Government solutions and e-Services for citizens. The success story started with the *Tiger's Leap* project undertaken by the government in the 1990s, to invest heavily in development and expansion of computer and network infrastructure in Estonia, with a particular emphasis on education.

E-learning, e-textbooks and other electronic materials with traditional methods and printed textbooks are in use today in schools and universities in Estonia. A push to move toward digital materials in teaching is discernible with common assumptions like: 'digital natives learn differently', 'they are fluent in dealing with computers and smartphones', and 'young people prefer everything electronic'. In a roadmap for Information Technology (IT) use in education in 2018 [1] there is a vision about the *Nordic Tiger*, which sees Estonian educational landscape as favorable and stable, values individuality and creativity and skilled Information and Communication Technology (ICT) use is integrated into learning processes. Academic personnel is familiar with these changes, but they also notice, that a lot of learning material made available in digital format gets printed out on paper for learning. What is the situation in Estonia? What are students' format preferences, when engaging with academic readings? No that kind of research has been done in Estonia before.

The aim of the study is to investigate Estonian students' preferences in their academic reading formats. The study is part of a multinational research project *Academic Reading Format International Study* (ARFIS), the survey instrument of which was originated by PhD Diane Mizrachi [2, 3] from University of California, Los Angeles.

2 Literature Review

Being able to read and understand the material you are reading, is essential for one to be literate. A lot of learning happens via reading. The importance of reading is being questioned recently, bringing out more attractive and less time consuming ways to deal with knowledge procurement. Skillful ICT use is one of these attractive ways, making learning materials electronic. With changes happening in reading and learning processes, new research contexts appear. Reading format preferences is an actual topic to research internationally, many disciplines are actively involved and various studies have found different kind of results. The following is a brief overview, showing the diversity of studies carried out.

In *Words Onscreen*, Naomi Baron [4] investigated how technology is reshaping the understanding of what it means to read. She raised the question of what long-standing benefits of reading might be lost if we go overwhelmingly digital. The author found that reading onscreen has many virtues, like convenience, potential cost-savings, the opportunity to bring free access to books and other written materials to people around the world. On the other hand Baron argued, that the positive sides of e-reading are matched with drawbacks. Users are easily distracted by other temptations on their devices, multitasking is rampant, and screens coax us to skim rather than read in-depth. She pointed out, that with reading habits changing, the writing needs to change as well – for example, texts are shorter, and less need for close reading.

Scholastic's [5] study *Kids & Family Reading Report* informed us what to expect from future generations' reading preferences. Their findings show, that the percentage of children (ages 6–17) who have read an e-book has increased steadily since 2010: it was 25% in 2010, 46% in 2012 and 61% in 2014. Home is the most common place for reading e-books, and the percentage of kids who read e-books at school has nearly doubled since 2012: it was 12% in 2012 and 21% in 2014 (while at home it was 34% in 2012 and 39% in 2014). The majority of children who have read an e-book (77%) say most of the books they read are in print. Here 62% of teens ages 15–17 say, that most of the books they read are in print, 21% that about half are e-books and half are print books and 15% that most of them are e-books. Sixty-five percent of children (ages 6–17) agree that they'll always want to read print books even though there are e-books available. Among children who have not read an e-book, interest in e-reading has dropped from 51% in 2012 to 37% in 2014.

Amanda Rockinson-Szapkiw and her colleagues [6] examined the relationship between textbook format and 538 university students' grades and perceived learning scores. They found that there was no difference in cognitive learning and grades between the two groups, suggesting that the electronic textbook is as effective for learning as the traditional textbook. Researchers pointed out, that the mean scores indicated that

students who chose e-textbooks for their education courses had significantly higher perceived affective learning and psychomotor learning than students who chose to use traditional print textbooks.

Swedes Caroline Myrberg and Ninna Wiberg [7] found in their study, that "[h]abit and attitude appeared to be important, and a digitally born textbook is by far the best alternative to a print textbook when it comes to studying. But even those who prefer to read on screens are originally native paper readers, and as long as the existing application interfaces cannot address the shortcomings of screens regarding spatial landmarks, we will keep returning to paper under certain circumstances." They would like to see more user-friendly e-readers and wish authors and publishers learn to fully utilize the potential of e-books.

At European Conference on Information Literacy (ECIL) 2014 the ARFIS project was initiated and at ECIL 2015 some of participating national survey results were introduced. The same questionnaire was used (see methodology part of this paper), but different focus was put on interpretations of survey results. The common finding to all presented studies was the students' overall preference for printed learning material [2, 8–11]. That remembering course materials better, and focusing and reviewing them better when reading from printed pages.

3   Methodology

The study is part of a multinational research project *Academic Reading Format International Study* (ARFIS) [2, 8–11], it uses the same survey instrument to get comparative results in LimeSurvey. The survey contains 16 Likert-style statements about the format influence on students' reading habits, aspects of ability to remember material, opinions about access convenience, possibilities to highlight and annotate text, and student's ability to review and concentrate on the text. Also, questions on the importance of language and length of the text to determine the preferred format, the electronic device students use to read digital materials, were asked. Some demographic and academic data were gathered, as well. For Estonian students the questionnaire was translated into Estonian.

The questionnaire was distributed to students in Estonia's four largest universities: University of Tartu (number of students: 13,750), Tallinn University (number of students: 9,000), Tallinn University of Technology (number of students: 12,000) and Estonian University of Life Sciences (number of students: 3,700). Specialists of academic affairs in all curricula, who administer students mailing-lists for study related information, were asked to forward the questionnaire to their students at all study levels. The data was gathered in February 2016 and 1,260 completed questionnaires were received. The result can be considered representative for Estonia. The data was analysed using descriptive statistics methods in MS Excel and free comments were analysed qualitatively.

Of the 1,260 completed questionnaires received, 83.49% (n 1,052) were answered by females and 16.51% (n 208) by male respondents. All possible age groups and study levels are represented by respondents and their distributions are shown in Table 1. All

study fields are covered; they divide as follows: 48.89% are from social sciences, 22.63% from humanities and 28.58% from sciences.

Table 1. Respondents by their age and study level

Age	n	%	Study level	n	%
−19	63	5.00	First year	240	19.05
20–24	544	43.17	Second year	205	16.27
25–29	269	21.35	Third year	242	19.21
30–34	136	10.79	Fourth year	76	6.03
35–39	112	8.89	Master student	380	30.16
40+	136	10.79	PhD student	79	6.27
			Other	38	3.02
Total	1,260	100.00		1260	100.00

4   Results and Discussion

Results of this study inform universities and their libraries about students' preferences in their academic readings. They help academic staff when preparing course reading lists and librarians in making collection development decisions. They will assist in the bigger policy making context of developing educational policy, as well.

4.1   Students' Preferences Regarding Course Material

Estonian students prefer their course materials in print (see Table 2). 22.94% of respondents strongly agree with the statement in having all their course materials in print and 36.11% agree with this position. Interesting is the slight difference between disagreeing in preferring print (17%) and preferring electronic (8.33%) – these results do not match exactly.

Comments added to these statements by respondents: there are "*too many distractions for reading electronically*" (social life, etc.); "*everything is in one place in a computer – no need to browse thousands of pages and easier to handle*"; "*for electronic device loaded battery is needed*"; those who do not agree or disagree mention that it depends of the situation, like how long ("*it is good to use find-command in long texts*" or "*not reasonable to print out*") or difficult the material is. They add that they like both possibilities (print and electronic). Electronic materials provide easy access and are easy to find later, if needed – say some and others are in an opposite position – easier to lose. Electronic materials are preferred (or forced to use), because there are not enough print copies available in a library. Students may not like it, but they understand, that if study

groups are big, there can't be a printed copy for everyone in a library (students do not have to buy their textbooks in Estonia). "*Digital materials are more difficult to make reference to, if needed.*" "*Print is better, because otherwise computer needs to be used all the time anyway.*" Electronic materials can be interactive. "*Prefer reading in print format, but assignments electronically* Preference may depend on the quality of digitization, because it is not always good. "*Even if one would like, it is not realistic to have everything in print nowadays*" (environmental issues).

Table 2. Course materials format preferences

Statement		Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Total
Q: I prefer to have all my course materials in print format (e.g. book, course reader, handouts)	n	289	455	236	215	65	1260
	%	22.94	36.11	18.73	17.06	5.16	100.00
Q: I prefer electronic textbooks over print textbooks	n	53	105	213	496	393	1260
	%	4.21	8.33	16.90	39.37	31.19	100.00

Regarding learning aspects (see Table 3), majority of respondents agree they remember material better when reading it in print: 37.38% strongly agrees and 40.32% agrees. Students say they focus better on the reading material when reading from printed pages: 48.73% strongly agrees and 33.89% agrees. These very expressive results are students' own evaluations. Many would want to say that it comes from habits, for example Caroline Myrberg and Ninna Wiberg [7] wrote: *"[b]ut even those who prefer to read on screens are originally native paper readers, and as long as the existing application interfaces cannot address the shortcomings of screens regarding spatial landmarks, we will keep returning to paper under certain circumstances.*" Or like Helin Puksand's [12] comment on Estonian schoolchildrens' reading at the computer, that adolescents read a lot at the computer, but this does not involve obtaining information for school: "*I think teachers should realize that using the computer could be a key component in shaping adolescents' reading habits.*" Students themselves mention, that there's too much computer usage already anyway, they get distracted at the computer, screens are not good for their eyes and they want to have a change from constant computer usage. Is it not that too often we hear the sayings "that is the way we're going to read in the future anyways, so why resist?", but respondents of this study seem to share the understanding with Anne Mangen and her colleagues [13], who pointed out that there is something to deep reading and deep thinking that is worth making an effort to preserve.

A lot of learning material is made available in some foreign language in Estonia, where English, the *lingua-franca* of nowadays is in use the most. Respondents of this study do not say that there is a big importance if their course material is in their native language or in a foreign one (see Table 3). In comments they bring out that language does not matter in format preference – it is the content, that matters here and how well you know the language. Students who are studying to become translators mention that they prefer electronic version sometimes because, with cases where they have to deal

with a language not very familiar to them, the digital way is easier to handle for understanding and translating the material needed.

Table 3. Learning aspects of different formats of academic readings

Statement		Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Total
Q: I remember information from my course readings best when I read them from printed pages	n	471	508	206	58	17	1260
	%	37.38	40.32	16.35	4.60	1.35	100.00
Q: It is more convenient to read my assigned readings electronically than to read them in print	n	42	131	268	536	283	1260
	%	3.33	10.40	21.27	42.54	22.46	100.00
Q: I can focus on the material better when I read it in print	n	614	427	139	56	24	1260
	%	48.73	33.89	11.03	4.44	1.90	100.00
Q: I am more likely to review my course readings (after I've read them at least once) when they are in print	n	241	533	345	109	32	1260
	%	19.13	42.30	27.38	8.65	2.54	100.00
Q: I prefer to read course readings which are in my native language electronically rather than print	n	49	100	326	548	237	1260
	%	3.89	7.94	25.87	43.49	18.81	100.00
Q: I prefer reading foreign language material in print than electronic	n	310	419	274	199	58	1260
	%	24.60	33.25	21.75	15.79	4.60	100.00

4.2 Learning Material Handling

The better skills students have to handle their learning material, the better the learning outcomes. In addition to traditional methods, which include paper and pencil, usually (very simply put) more are needed in digital environments. Also, with every new version of the software and/or device, the possibilities change. One just learns all the tricks and gets used to something when there is a need to change this ability already. This may be frustrating for many and the wish to keep up with changes diminishes.

Table 4 illustrates how Estonian students highlight and make notes to their course material during the proccess of reading and learning. The majority of respondents use these strategies when reading in print format (53.4% strongly agree and 33.8% agree), but do not use these strategies with electronic readings (24.6% agrees, only 6.8% strongly agrees and more than half of the respondents disagrees). To explain this behavior students comment, that it depends of the file format, because in some the option is disabled (includes digitized materials, which are often in use). They mention that the effect is not the same, because electronic material is more dynamic and flowing – one does not remember it like on paper pages. It appears that it is not very convenient to add

comments to electronic material in e-readers and not all file formats fit. One respondent comments: "*Interactivity! Please! All terms and concepts opened and explained. Examples added, real life examples if talking about technical solutions.*" Also, as more than half of the respondents like to print out the reading material (see Table 5), the activity explains the outcome itself.

Table 4. Highlighting and notating academic readings regarding format

Statement		Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Total
Q: I usually highlight and notate my printed course readings	n	673	426	73	62	26	1260
	%	53.41	33.81	5.79	4.92	2.06	100.00
Q: I usually highlight and annotate my electronic readings	n	86	310	156	426	282	1260
	%	6.83	24.60	12.38	33.81	22.38	100.00

Table 5. Printing out or digitizing learning materials

Statement		Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Total
Q: I prefer to print out my course readings rather than read them electronically	n	367	466	198	161	68	1260
	%	29.13	36.98	15.71	12.78	5.40	100.00
Q: I like to make digital copies of my printed course materials	n	35	155	207	440	423	1260
	%	2.78	12.30	16.43	34.92	33.57	100.0

Many respondents' comments show that electronic is considered as a good way to have access to course materials, but not prefered format for activities most important in the learning process: annotating, concentrating and remembering purposes. Over twenty-nine percent strongly agree and 36.98% agree about printing out course readings (see Table 5), because they like to highlight, underline, add notes when reading. Many respondents say that they print out for preservation, adding that this includes all kind of study materials.

Few students digitize their course materials: only 2.78% strongly agrees and 12.3% agrees. The result makes sense because a lot of learning materials are made available in electronic format via e-learning environments and study information systems. As these texts are often in not editable format, students prefer to print them out. Respondents' comments show that they digitize their own handwritten material, for example, for sharing purposes with coursemates.

The most commonly used device for electronic course readings is a laptop computer: 93.17%. Almost 34% of respondents use Phones, 25.87% use desktop computers, 18.17% use Tablets, and 6.11% of respondents use dedicated e-readers. Only 1.51% say they use their electronic course material with an audio application, and 1.67% say that they never

read course material electronically. Regarding the last option many commented that this is not possible nowadays – there's something one has to read electronically one way or the other.

Results of this study clearly demonstrate students' preference for print format. Can one of the reasons be the nature of the electronic books, itself? Possibly they are not dynamic enough, or interactive like they could be so the reading and learning experience is not different from the familiar one so far. In most of the cases nowadays textbooks are static materials – they are like linear codices, but digitally a lot less convenient to use than in print format. For example Amanda Rockinson-Szapkiw and her colleagues [6] were critical in their findings confirming that "*students are ready to learn digitally due to the reported increase on affective and psychomotor learning. A major hindrance is not all university content is ready to meet the demands of 21st Century students*". In a more optimistic note they wrote: "*recently developed e-reader products and mobile devices are more advanced and, thus, may be more suitable for academic use and may continue to change the reading experience.*" Also Caroline Myrberg and Ninna Wiberg [7] pointed to the fact that e-readers could be more user-friendly and wish authors and publishers learn to fully utilize the potential of ebooks.

5   Conclusion

Estonian results are similar to other reading preference studies: students prefer to read in print [3, 7–11]. This study shows that contrary to popular belief: 'young people prefer everything electronic', young people do not want everything digital, they want a change from their constant computer usage.

As long as we do not have new reading experience offering electronic textbooks and students prefer printed books, universities and libraries should consider the situation and act accordingly. There is a demand by students to purchase academic literature in print still and university libraries cannot yet shift from acquiring printed materials to electronic ones instead.

With a push to move toward digital learning materials should come the knowledge about learner-friendly textbooks, which are designed the way skilled ICT use is integrated into learning processes. Students make a difference between the need to read texts on screen and doing assignments via e-learning. Respondents of the study do not prefer to read from the screen, but they value access they have via digital learning and the possibility of doing assignments electronically. The bottleneck of the problem seems to be in e-reading, where the digital environment does not offer the possibilities and convenience the print does.

Even though one notices students being in front of various screens' all the time', may not mean that this is the place where they want to be. It may not be wise to push young people to use technology, which is not fully ready to use. Learning still happens via reading a lot, let's not make it a bad experience.

Kurbanoglu from Hacettepe University, Turkey for initiating this international research project and letting us be part of that useful study.

References

1. IT+Haridus: EST_IT@2018 Raport Infotehnoloogia Kasutamisest Hariduses. Eesti Arengufond (Estonian Development Fund) (2010). http://www.arengufond.ee/upload/Editor/Publikatsioonid/IT+Haridus_teekaart_est.pdf
2. Mizrachi, D.: Online or print: which do students prefer? In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 733–742. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_76
3. Mizrachi, D.: Undergraduates' academic reading format preferences and behaviors. J. Acad. Libr. **41**(3), 301–311 (2015)
4. Baron, N.S.: Words Onscreen: The Fate of Reading in a Digital World. Oxford University Press, Oxford (2015)
5. Scholastic: Kids & Family Reading Report, 5th edn. (2014). http://www.scholastic.com/readingreport/Scholastic-KidsAndFamilyReadingReport-5thEdition.pdf?v=100
6. Rockinson-Szapkiw, A.J., Courduff, J., Carter, K., Bennett, D.: Electronic versus traditional print textbooks: a comparison study on the influence of University students' learning. Comput. Educ. **63**, 259–266 (2013). doi:10.1016/j.compedu.2012.11.022
7. Myrberg, C., Wiberg, N.: Screen vs. paper: what is the difference for reading and learning? Insights **28**(2), 49–54 (2015). doi:10.1629/uksg.236
8. Landøy, A., Repanovici, A., Gastinger, A.: The more they tried it the less they liked it: norwegian and romanian student's response to electronic course material. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 455–463. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_46
9. Kortelainen, T.: Reading format preferences of finnish university students. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 446–454. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_45
10. Terra, A.L.: Students' reading behavior: digital vs. print preferences in portuguese context. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 436–445. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_44
11. Zabukovec, V., Vilar, P.: Paper or electronic: preferences of slovenian students. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 427–435. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_43
12. Puksand, H.: The reading preferences of estonian adolescents. In: Lauristin, M., Vihalemm, P. (eds.) Reading in Changing Society, pp. 166–177. University of Tartu Press (2014)
13. Mangen, A., Bente, R.W., Kolbjørn, B.: Reading linear texts on paper versus computer screen: effects on reading comprehension. Int. J. Educ. Res. **58**, 61–68 (2013)

Print and Digital Reading Preferences and Behaviors of University Students in Qatar

Nicole Johnston[1(✉)], Alicia Salaz[2], and Lana Alsabbagh[3]

[1] Edith Cowan University, Perth, Australia
n.johnston@ecu.edu.au
[2] Carnegie Mellon University, Doha, Qatar
asalaz@qatar.cmu.edu
[3] Qatar University, Doha, Qatar
lalsabbagh@qu.edu.qa

Abstract. This paper presents findings of a study that investigated the reading preferences and behaviors of university students in Qatar. The study involved a survey of the print versus digital preferences of students in Qatar followed by an observation of the academic reading behaviors of university students using eye tracking glasses for explanatory insight. Results from the survey indicated that students preferred reading course materials and textbooks in print and felt they learn better this way. Results also indicated that language did not play a large part in students reading format preferences, and a large percentage of students only highlighted and took notes when reading in print. This finding was supported by the eye tracking test that showed that most students only used features such as highlighting and taking notes in print format. The eye tracking reading tests revealed some differences in print versus digital reading behaviors, for example that students tended to navigate differently in digital format by skimming and flipping back and forth more than in print, and that participants spent more time concentrating on the print text. As students tended to mimic their print reading behaviors in digital format except for using features, this would indicate that if students were more familiar with digital features then they would use them when reading digitally. Although students may prefer print, the reality is that course materials are increasingly becoming available only in digital format, therefore libraries and publishers can help students by providing both training in how to use features of digital formats and by developing user friendly digital formats that mimic print reading.

Keywords: Reading preferences · Reading behaviors · Print · Digital · Format · Electronic reading · Eye tracking

1   Introduction

This paper presents findings of a study that investigated the reading preferences and behaviors of university students in Qatar. The study was conducted in two stages. The first stage involved a survey of the print versus digital preferences of students at two universities in Qatar (including both undergraduate and postgraduate students in different disciplines). This survey was undertaken as part of the larger Academic Reading Format International Study

(ARFIS) that is investigating print versus digital reading preferences in 31 countries. The second stage of the project involved investigating the academic reading behaviors of different groups of university students in Qatar by using eye tracking software to investigate if their reading behaviors differed when reading print versus digital materials. The researchers were interested in investigating not only the students' reading preferences, but the differences in their behaviors when they read in print and in digital formats. The study aimed to use the data to provide recommendations on how to improve the usability of electronic course materials as well as provide insight into the reading preferences of students studying in Qatar. Eye tracking allowed the researchers to record and qualitatively analyse the reading behaviors of students. Eye tracking as a methodology is based on the "eye-mind hypothesis: the location of a person's gaze directly corresponds to the most immediate thought in a person's mind" [1, p. 3].

This research study was conducted with undergraduate and postgraduate students in Qatar. Students studying in Qatar come from a diverse range of backgrounds and countries including Qatari nationals as well as a large number of expatriates from other Gulf countries, the Middle East, Asia, Africa, U.S.A, Europe, and the U.K. Qatar University, the largest and national institution in the country, was established in 1973, and comprises eight colleges and over 60 specializations. As of spring 2015, 17,606 male and female students, including 15,758 undergraduates, were enrolled. Courses are taught in both Arabic and English. A number of American and British universities also have small branch campuses on Education City, an initiative set up by the Qatar Foundation. Each branch campus delivers courses and conducts research in different specializations. Carnegie Mellon University in Qatar (CMU-Q) and University College London Qatar (UCL Qatar) are two of the branch campuses currently located within Education City. CMU-Q was established in 2004 and specializes in business administration, information systems, biological sciences, and computer science. In 2015, there were 414 students from 37 nationalities enrolled. Sixty percent of the students enrolled were female. UCL Qatar teaches four Masters programs in the cultural heritage area including library and information studies, museum studies, archeology, and conservation studies. The first students enrolled in August 2012 and since then and UCL Qatar has enrolled more than 190 students from over 40 countries.

2   Literature Review

2.1   Reading Preferences of Students

Results of several surveys conducted as part of ARFIS indicated that most students feel that print helps them to learn better and prefer reading their academic texts in print format. A majority of students also preferred to print their class readings [2–4]. In a study conducted with 400 undergraduate students at the University of California, Mizrachi [5] found that, overwhelmingly, the students preferred print over electronic formats for learning purposes. The students' reasons for preferring print included that print caused less eyestrain, the advantages of the tactile aspects of print, and that they were more inclined to highlight and make notes with print readings. Mizrachi also found that multiple factors such as accessibility, cost, and complexity of the readings had an affect on their reading behaviors. Other studies have used qualitative methods such as writing in diaries to gauge the students'

reading preferences. Foasberg [6] conducted a study with seventeen students across all year levels at Queens College, New York where she asked students to record information about their reading practices for twelve days in a diary. She found that students tended to use print for academic and long form reading and to engage with it more deeply, and that students often used the electronic medium for shorter and nonacademic reading.

Studies have also been conducted on the impact of reading comprehension when reading in print or digital format. A study conducted with 92nd-year college students from one university in Beijing, China found that students who read with paper performed significantly better than students reading on computers when it came to shallow level comprehension [7]. They also found that familiarity with electronic devices such as tablets resulted in more deep reading comprehension, leading them to conclude that you can improve electronic reading comprehension if you provided training to students on how to use electronic devices. Despite device familiarity having an impact on reading comprehension, students still preferred reading in print over electronically. A study of 91 students at a university found that previous use of e-books did not have an impact on the students preference to read in print for learning. The study also found that students were more likely to use special features in print books than in e-books [8].

2.2   Eye Tracking Studies

Eye tracking hardware and software have been utilised in numerous usability studies to test the usability of web interfaces and well as study users' online search behavior [9–11]. Eye tracking has also been used to study reading behavior in areas such as font size [12], reading subtitles [13], and concept mapping [14]. Previous studies investigating reading behaviors of print text focused on how variations in textual and graphic presentation affected behavior [1]. One eye tracking study that investigated how font size impacts online reading found that, for smaller font sizes, fixation durations were significantly longer, resulting in slower reading and that there were no significant differences in serif versus san serif fonts. They did find, however, that there were significant eye tracking differences for different age groups and whether English is the subject's first language. Early studies on font size have found that the ideal serif body text in the range of 9 to 12 points as less than 9 point font affects visibility and larger than 12 font slows down reading since people are forced to read in sections [1].

Eye tracking studies that focus on online reading tend to focus on usability factors such as issues of accessibility and navigation or the number of fixations on an object or area as well as the users' scan path. Lorigo et al.'s [9] eye tracking study on online searching of students revealed that, on average, 3.2 distinct abstracts were viewed following each query. Overall, their findings revealed that if none of the top three results were relevant, then the user does not explore further results. In another study on scan path's where different web interfaces were tested, the researchers found that the users preferred scan path was impacted by the features of the Webpage and memory [15]. There are limited studies comparing the print and digital reading behaviours of university students. This study will address the gap through its analysis of the different behaviors of students such as their scan path's, fixations, navigation and use of features while reading academic materials in print and digital format.

3   Methods

The study was conducted in two stages. The first stage involved gathering data from a survey of the print versus digital preferences of students at two universities in Qatar. This survey was undertaken as part of the larger Academic Reading Format International Study (ARFIS) that is investigating print versus digital reading preferences in 31 countries. Surveys were sent to a random sample of approximately 3,000 undergraduate and postgraduate students at Qatar University and UCL Qatar in January and February 2016 after receiving ethics approval from both universities. The ARFIS questionnaire consists of 17 Likert-style statements on academic reading behaviors and preferences, six demographic questions, and an open prompt for any further information. Students had the option of completing the survey in either English or Arabic. Questions in the survey aimed to gauge the print and digital reading preferences including whether factors such as length of text and language impacted their preferences.

The second stage of the project involved an exploratory study investigating the academic reading behaviors of university students in Qatar by using eye tracking glasses and software to investigate if their reading behaviors differ when reading print versus digital materials. Eye tracking is useful because it can be used to measure behavior that would be difficult to obtain through other test measures and has previously been used as a method to investigate reading behaviors [1]. Students from Qatar University, Carnegie Mellon University in Qatar, and UCL Qatar were tested in the second stage of the study. The study used Tobii Pro glasses to record eye tracking data. In order to complete the eye tracking test students were asked to complete two reading tasks. The first task involved reading one chapter in print with the second task involving reading one chapter of the same book on a tablet in the Kindle app. Both chapters were of the same approximate length and both contained figures or images. The book was a general undergraduate text on Psychology. For both tasks students were asked to write a 100 to 150 word summary of the chapter. The Tobii Pro Glasses recorded the eye movements of the participants. The data from the recordings was analysed through watching the recordings and event logging the eye and hand movements of the participants. The scan paths, fixations, navigation, and use of features while reading academic materials in print and digital format were recorded in the event log. Twenty students were tested in this exploratory test in May 2016 using the eye tracking glasses and software.

4   Results

4.1   Survey

Students fully completed a total of 105 surveys. The majority of the respondents were female (85%) and undergraduate students (79%). Respondents were evenly dispersed across all of faculties at the universities with respondents studying in the Arts and Social Sciences, Humanities, Business, Engineering, Science, and Medical Sciences.

Eight-three percent of the students strongly agreed (63%) or agreed (20%) that they remember information from course readings better when in print form, as shown in Fig. 1. Students commented that this was often because print text allowed them to
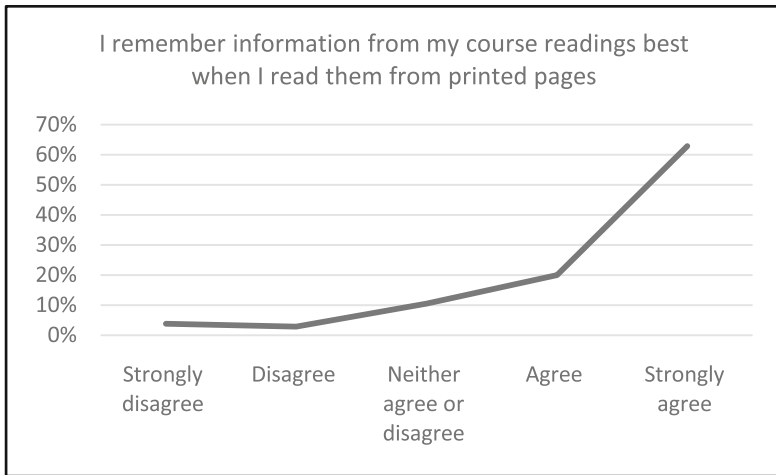
Fig. 1. Remembering information from print materials

highlight and take notes in order to retain information. One student stated "Mostly physical text helps the student highlight what's important and come up with questions to help him/her better understand and practice answering different questions", with another student commenting that "because it involved making handwritten notes that somehow helps me to remember the information". One student also commented on how reading print impacts on memory; "Other than it being my personal preference, several studies have shown the direct relation between reading print and memory strength". Seventy-four percent of the students also disagreed that is was more convenient to read course readings electronically. Students felt this was because of a number of reasons and often depended on factors such as eye fatigue and the size of the computer screen device they are reading from. They added that they were more easily distracted when reading on their computers.

Students also preferred to have all of their course materials in print with 76% of the students agreeing that this was their preference, as shown in Fig. 2. With regards to printing, students also had clear preferences about printing course materials based on page length. Seventy-eight percent of the students who responded agreed that they prefer to print their course readings if the document was over seven pages. Some students noted that this was due to eye strain from reading course materials electronically.

Overwhelmingly, students also preferred to print out their course readings rather than read them electronically. Only 30% of students agreed that they preferred to read materials electronically if the material was under seven pages with some students stating that the number of pages did not matter. Some of the students who did not print out course materials stated that they did this for environmental reasons, with some students who do prefer to print out readings stating that their reasons were because of the poor quality of electronic or scanned material.

As Fig. 3 shows, a large percentage of students only highlighted and took notes when reading in print. Ninety-two percent of the students agreed that they took notes and
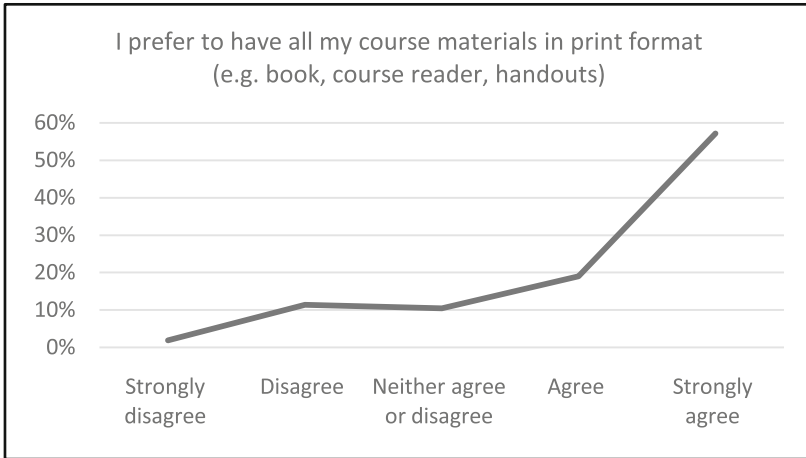
Fig. 2. Print format preference

highlighted print course readings with only 25% of the students agreeing that they did this with electronic readings.
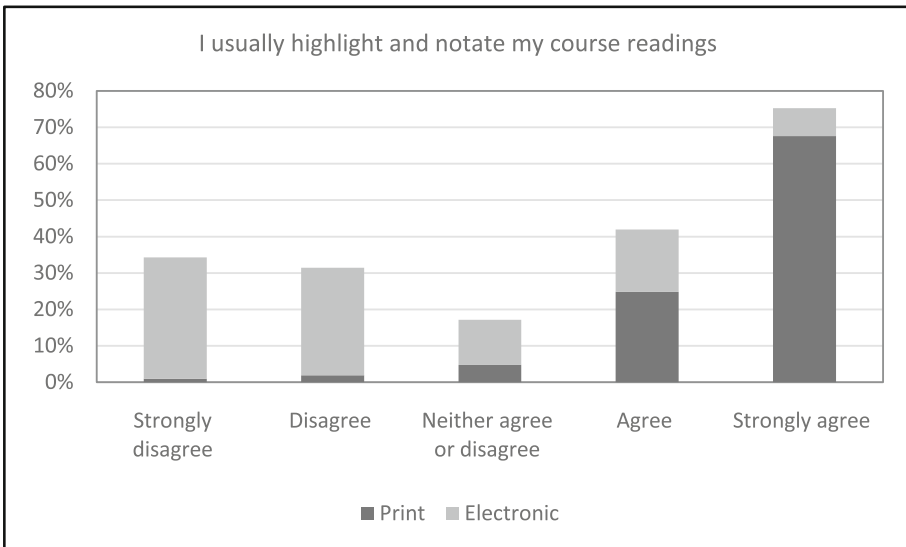
Fig. 3. Taking notes and highlighting

Another area the survey gathered data on was whether language had an impact on the print or digital preferences of students. According to the results of this survey, language did not have a significant impact on the reading preferences of students at Qatar universities. Sixty-seven percent of the students disagreed that they preferred to read course readings in their native language electronically rather than print with students stating that they did not

mind either way and they used both languages when reading materials. Fifty-nine percent of the students agreed that they preferred reading foreign language material in print rather than electronic form. This reinforces students' preferences for print no matter what the language. Several students stated it did not matter which language their reading material was in as language was irrelevant to their preferences.

4.2 Eye Tracking

Twenty students completed the reading test using the eye tracking glasses. Twelve were undergraduate students and eight were postgraduate students. Since sixteen of the twenty students were female, this caused some limitations to the data analysis as gender is not a factor that can be anlaysed for differences in behaviors. Nine of the students spoke Arabic as their first language with the other students speaking English, Urdu, French, Somalian, and/or Pashtu. Of the twenty students, fourteen stated they preferred to read all of their course materials in print format; sixteen students stated they remembered information from course readings best when in print format.

The reading tests revealed both similarities and differences in how the students read in print versus digital formats. Many students displayed similar reading behaviors in terms of their scan paths, but displayed different behaviors in using the features of both print and digital formats. There were differences in the reading behaviors of students while reading print, but as this study looked at the differences between print versus digital, that data is not analysed here. Most students scanned both print and digital chapters line by line with no specific fixations on different parts of the text. Students sometimes fixated on text before images or figures but demonstrated no significant differences in print versus digital. On the whole, however, students reading the digital format tended to skim more than when reading print and, when navigating in digital, tended to flip back and forth more. One reason for this was the students' behavior when writing the summaries. When writing the summary of the text in digital format, students tended to start writing the summary at some point during the first reading of the text while referring back to the text often, as well as flipping back and forth and skimming. When reading print they tended to finish reading the whole text one full time, then write the summary referring back to highlighted points or handwritten notes.

Although students were given paper to write notes for both formats very few students wrote notes for the digital text with most taking some form of notes for the print. Most students highlighted text, or underlined or circled words or sections with pen or pencil in the print text. Only one student used the highlighting feature in the digital format and one student zoomed in and out. Only these two students used any features in the digital format. There were some limitations in the study when it comes to reading speed since the students read different chapters, but what the study did show was that students tended to take more time and concentration when reading print, while they tended to skim the words faster in digital format. Although comparing exact reading speed would have been interesting, it would have been difficult to test students reading the same text twice as they would naturally tend to read it faster on a second reading.

5   Discussion

Results of several surveys conducted as part of ARFIS have indicated that most students acknowledged that print works best for learning. Students still preferred reading their academic texts in print format [2, 5]. Results from administering the ARFIS survey in Qatar supported these results. Students from Qatar preferred to print their course readings rather than read them electronically and preferred reading course materials and textbooks in print. Similar to Mizrachi's [5] study, students also stated their reasons for preferring print was because of their greater inclination to highlight and annotate printed readings and that reading print resulted in less eyestrain and fatigue. Students who preferred digital indicated that this choice was often due to wanting to be environmentally conscious. The eye tracking study also supported the findings of the survey with the test showing that students highlighted and took notes in print format but not in digital format. This could indicate an unfamiliarity with the features of tablets and e-books. Chen [7] found that when students were familiar with electronic devices their comprehension was better; it could be argued that, with training, students might start to feel familiar with the features and start to use them. Students' reading behaviors indicated that they liked to highlight and annotate, therefore lack of familiarity could be one thing holding them back. One interesting observation of the study was that students mimicked how they held the tablet the same way they held paper and their scan path or reading path were similar in both formats. This finding along with the preferences of students to read in print format would indicate that when students read in digital formats they were trying to replicate their print reading preferences and behaviors. This provides useful insights that can be used by publishers when they are creating e-books and digital course materials.

6   Conclusion

This study of the print and digital reading preferences of students in Qatar found that, overwhelmingly, students preferred to read in print format and felt they learned best when reading in print. The study also found that language does not have an impact on the reading preferences of students and that students preferences and behavior is to only use features such as highlighting and taking notes in print format. Students also indicated that they learn best with print and the eye tracking showed they spent more time concentrating on the print text, therefore there is still more that needs to be done to improve the usability and readability of digital formats in order to help students learn effectively while reading in digital formats. This study also shows that students mimicked their print reading behaviors when reading in digital format and that they were more likely to skim in digital format than in print. Students were also more easily able to concentrate and fixate on print text and more easily summarise course materials. Although students may prefer print, the reality is that course materials are increasingly becoming available only in digital format. Therefore, libraries and publishers can help students by providing both training in how to use features of digital formats and by developing user friendly digital formats that mimic print reading.

References

1. Cooke, L.: Eye tracking: how it works and how it relates to usability. Tech. Commun. **52**(4), 456–463 (2005)
2. Boustany, J.: Print vs. electronic: what do French students prefer in their academic reading material? In: The Third European Conference on Information Literacy (ECIL), Tallinn, Estonia (2015)
3. Kortelainen, T.: Reading format preferences of finnish university students. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 446–454. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_45
4. Zabukovec, V., Vilar, P.: Paper or electronic: preferences of slovenian students. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 427–435. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_43
5. Mizrachi, D.: Undergraduates' academic reading format preferences and behaviors. J. Acad. Librariansh. **41**(3), 301–311 (2015)
6. Foasberg, N.M.: Student reading practices in print and electronic media. Coll. Res. Librar. **75**(5), 705–723 (2014)
7. Chen, G., et al.: A comparison of reading comprehension across paper, computer screens, and tablets: does tablet familiarity matter? J. Comput. Educ. **1**(2), 213–225 (2014)
8. Woody, W.D., Daniel, D.B., Baker, C.A.: E-books or textbooks: students prefer textbooks. Comput. Educ. **55**(3), 945–948 (2010)
9. Lorigo, L., et al.: Eye tracking and online search: lessons learned and challenges ahead. J. Am. Soc. Inf. Sci. Technol. **59**(7), 1041–1052 (2008)
10. Bojko, A.: Using eye tracking to compare web page designs: a case study. J. Usability Stud. **1**(3), 112–120 (2006)
11. Djamasbi, S., Siegel, M., Tullis, T.: Generation Y, web design, and eye tracking. Int. J. Hum Comput Stud. **68**(5), 307–323 (2010)
12. Beymer, D., Russell, D., Orton, P.: An eye tracking study of how font size and type influence online reading. In: Proceedings of the 22nd British HCI Group Annual Conference on People and Computers: Culture, Creativity, Interaction, vol. 2, pp. 15–18. British Computer Society, Liverpool (2008)
13. Kruger, J.-L., Steyn, F.: Subtitles and eye tracking: reading and performance. Reading Res. Q. **49**(1), 105–120 (2014)
14. Liu, P.-L.: Using eye tracking to understand learners' reading process through the concept-mapping learning strategy. Comput. Educ. **78**, 237–249 (2014)
15. Josephson, S., Holmes, M.E.: Visual attention to repeated internet images: testing the scanpath theory on the world wide web. In: Proceedings of the 2002 Symposium on Eye Tracking Research and Applications. ACM (2002)

Academic Policy Reflections of Student's Reading Behavior Study in ULSIT

Tania Todorova[✉], Rositza Krasteva, Tereza Trencheva, and Elisaveta Tsvetkova

University of Library Studies and Information Technologies, Sofia, Bulgaria
{t.todorova,r.krasteva,t.trencheva,e.cvetkova}@unibit.bg

Abstract. The Strategy for Effective Implementation of ICT in Education and Science of the Republic of Bulgaria (2014 to 2020) has as its objective digital transformation in education. In this context, a survey was conducted in 2015 among students at the University of Library Studies and Information Technologies (ULSIT) as part of the Academic Reading Format International Study, essential for updating the institutional policy according the requirements of the strategy. At ULSIT, the survey was accepted with interest: of the target group of 350 students, 234 respondents responded to the whole survey. Analysis of the results highlighted the statistically significant differences in preferences and behavior of students from both faculties at ULSIT. The students from the *Faculty of Library Studies and Cultural Heritage* mostly prefer using printed materials, while their colleagues from the *Faculty of Information Sciences* prefer using teaching materials in electronic format in many cases.

Keywords: Academic readings · ULSIT · LIS higher education · Academic reading format international study

1 Introduction

The Strategy for Effective Implementation of Information and Communication Technologies (ICT) in Education and Science of the Republic of Bulgaria (2014 to 2020) has as its main objective digital transformation in education. The main vision of the National Strategy is related to iconic messages, such as: development of an integrated modern ICT learning environment, science and innovation; introduction of integrated digital control in all spheres of education and science and automation of the administrative work of teachers and researchers; priority development of generally accessible, universal and compatible standardized electronic content (including access via its own mobile devices) and significant reduction of paper document turnover in the sphere of education and science; development through ICT tools of new educational and scientific services, registers and generally available public information, in order to attract all potential participants in support of the strategy - parents, institutions, companies, civil society organizations [1]. In this context, the survey conducted in 2015 among students at the University of Library Studies and Information Technologies (ULSIT) as a part of the Academic Reading Format International Study (ARFIS) is essential for updating the institutional policy according the requirements of the National Strategy.

The ARFIS covers 27 nations and the international collaboration is headed by Mizrachi, Boustany and Kurbanoglu [2]. The objective of the survey is to explore the attitudes and behaviors of students towards academic readings on paper and on screen, and the factors determining these preferences and behavior. The International thematic survey was conducted through the online based platform LimeSurvey and remote scientific cooperation and demonstrates new trends in the organization of scientific communication and knowledge.

2   Specific Issues on Survey Implementation in ULSIT

2.1   ULSIT Educational Profile

ULSIT is a higher education institution, which has educational capacity in the field of: Library and Information Sciences, Cultural and Historical Heritage Sciences, Social Communications, Computer Sciences and National Security. The main university units: the *Faculty of Library Studies and Cultural Heritage (FLSCH)* and the *Faculty of Information Sciences (FIS)* offer full-time, part-time and distance learning in Bachelor's, Master's and PhD program levels.

2.2   Conducting the Survey at ULSIT

In February 2015, the survey tool was translated from English to the Bulgarian language and a web page of the Bulgarian online survey at the e-platform LimeSurvey was created. The e-mail list of Bachelors, Masters and doctorate degree students - respondents from different specialties at ULSIT was prepared by the group supervisors, heads of departments, teachers and representatives of the Student Council, who were invited to clarify the purpose and the method of the survey.

The important task of the implementation of ARFIS at the ULSIT was to involve students from more specialties from the *Faculty of Library Studies and Cultural Heritage* (Bachelor's degree programs - Library Studies and Bibliography, Library and Information Management, Information Funds of Cultural Heritage, Information Resources of Tourism, Archival Science and Documentary, Print Communications, National Security; Master's degree programs – Library, Information and Cultural Management, Electronic Content - Innovation and Policy, Management of Documents and Archives, Strategic Communications and Information) and from the *Faculty of Information Sciences* (Bachelors degree programs - Information Technology, Information Brokerage, Information Security, Information Technologies in Judicial Administration, Computer Science; Masters degree programs - National Security and Cultural Heritage, National Security). The invitation to take part in an online survey "Academic Reading: print vs. electronic documents" was distributed to 350 respondents in the period from 4th March to 3rd December 2015.

The main questions of the ARFIS study were: *What are the format reading preferences of the students (print or electronic) when engaged in their academic readings?; What factors impact their preferences and behaviors?,* and *How these factors impact their behaviors?* According to the unique nature of ULSIT, we added to the objective

of the survey the following question: *Does the specialty studied at ULSIT (from FLSCH or FIS) influence the preferences and behaviors of the students' academic reading?*

The data obtained were subjected to logical verification and control and then processed through the statistical package SPSS (Statistical Package for the Social Sciences) for Windows 21.0. For specification of the psychometric characteristics of the methods and verification of the hypotheses, other statistical processing methods were also applied: descriptive statistics; correlation analysis; factor analysis; single-factor dispersion analysis.

3   Findings

3.1   Demographics

Survey responses totalled 234: 58% (n = 135) from *FLSCH*; 27% (n = 64) from *FIS* and 15% (n = 35) others, of them - 4 Ph.D. students and other respondents who marked only ULSIT. Out of 234 respondents, 80% (n = 188) were female and 20% (n = 46) were male. Most of the participants were ages 19–23 (42%). This is followed by those in the age range of 24–30 (30%) and 31–40 (19%). Nine percent of respondents were 41–50 years old. Most of the respondents, 83% (n = 195), study their Bachelors degree, followed by students studying their Masters degree 15% (n = 35), and PhD 2% (n = 4). Most of the respondents from *FLSCH* – 46.1% (n = 111) specialize in Library and Information Science, while the remaining students in History and Cultural Heritage – 7% (n = 17) and in Archival Science – 4.7% (n = 7). As to *FIS*, the most of the respondents study Information Technologies and Computer Science – 27.4% (n = 64) and 15% (n = 35) of the respondents marked "Other".

3.2   Comparative Analysis of Students' Reading Behavior

The original survey includes seventeen statements on the preferences and behaviors, as follows: *'I remember information from my course readings best when I read them from printed pages'* (Q1); *'It is more convenient to read my assigned readings electronically than to read them in print'* (Q2); *'I prefer to have all my course materials in print format (e.g. book, course reader, handouts'* (Q3); *'If an assigned reading is 7 pages or more, I prefer to read it in print'* (Q4); *'I prefer to print out my course readings rather than read them electronically'* (Q5); *'I like to make digital copies of my printed course materials'* (Q6); *'Usually, I take notes and highlight important passages in my print teaching materials'* (Q7); *'If an assigned reading is less than 7 pages, I prefer to read it electronically'* (Q8); *'I am more likely to review my course readings (after I've read them at least once) when they are in print'* (Q9); *'I prefer electronic textbooks over print textbooks'* (Q10); *'I usually highlight and annotate my electronic readings'* (Q11); *'I can focus on the material better when I read it in print'* (Q12); *'I prefer to read my course readings electronically'* (Q13); *'I prefer to read course readings which are in my native language electronically rather than print'* (Q14); *'I prefer reading foreign language material in print than electronic'*(Q15). One of the questions was aimed at gathering information on the preferences of the students by what kind of devices they

prefer to use when reading the training materials in electronic format (Q16). And the last statement of the first panel was: *'My preferred reading format, electronic or print, depends on the language of the reading'* (Q17).

All the statements required responses on a 5-point Likert scale. On Fig. 1, +2 corresponds to *Strongly Agree*; +1 to *Agree*; 0 to *Neither Agree nor Disagree*; −1 to *Disagree* and −2 to *Strongly Disagree*. Figure 1 shows the results accordingly the respondents' affiliation to *FLSCH* or *FIS*.
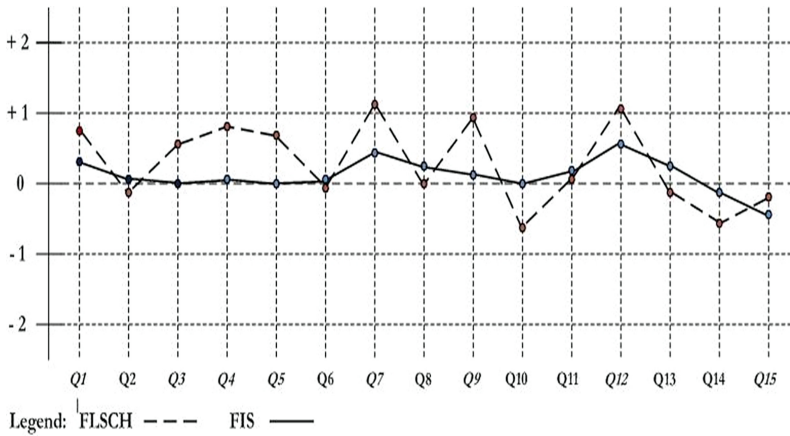
Fig. 1. Preferences and behaviors of the students from FLSCH and FIS

Most of the opinions of the respondents from ULSIT confirm their *preference for printed format of the educational materials*, as it became clear from the first study of Mizrachi among students at the University of California, Los Angeles (UCLA) [3, p. 740]. From the respondents of the ULSIT, most of the students 65.8% (n = 154) stated that they memorize information better when reading it from printed materials (Q1); 14.5% (n = 34) disagree with this opinion; those with no definitive opinion total 19.7% (n = 46) of the respondents. Among the answers to questions (Q1) and (Q2) there is a high negative correlation between the variables (r =, –47). High is the existing correlation between Q2 - preference for teaching materials in electronic format and Q5 - preference for printing those training materials received in electronic format (r =, –46). The priority use of printed educational materials is confirmed by the established very high correlation (r =, 66) between answers to questions Q1 and Q5.

The hypothesis is that *in view of the specialization course content and the methodology of training, statistically significant differences in preferences for printed or electronic format of the educational content among the students studying subjects in FLSCH or FIS was established.* This suggests that the organization and quality of the educational process at *FIS*, and the preparation of the students at this faculty corresponds more closely to the challenges and requirements surrounding the implementation of The Strategy for Effective Implementation of ICT in Education and Science of the Republic of Bulgaria (2014 to 2020).

The purpose of the current analysis is to collect data for making assessments and conclusions, with further reflection on the institutional policy and the specific improvements of the

Quality of Education Management System (QEMS) at ULSIT towards implementation of the requirements of the National Strategy.

The analysis of the results from the Academic Reading Format Study illustrates the statistically significant differences in preferences and behaviors of the students from both faculties at ULSIT. The students from *FLSCH* mostly prefer using the printed form of teaching materials, while their colleagues from *FIS* prefer using teaching materials in electronic format in many cases. *The formulated hypothesis is thus confirmed.*

The positive answers (*Agree*, *Strongly Agree*) of the respondents from *FLSCH* to the statements related to pointing out the advantages of the printing format compared to electronic format of academic materials (Q1, Q3, Q4, Q5, Q7, Q9, Q12, Q15) are prevalent. For the students from *FLSCH,* positive factors include better memorization of learning content by reading from printed materials, the possibility of taking notes, highlighting important passages, and comfort in reviewing the educational content of printed educational materials. High correlation between Q9 and Q1 - (r =, 598) was established, which shows that the students prefer studying and reviewing their lessons from printed materials. Prevalent among the respondents from *FLSCH* is also the opinion that the use of printed documents guarantees better concentration in the learning process (Q12).This fact is confirmed by data obtained from the correlation analysis between Q12 and Q1 - (r =, 663).

Data from the one dimensional distribution of the responses were confirmed through single-factor dispersion analysis - there was a significant statistical difference between the respondents from the two faculties – from *FLSCH*: (M = 1,05); from *FIS*: (M =, 053).

It was established that the students trained in the specialties at *FIS* use almost equally, printed and electronic materials for their educational purposes, and these preferences are determined by specific factors. For example, the respondents from *FIS* greatly agree with the statement that the electronic format is more convenient for reading educational materials than the printed format (Q2) (M =, 14), while the result of the students from *FLSCH* responding to the same question is (M = -, 32). The *FIS* students prefer to read in electronic form materials in a volume of less than 7 pages (M =, 25), while those from *FLSCH*, in response to the same question took in account the statistically significant difference (M =, 01). The *FIS* students tend to read e-learning content in academic disciplines and to use electronic educational materials in the Bulgarian language (Q8, Q13, Q14). The possibility of taking additional notes, annotating and highlighting when reading e-learning materials are among the factors determining their preference to a greater degree by the *FIS* students questioned.

To the greatest extent, the answers given by the respondents from *FLSCH* and *FIS* show a coincidence regarding the preference for making digital copies of the provided printed educational materials (Q6) and taking additional notes, highlighting and annotating reading of e-learning materials (Q11). But in both statements, the students from *FIS* had a more positive attitude to the electronic format.

The study established that the students from ULSIT do not prefer in general electronic textbooks compared to printed textbooks (Q10), as stated by 55.0% (n = 128) of them. Preference for electronic textbooks was expressed by 19.8% (n = 46), while 25.2% (n = 59) of the participants in the survey expressed no definite opinion. The *FLSCH* students - (M = -, 64) expressed a predominantly negative attitude towards the electronic

textbooks (Q11), while among their colleagues from *FIS* were both supporters and negatively inclined respondents - (M =, 00) regarding the use of textbooks in electronic form.

The statement that reading of printed documents predisposes to better concentration (Q12) is supported among most of the *FLSCH* respondents - 83.7% (n = 113). A statistically significant difference exists between the opinions of the respondents from the two faculties - (M = 1.05) for *FLSCH* and (M =, 53) for *FIS*.

The data received in response to the question on the preference for reading foreign language materials in print format (Q15) was interesting. A statistically significant difference exists in the opinions of the respondents from both faculties on this issue, and the printed version when using foreign language documents is preferred by students from *FLSCH* (M =, 36). Although the answers of the respondents from both faculties vary across the whole scale spectrum (from −2 to +2), the foreign language in which they were written is significantly less important as a factor of preference for the documents in electronic format, for the students from *FIS* (M = -, 30).

The favorite device of respondents for reading in electronic format (Q 16) is their laptops (70.3%), followed by their mobile phones (42.7%), desktop computers (39.4%), iPads/tablets (22.0%).

The language of the learning materials (Q 17) is not a factor when deciding between the print and digital format. This is the opinion of the most respondents at ULSIT 60% (n = 140). The language of reading documents is more important for the students from *FLSCH* (M=, 36), while for the students from *FIS*, this is not a factor of importance for their preference for document format – print or electronic (M= -, 30).

3.3   Analysis with Independent Variables

A statistically significant difference exists by gender. The female respondents definitely show a greater preference for using printed materials for educational purposes. According to data obtained from the single-factor dispersion analysis with an independent variable "*the gender of the respondent*", significant indicators were found in the various manifestations of preference for the traditional paper format. For example, when preference is given to reading in printed format when the teaching material totals more than 7 pages (F = 9,184; p =, 003); when preference is given to the printing of educational materials produced in electronic format (F = 3,416; p =, 066); when preference is given for making digital copies of the provided printed educational materials (F = 6,857; p =, 009). An especially significant statistical difference was observed in the answer to the last question by the female persons surveyed (M = -, 14) and by the male persons (M =, 35).

Findings indicate that reading preferences and behaviors differ according to the respondents' age. There is a preference for reading in electronic format by students between 19 and 30 years of age (n = 98). They tend to digitize their learning materials and prefer to read their educational content of up to 7 pages in electronic form. The respondents over the age of 30 clearly expressed their preference for printed materials (M =, 91). Interesting gradation of opinions was observed with the students from different degrees and year of study. The greatest preference for reading printed materials is given by the students from the first year of study in Bachelors degree (M =, 83). This

preference goes in a downward direction with the academic experience gathered, and with the students enrolled for Masters degree it is significantly lower (M =, 09). Students in Doctors degree to the greatest extent feel that they memorize the information better when they read printed materials (M = 1.00). This is probably due to the large volume of information that the Ph.D. students need to learn in the process of working on their doctoral theses. There is a trend that the students enrolled in Masters degree programs are to the lowest degree influenced by the form of their academic materials. They tend to use e-content and at least prefer to print the learning materials received in electronic format. A statistically significant difference, although small, was noticed in the responses given by the students in Masters degree programs in terms of digitization of the available training materials (M =, 15), compared with the views of the students in Bachelors degree (M = -, 09) . Only with the students from the Masters degree programs exists "balance" between the positive and negative responses to the statement: *I prefer to read my course readings electronically'* (M =, 00). Visually impaired students expressed their preference for the printed format of the educational content (M =, 81) and to the greatest extent disagree with the advantage of electronic over print books (M = -, 59).

In the survey questionnaire, the respondents had the opportunity to express their *opinions as free text* and those from ULSIT were very responsive. The opinions shared are a valuable resource for analysis and prove that the student community is interested in those problems. Here are highlighted some key points of student opinions. Respondents emphasize that the quality of training and concentration in the learning process is more essential in relation to the content of the teaching materials than their format. Choosing the reading format is dependent on the complexity of the text and the manner of presentation of the information. Important factors for mastering the teaching material and the process of learning is the quality of teaching and the learning methodology applied by the teachers. Arguments associated with the loss of concentration and health effects on vision were pointed out as reasons for not preferring educational materials in electronic format. The opinions expressed by the respondents as free text are diametrically different. Naturally, the advantages and disadvantages of using print or electronic educational materials were discussed. Among the advantages of electronic textbooks emphasized: the ability for easy transfer, use and repeated reproduction, protection from technical damages, ability for quick searching through the text by keyword, possibilities of hypertext, free-of-charge access, ecological attitude. The electronic format was seen as especially suitable for textbooks with tables and graphs, as well as tests. Some of the respondents state that they highlight and take notes also on the documents in electronic format. Students say that they digitize learning materials they want to keep in their personal archives for educational purposes. Among the advantages of the printed educational materials emphasized were easier note taking, ease of memorization, and repetition without requiring any technical devices or Internet connection.

4   Outcomes and Academic Policy Reflections

The findings from the Academic Reading Format Study were brought to the attention of the ULSIT's management, teaching staff and university librarians. The systematized data and conclusions were provided to all individuals and groups responsible for quality

standards design at the university: Rector; Vice Rector for Quality of Education and Accreditation and Vice Rector for Learning Activities, Deans of *FLSCH* and *FIS*; Head of Departments; Student Council, University Library.

In the period 2012–2014, in *FLSCH* the project *"Distance Education in Library and Information Science, Print Communications and Cultural Heritage"* was implemented. The teaching staff was trained to create e-learning content, electronic learning aids, work with the e-platform ILIAS and use the electronic forms of learning. Six Masters distance learning programs were developed. For two academic years effective distance learning masters were trained in "Library, Information and Cultural Management", as the only opportunity of the kind provided nationwide. The achievements of this project allowed building required capacity and institutional experience in using electronic forms of training at *FLSCH*. However, the e-learning content is created primarily for training students in Masters degree. The results of the students' reading behavior survey highlighted the need for a targeted approach for the provision of such electronic format as part of the training materials in the Bachelors degree, in response to student needs and trends towards digital transformation in the Bulgarian education.

For future interaction, an important partner could be the *University Youth Knowledge Academy,* established in 2013, based on the new educational paradigm of UNESCO, by accredited qualification to certified skills. The main tasks of the Academy are to ensure wider access to knowledge and its dissemination as a link between business and education, and to support education and the professional development of students and young scientists, as well as representatives of other universities in Bulgaria and abroad or from various institutions and business environments [4, p. 264]. The *University Youth Knowledge Academy* will be invited to organize events and trainings for teachers and students from both faculties to exchange experience and ideas, in order to find the right balance between print and digital documents needed for educational and scientific purposes at ULSIT.

Furthermore, the students' opinions regarding the choice of print or electronic format of training materials will have an effect on the individual decisions of teachers on whether to publish their works for academic and research purposes in open access, and whether they will support the institutional decision to establish an Open Access Repository at the university and to join to the Open Science movement.

The recommendations from the ARFIS survey are aimed at rethinking the shape of the educational content provided; the methodology of student teaching and assessment; acquisition policy and cooperation with the university library, as well as overall academic interaction with respect to different specialties at *FLSCH* and *FIS* towards application of ICT in the learning process and its optimization and self-study of LIS students in modern academia.

The results of the study conducted at the ULSIT on the similarities and differences in students' reading behavior and the actions taken towards optimization of the institutional policy could be interesting to the LIS international community.

References

1. Strategy for effective implementation of ICT in Education and Science of the Republic of Bulgaria (2014 to 2020). http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=904
2. Mizrachi, D., Boustany, J., Kurbanoglu, S.: Academic reading format international study: investigating the "Print or Electronic" question around the world. In: Špiranec, S., et al., (eds.) The Third European Conference on Information Literacy (ECIL): Abstracts, p. 58. Tallinn University, Tallinn (2015)
3. Mizrachi, D.: Online or print: which do students prefer? In: Kurbanoglu, S., et al. (eds.) Information Literacy: Lifelong Learning and Digital Citizenship in the 21st Century, ECIL 2014. CCIS, vol. 492, pp. 733–744. Springer, Heidelberg (2014)
4. Denchev, S., Trencheva, T.: The summer knowledge academy as a part of the University Research and Educational Environment. In: Conference Proceedings of the International Conference on the New Perspectives in Science Education, vol. 4, pp. 262–265. Liberia Universitaria (2015)

Theoretical Aspects

Toward a Theory of Information Literacy: Information Science Meets Instructional Systems Design

Delia Neuman[✉]

College of Computing and Informatics, Drexel University, Philadelphia, USA
dneuman@drexel.edu

Abstract. This paper addresses the need for a comprehensive theory of information literacy by beginning to lay the groundwork for a theory that encompasses the use of information as well as its location and evaluation. First—drawing on research and theory from two fields grounded in complementary understandings of "information" —the theory posits that information literacy and learning are strongly related because information itself is the basic building block for human learning. Second, the paper discusses the importance of knowing how the characteristics of different information formats—visual, multisensory, and digital—can be used to support different kinds of learning. The paper concludes by arguing that students and others must understand these characteristics in order to be truly information literate—that is, to use information effectively to engage in deep and meaningful learning in the information-rich environment of the 21st century.

Keywords: Theory · Information science · Instructional systems design · Learning · Affordances

1 Introduction

For at least a decade, Johnston and Webber [1] have argued that information literacy is a stand-alone discipline with its own journals, conferences, associations, and adherents. This paper supports and extends that argument by suggesting that the discipline also needs a comprehensive theory to provide the conceptual basis necessary to support its research and practice. The paper begins to lay the groundwork for such a theory—one that encompasses all three of the areas typically mentioned in definitions of information literacy: access, evaluation, and use. While a fully realized theory would have to go well beyond the ideas suggested here—including, for example, a comprehensive review of works on information literacy and learning and of more general ideas related to various aspects and varieties of pedagogy—the paper attempts to set the stage for discussions that could lead to the development of a robust theory of information literacy that can anchor the discipline and inform both its research and its practice.

"Information literacy" is defined as "the ability to locate, evaluate, and use" information [2], but discussion of the topic frequently focuses only on the "locate" and "evaluate" steps and falls short of considering information use. Arguably, examination of the "use" step is overlooked because the ways in which information is used are too numerous to master and because "information use" is generally considered the province of individual information

seekers and of professionals outside the information field—teachers, researchers, and other experts. However, while a focus on "location" and "evaluation" is understandable—especially from a practical perspective—a consideration of all three steps in the information-literacy definition is necessary for the development of a theory that can undergird the field. This paper draws on two separate but related fields—information science and instructional systems design—which share key constructs that could ground the creation of such a comprehensive theory of information literacy.

2   Information Literacy and Learning: The Foundation

T. D. Wilson's [3, 4] inclusion of a step titled "information processing and use" in his information-behavior model opened the door for information-science researchers to explore what users do with information after they find it. Neuman's [5–7] theory posits that what learners do is "process and use" information to create the new cognitive structures that result from learning. The theory posits, further, that information itself is the basic building block for all human learning—that is, for "learning" in the broadest sense rather than learning tied to any particular theoretical or pedagogical paradigm.

The connection between information literacy and learning is well established. Perhaps the most influential statement linking the two comes from the final report of the American Library Association's Presidential Committee on Information Literacy, published in 1989:

> To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. …Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning because they can always find the information needed for any task or decision at hand [2].

This definition was among the first—if not the first—to make explicit the link between information and learning. It notes the higher-order thinking skills associated with effective information use, states the importance of knowing how "knowledge is organized," and points out that the primary goal of information literacy is preparation "for lifelong learning." While discussions of information literacy and learning have expanded on these ideas over the years, this definition's integration of concepts inherent to learning with concepts essential to information use remains critical because it suggests a conceptual framework in which to examine the details of the connection between information and learning [8]. Neuman's [5–7] theory addresses those details from the perspectives of two disciplines: information science and instructional systems design.

3   The Theory: Learning with Information

Neuman's [5–7] theory was developed through an extensive examination and integration of research and theory from both information science and instructional systems design and was borne out in personal research. The field of information science, of course, has led the way in defining the first two components of learning with information—accession and evaluation. Instructional systems design, which may be unfamiliar to many readers,

offers insights about the completion of the process—using an array of concepts and techniques to organize the "found" information into useful and coherent cognitive structures. The theory's focus on understanding the importance of this "use" component was generated by Neuman's [9] finding from an extensive qualitative study of middle-school students: these 11- to 13-year-olds were able to find and evaluate information reasonably well but foundered significantly when it came to organizing and synthesizing the information successfully. Thus, while Neuman's [5–7] theory is related to information-seeking models like Eisenberg & Berkowitz's [10] "Big 6" approach and Kuhlthau, Maniotes, & Caspari's [11] work on guided inquiry, it is more comprehensive both theoretically and practically because it directly addresses the learning side of the information-and-learning equation as well as the information-seeking one.

The conceptual grounding for the theory lies in the understandings of "information" held by the two fields that the theory brings together. These understandings are not only complementary but virtually overlapping. Writing in information science, Buckland [12] notes that "information" is not a monolithic unit but simultaneously a process (the act of communication); a thing (an object that imparts information); and knowledge itself (an increase in understanding or a decrease in uncertainty). Marchionini is even more expansive in his understanding, noting that information is "anything than can change a person's knowledge," including "objects in the world, what is transferred from people or objects to a person's cognitive system, and … the components of internal knowledge in people's minds" [13, p. 5].

For instructional systems design, "information" is also multifaceted. Merrill [14, 15], one of this field's most important theorists, proposed that information consists of four types—facts, concepts, principles, and procedures—and that learning consists of three processes—remember, use, and find—applied to those types. Gagne [16, 17], another prominent theorist, identified verbal information and cognitive strategies as "learned capabilities" and included forming concepts and applying rules among his "intellectual skills." For both these seminal thinkers, "information" is both something acted on during learning and something resulting from the learning process. Like information science, instructional systems design clearly sees "information" as something that is fluid, dynamic, complex, and consisting of interrelated components.

Like both information science and instructional systems design, Neuman's [5–7] theory characterizes "information" as a network of entities and relationships that is dynamic, complex, multifaceted, and multipurpose. It is both the "stuff" that underlies the learning process and the outcome of that process. Through learning, information is transferred from the environment into human cognitive systems to become knowledge. As an active, self-directed activity by which humans make sense of the information we encounter, learning ultimately requires accessing, evaluating, and using information— just as information literacy does. Thinking of information as the building block for learning thus ties learning with information directly to information literacy. It allows us to draw on research and theory from both information science and instructional systems design to explain learning and to design strategies and activities that will support that learning as well.

4 The "Learning" Part of Information Literacy: Insights from Instructional Systems Design

Instructional systems design offers insights into how a learner might organize information successfully during the last component of information literacy—organizing "found" information into coherent and memorable cognitive structures. About seventy years of work on creating effective instructional presentations—visual, aural, multisensory, and interactive—provide research-based strategies and techniques for organizing and representing information in ways that enhance learning. Neuman's [5–7] theory holds that, by extension, these strategies provide an entrée into helping learners understand how to create cognitive structures for themselves that represent their new ideas in clear, well-integrated ways—that is, the strategies and techniques provide a way to help people learn.

Indeed, instructional systems design research has yielded extensive guidelines for using the features inherent in various information formats to support learning. Known as "affordances" [18] these features make different formats particularly useful for different kinds of learning. For example, charts and graphs have the affordance of being especially effective at displaying and supporting visual learning [19]; film and video have the affordance of being especially well suited for displaying and supporting the learning of processes [20]; and interactive materials, the affordance of being able to display and support the learning of abstract concepts in ways that no other information format can match [21]. A variety of comprehensive instructional-systems-design resources—for example, the four successive editions of the Handbook of Research on Educational Communications and Technology [22–25] sponsored by the Association for Educational Communications and Technology—present a wealth of theoretical and practical guidance for exploiting the affordances of various formats to support various kinds of learning. Understanding these affordances—and helping learners understand them—is essential to maximizing the use of various information formats in support of various kinds of learning.

5 Using the Affordances of Information Formats to Create and Support Learning

The idea of "affordances" has a long history and is more complicated to explain than to exemplify. And while there are many examples that can be used to illustrate learning with the affordances of various information formats, this paper can focus on only a few basic ideas to illustrate how learners in both formal and informal learning environments can create representations of their new knowledge that capitalize on and reinforce features inherent in that knowledge. These ideas and the strategies for their implementation in terms of information literacy are largely theoretical at present, but they offer a rich opportunity for extending the research base for the "learning" segment of the information-literacy continuum.

5.1   Learning Affordances in Formal Learning Environments

Imagine an array of "information literacy" activities designed to help students access, evaluate, and use information about climate change in order to understand it and to formulate ways to address it. One group of students—for example, younger ones—might closely follow a teacher's or librarian's guidance to find resources about recycling (as a way to save energy) that are age-appropriate and that come in various information formats—picture books, instructional videos, and websites for children. Another group—for example, students in middle or secondary school—might have more independence in finding and evaluating their own resources and might explore books that are more advanced, a wider variety of websites, and YouTube videos of the creation and management of neighborhood gardens. They might also tap the information held by local experts by asking them how they created a garden that thrives in the climate conditions in that area. Yet a third group—for example, university students—might work with almost total independence to explore articles in scientific journals, interviews with experts and activists posted on specialized blogs, and data posted on government weather-related websites in order to develop a plan to address their city's problem with micro-climates that create flash flooding in some neighborhoods. All these activities, as well as many more, require the acquisition, evaluation, and use of information to create learning and the mental and physical products that represent it.

But how does one "use" the information to create those products? The younger students mentioned above might put together a map showing recycling centers in their city. Their choice (or, more likely, their teacher's) to use a visual medium to organize and display this information capitalizes on the affordances of visual information formats—the abilities to present information simultaneously rather than sequentially, to use color and different fonts and sizes of letters to highlight and emphasize particular segments of the information, to draw on the cognitive activity that is unique to processing visual information. Thus, the importance of the map for "learning" is not its attractiveness but its organization and representation of information. The development of the map helps learners to "see" the information in a way that makes it coherent and understandable and to create and remember a visual representation that is, in itself, a cognitive structure and therefore an example of learning.

The second group might use the information gathered from its wide variety of resources to produce a video report on designing and creating a successful community garden. Following what Saloman [20] called the "filmic code" and others have called the "grammar of film," the group might use careful pacing, well-placed cuts, dramatic zooms and fades, and carefully chosen camera angles to organize the information from all these resources into an effective—and highly sophisticated—display of their learning. They might, for example, interweave videos of interviews with local experts with snippets of the processes of planting, cultivating, and weeding. Creating the report would require our learners to draw upon the affordances of a multisensory presentation—that is, the film's ability to present two kinds of information, visual and aural, simultaneously. Creating the report would also require students to draw upon the unique cognitive activity required by such presentations—the abilities to process both verbal and pictorial information, each of which embodies its own inherent structure, in tandem and to integrate them into a unified cognitive representation. Once again, the importance of the video for learning would not be its attractiveness but the way it organizes and represents information. In this case, the students' learning

would create and result in a mental model that reflects not only the concepts related to community gardens but also the processes involved in creating and maintaining one.

The third group would have a more complex and challenging task that would result in even more complex and sophisticated learning. They would have to access and evaluate the information in the journal articles, sort through and identify accurate and biased information in the videos on the blogs, and analyze and interpret the information in the statistical tables on the government websites. The unique affordances of each of these individual formats support different kinds of tasks and cognitive processing, similar to those described in the "recycling" and "community gardening" examples mentioned above. But perhaps the most interesting information-related task for this group involves the interpretation and representation of the government data.

Suppose, for example, that the students are part of a research team preparing to give a paper at a conference. They need to convey highly complex ideas quickly and simply to the city employees who must deal with the wet basements and clogged water lines that result from the flash flooding. The students download a particularly important table and, with a few clicks, transform it into a pie chart. The underlying information remains the same—20% remains 20%, of course—but the "new" information format is completely different. To create and represent the information in the most memorable way, the students have taken advantage of a primary learning affordance of interactive information formats: their ability to transform information from one kind of representation to another while maintaining the nature of the information itself [21]. While the information is now organized in a graphic rather than in lines and columns, the information itself has not changed. And what the audience will learn and remember is not just the information itself but the way the students organized and represented it—that is, audience members will create personal cognitive structures that embody abstract information in an understandable and memorable way. As ALA's definition of information literacy suggests, the students in our third group are truly information literate not only because they know how to create and represent complex information displays but because they know "how to use information in such a way that others can learn from them" [2].

5.2   Learning Affordances in Informal Learning Environments

While the importance of learning affordances is perhaps more evident in formal learning environments like those described above, such affordances can play a role in informal learning environments as well—for example, in visits to museums and music festivals, to mastering the intricacies of a hobby, and in participating in theatre. Imagine, for example, the array of "information literacy" activities that the director at a local community theatre might encounter. Perhaps her first challenge would be to find a suitable play, and so she locates and evaluates a selection of comedies and dramas she thinks are likely candidates. Here, she relies on a principal affordance of print—its stability, which allows her to read closely and carefully [20], going back and forth over the text to tease out aspects of plot and character that would fall within the range of her volunteer actors. The result of this activity might be an internal "script"—that is, a mental model that organizes and represents her initial understanding of what play to use and how to stage it. Next, she might find and consider sketches of costumes that had been worn in

earlier productions of the play she's selected, again using the stability of print to study the details in order to create a mental model of her actors in similar costumes. She might even draw her own sketches—creating a physical representation that reflects and organizes her own visual learning.

Intrigued by what she's discovered so far, our director locates a video of a televised version of the play and watches it to build her understanding of the actors' movements and speeches on the stage. Using the affordances of a multisensory presentation described above, she processes both visual and aural information to create her own "vision" of how and from where her community players might enter the stage, where they might stand to deliver key lines, the cadence and inflection they might use to deliver those lines most effectively, and so on. Again, to learn what she needs to know at this stage in her preparation, she will organize and represent the information in ways that are supported by the particular affordances of film.

Finally, concerned about the placement of the props in a particular scene and the routes the actors might take to cross from one area of the stage to another, our director uses a computer program to "block" the scene—drawing on the affordances of digital technology to manipulate these elements in 3-D space. As she moves through this exercise, she creates a number of possible "scenes" by re-positioning the various props and moving the characters through them. Each scene maintains the overall nature of the information—the totality of the scene itself—but also transforms that information by changing the way it is organized and represented. Ultimately, this transforming and re-transforming of information allows her to create a variety of mental models depicting how she might stage the scene. Then, the one she chooses to present in the theatre will be re-created and stored in her audience's mental models as well. Like our university students in the "formal learning" example above, she is truly information literate because she knows "how to use information in such a way that others can learn from [her]" [2].

5.3 Learning Affordances: So What?

These examples of the "use" component of information literacy in formal and informal environments only begin to suggest the ways in which the complementary theoretical understandings of "information" from information science and instructional systems design converge on a practical level. This convergence clearly suggests that students and others must be aware of the role of information itself as the basic building block for learning, must understand that "information" is a dynamic and multifaceted construct that encompasses a variety of formats, and must also understand how various information formats "work." All of us must be able to decode the learning affordances in information formats in order to gain the most from them and must also, in turn, know how to use the affordances as designers of our own information structures. To attain deep and complex levels of learning—to be truly information literate—we must know how to create sophisticated internal cognitive structures as well as external products that convey those structures to others.

Today's—and tomorrow's—learners must know how to learn from a vast array of information resources of varying types, quality, and coherence. To do so effectively, they must know not only how to access and evaluate information but also how to use it

in ways that enable them to derive maximum learning benefits. Understanding the nature and uses of the various affordances inherent in different information formats is especially critical in today's information-rich environment. Information objects in this environment (websites, commercial videos, games) are themselves carefully designed by experts in graphic design, film and video, game theory, etc. Such objects are not always vetted and can be—and often are—designed to misinform as well as to inform. As both sophisticated and novice learners turn to information resources produced by illegitimate sources as well as legitimate ones, they must become aware of the complex nature of information, the various cognitive processes required to understand and create it, and the affordances inherent in information formats that can support learning effectively and creatively.

6 Conclusion

As "information literacy" gains stature as a discipline in its own right, it requires a comprehensive theory to undergird its ongoing research and practice. Neuman's [5–7] theory, which encompasses using information as well as locating and evaluating it, offers an avenue toward establishing such a theory—one that is based on research and theory from two fields, information science and instructional systems design, which hold complementary understandings of "information." The theory posits that information literacy and learning are strongly related and that information itself is the basic building block for human learning. Information is, in fact, both the "stuff" that underlies the learning process and the outcome of that process. The theory also addresses the importance of understanding how the affordances of different information formats—such as visual, multisensory, and digital ones—can be used to support different kinds of learning. An important outcome of the theory is a framework for designing studies to determine how best to engage formal and informal learners in mastering the use of these affordances in order to flourish in the information-rich environment of the 21st century.

Another important outcome of the theory is the suggestion that information professionals themselves—not just teachers and other subject-matter experts—have a role to play in helping formal and informal learners master the "use" component of the information-literacy triad. As experts in the organization and representation of information, these professionals have specialized knowledge they can use to help others to understand the nature of information and the nature and role of the affordances of various information formats. Affordances, by nature and definition, are inherent features of the information in the full range of information formats—print, film and video, websites, and more—and they transcend the subject-matter content of any individual book, movie, game, etc. Only by helping students and others to understand and exploit the affordances of various information formats can information professionals fully meet their mandate to develop the full range of information-literacy skills we need in today's world.

Finally, a third important outcome of the theory is the I-LEARN model [5–7], a teaching-and-learning model that translates the theory described above into a practical approach for learning with information. The model has six stages: Identify a problem or question that can be addressed with information, Locate information relevant to the problem

or question, Evaluate that information according to a variety of criteria, Apply the information to solve the problem or answer the question, Reflect on the process and products of the information seeking and learning, and instantiate the new kNowledge in order to identify new problems or questions and start the process all over again. To date, I-LEARN has been implemented and studied in a variety of settings [26–31]. And while it is beyond the scope and intent of this paper to go into a detailed explanation of the empirical aspects of I-LEARN, it is worth noting that teachers who have used the model with students in elementary and middle school as well as in college have found it to be an effective tool. Additional work continues—to discover the best strategies for implementing the model, to understand more fully what "learning with information" means to students of various ages and developmental levels, and to explore strategies and techniques for formally integrating learning affordances into the instructional framework that the model provides.

References

1. Johnston, B., Webber, S.: As we may think: information literacy as a discipline for the information age. Res. Strat. **20**(3), 108–121 (2006)
2. American Library Association: Presidential Committee on Information Literacy: Final Report (1989). http://www.ala.org/acrl/publications/whitepapers/presidential
3. Wilson, T.D.: Models of information behavior research. J. Doc. **55**, 249–270 (1999)
4. Wilson, T.D.: On user studies and information needs. J. Doc. **37**, 3–15 (1981)
5. Neuman, D.: I-LEARN: information literacy for learners. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 111–117. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_13
6. Neuman, D.: Constructing knowledge in the 21st century: I-LEARN and using information as a tool for learning. School Libr. Med. Res. **14** (2011)
7. Neuman, D.: Learning in Information-rich Environments: I-LEARN and the Construction of Knowledge in the 21st Century. Springer, New York (2011)
8. Neuman, D.: Learning and the digital library. Libr. Trends **45**(4), 687–707 (1997)
9. Neuman, D.: Learning in an information-rich environment: preliminary results. Paper presented at the Annual Conference of the Association for Educational Communications and Technology, Dallas, TX (2002)
10. Eisenberg, M.B., Berkowitz, R.E.: Information Problem Solving: The Big Six Approach to Library and Information Skills Instruction. Ablex, Norwood (1990)
11. Kuhlthau, C.C., Maniotes, L.K., Caspari, A.K.: Guided Inquiry: Learning in the 21st Century. Libraries Unlimited, Santa Barbara (2007)
12. Buckland, M.: Information and Information Systems. Praeger, New York (1991)
13. Marchionini, G.: Information Seeking in Electronic Environments. Cambridge University Press, Cambridge (1995)
14. Merrill, M.D.: Instructional transaction theory: instructional design based on knowledge objects. In: Reigeluth, C.M. (ed.) Instructional Design -Theories and Models. Vol. II: A New Paradigm of Instructional Theory, pp. 397–424. Lawrence Erlbaum Associates, Mahwah (1999)
15. Merrill, M.D.: Component display theory. In: Reigeluth, C.M. (ed.) Instructional Design -Theories and Models, pp. 279–333. Lawrence Erlbaum Associates, Mahwah (1983)
16. Gagne, R.M.: The Conditions of Learning, 3rd edn. Holt, Rinehart, and Winston, New York (1985)

17. Gagne, R.M.: The Conditions of Learning. Holt, Rinehart, and Winston, New York (1965)
18. Norman, D.: The Design of Everyday Things. Revised and Expanded. Basic Books, New York (2013)
19. Smaldino, S.E., Lowther, D.L., Russell, J.D.: Instructional Technology and Media for Learning, 9th edn. Pearson Prentice Hall, Upper Saddle River (2008)
20. Salomon, G.: Interaction of Meaning, Cognition, and Learning: An Exploration of How Symbolic Forms Cultivate Mental Skills and Affect Knowledge Acquisition. Jossey-Bass, San Francisco (1979)
21. Kozma, R.B.: Learning with media. Rev. Educ. Res. **61**, 179–211 (1991)
22. Jonassen, D.H.: Handbook of Research on Educational Communications and Technology, 2nd edn. Lawrence Erlbaum, Mahwah (2004)
23. Jonassen, D.H.: Handbook of Research on Educational Communications and Technology. Lawrence Erlbaum, Mahwah (1996)
24. Spector, M.J., Merrill, M.D., Elen, J., Bishop, M.J.: Handbook of Research on Educational Communications and Technology, 4th edn. Springer, New York (2013)
25. Spector, M.J., Merrill, M.D., van Merrienboer, J., Driscoll, M.P.: Handbook of Research on Educational Communications and Technology, 3rd edn. Lawrence Erlbaum, Mahwah (2008)
26. Greenwell, S.: Using the I-LEARN model for information literacy instruction. J. Inf. Literacy **10**(1), 67–85 (2016)
27. Greenwell, S.: Using the I-LEARN model to design information literacy ınstruction. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 400–406. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_42
28. Lee, V.J., Grant, A.G., Neuman, D., Tecce DeCarlo, M.J.: A Collaborative I-LEARN Project with Kindergarten and Second-grade Teachers and Students at a University-assisted School, Urban Education (2016)
29. Neuman, D., Grant, A., Lee, V., Tecce DeCarlo, M.J.: Information literacy in a high-poverty urban school: an I-LEARN project. Sch. Libr. Worldwide **21**(1), 38–53 (2015)
30. Neuman, D., Lee, V.J., Tecce DeCarlo, M.J., Grant, A.: Implementing I-LEARN in a high-poverty urban school. In: Hughes-Hassell, S., Bracy, P., Rawson, C. (eds.) Libraries, Literacy, and African-American Youth: Research & Practice. Libraries Unlimited, Santa Barbara (2016)
31. DeCarlo, M.J.T., Grant, A., Lee, Vera, J., Neuman, D.: I-LEARN: helping young children become information literate. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 243–252. Springer, Heidelberg (2014). doi: 10.1007/978-3-319-14136-7_26

Open Science and the Research Information Literacy Framework

Jela Steinerová[(✉)]

Comenius University in Bratislava, Bratislava, Slovakia
`jela.steinerova@uniba.sk`

Abstract. The paper explores a possible framework for integration of concepts of open science and research information literacy. The factors of open science are identified, including relations with broader public and transparent information policies, practices, methods, data and publications. Models of digital scholarship are considered. The second part of the paper reports on results of a qualitative study of information behavior of 19 researchers in Slovakia. Semi-structured interviews and conceptual modeling were applied. Findings point to common methodological analytical procedures and differences in problem statements, data management and publishing strategies. Less awareness of open access, digital sources and publicity of research results was noted. Disciplinary differences are manifested mainly in publishing, procedures and evaluation of results. In conclusion, a resulting ecological framework of research information interactions and research information literacy based on understanding and sense making are proposed. Implications for researchers' information spaces as part of knowledge infrastructure are considered.

Keywords: Open science · Research information literacy · Information behavior of researchers · Ecological framework · Research information interactions

1 Introduction

Open science represents a challenge for information literacy research. Relationships of open science and information literacy research can be manifested in a number of dimensions, including information policies, information behavior of researchers and knowledge infrastructures in digital environment. The purpose of this paper is to explore a framework for integration of concepts of open science and research information literacy. We ask the following questions: Which factors of open science make an impact on research information literacy? How can we determine the notion of research information literacy in changing research and information processes? We will briefly report on a qualitative study of information behavior of researchers in Slovakia and present an ecological framework of research information interactions and research information literacy for open science.

2   Open Science and Open Access: Related Concepts

Open science identifies relations of the research process with the broader public based on transparent information practices, methods, data, publications and democratic access to knowledge. Digital scholarship as part of open science means transformation of scholarly processes and communications into digital environments as presented in several models [1, 2]. For example, Zuccala [3] identified the importance of relationships of researchers with public, education of public and open access to documents as the core principles of open science. The Finnish framework of Open Science (OSR) [4] presents a model of main components of open science (policies, changing working culture, working methods, services and open infrastructures, including publications, data, expertise, services). The core of open science structure is represented by the Open Access (OA) movement, especially OA to data and publications. U.K. framework for Open Science [5] and RLUK report [6] confirm new features of open science, research policies and new information needs of researchers based on changing researchers' behavior and needs for re-skilling.

Changing researchers' behavior in open science has been interpreted by a number of authors [7]. Main benefits of changing scholarly knowledge infrastructure are connected with visibility and transparency of processes and publications. On the other hand, many sociotechnical concerns of copyright, funding, information ethics or digital divide are raised. Disciplinary differences and domains make an impact on the information behavior of scholars in digital and open science, as interpreted by Talja [8], Fry [9] and others [10].

Open access movement to data, publications, learning materials and other products based on the Budapest Open Access Initiatives resulted in the EC Open Science declaration [11] emphasizing transparent access and knowledge sharing. Open Science is determined by social, technological and community dimensions. If we are to understand the information practices of open science, we need to reconceptualize the notion of research information literacy.

3   Research Information Literacy: Related Research

A new concept of information literacy in transformation of scholarly processes was presented in the ACRL Framework [12]. The emphasis is put on understanding, values and experience in contexts. Ways of learning, participation in communities and metacognitive strategies are factors that determine holistic interpretation of information literacy as strategic exploration. Costructivism and process approach are applied in order to construct meaning of information based on values and dialogue. For example, van Helvoort [13] emphasized the personal knowledge base (expertise and cognitive strategies), other authors introduced the concept of information fluency (Bawden [14]). Information fluency means understanding, critical thinking and adaptations as main drivers of intellectual activities.

A number of authors presented concepts of scholarly and research literacy [15, 16]. Based on this we can determine research information literacy as the ability to understand and use information in order to carry out research in disciplines. It is related to the broader term of scientific literacy as put by Karvalics [17, p. 128] according to the (U.S.) National Science Education Standards. Scientific literacy is the capacity to use scientific knowledge mediated

by education. It helps ask scientific questions, understand science and its impact for society [18]. Academic literacy is a narrower term connected with participation in academic culture, understanding academic values and practising academic argumentation. In open science, research information literacy is supported by digital literacy. According to Bawden and Robinson [19], digital literacy covers knowledge assembly, retrieval skills and critical thinking, understanding digital objects and digital filters, and publishing and communication in digital environments.

Researcher Development Framework [20] determined four main domains for research training and development in the U.K., i.e. knowledge and intellectual abilities (A), personal effectiveness (B), research governance and organization (C), engagement, influence and impact (D). The term "research information literacy" will be used here in the context of this framework with regard to open science factors. Several studies of academics and researchers confirm complex relationships of researchers with information environments and libraries (e.g. Webber, Johnston [21], Mc Guiness [22]) or present interesting integrative models emphasizing the domain knowledge (e.g. [23, 24]). However, not very much attention was paid to perceptions of open science. Understanding open science principles is an important part of research information literacy based on knowledge of information use patterns in academic communities. We will explore research information literacy based on our study of information behavior patterns of researchers, with regard to our past studies of methodological literacy and doctoral students [25]. Open science principles consider professional expertise, promotion of science, digital literacy, open access to data, and digital publications.

4   Study of Information Behavior of Researchers in Slovakia

4.1   Design of the Study and Methodology

In the framework of a research project on digital scholarship we carried out a qualitative study into the information behavior of 19 selected researchers in Slovakia. The main research question was focused on determination of domain differences with regard to the information behavior of researchers and their perceptions of elements of open science. We applied the methodology of semi-structured interviews. The design of the study was based on a conceptual map of the information behavior of a researcher (Fig. 1). The information process is embedded in the research process and knowledge infrastructure is based on research data, information systems, libraries and publications (as determined by Borgman [1]). External factors that make an impact on the research process include research policies, values, barriers, information ethics and evaluation metrics.

4.2   Analyses and Findings

The participants of the study included selected 19 top researchers in sciences and medicine, humanities, social sciences and computer science in Slovakia. The selection criteria of subjects were based on the expertise and excellence in the domain, international networks, use of big data, advanced technologies, visibility or unique characteristics of the disciplines. Basic background characteristics of the subjects are outlined in Table 1.

Table 1. Characteristics of the participants of the study (19 participants)

Group	Discipline [17]	Research subjects	Gender
Humanities (8)	Archaeology; Archival studies; Comparative religionistics; Literary studies; Sinology; Slovak language – linguistics; Systematic philosophy (2) [7]	Aeneolith, Bronze age; Written culture history in Slovakia; Maya culture; Slovak literature; History of China; Slavic languages, Dialectology; Logics; Pragmaticism	F (0) M (8)
Social sciences (4)	Ethnology; Economics, Statistics; Politology; Sociology [4]	Folk traditions, Social anthropology; Megatrends, Prognostics; Comparative politology, European integration; Social policy	F (4) M (0)
Sciences (5)	Astronomy, Astrophysics; Macromolecular chemistry; Molecular biology; Neurophysiology; Nuclear physics [5]	Observational astronomy; Polymers; Genetics; Autism; Space sciences	F (1) M (4)
Technical sciences (2)	Computer science (2) [1]	Information systems; Software engineering	F (1) M (1)

The 19 respondents included 13 males (68,4%) and 6 females (31,6%), the average age was 54,4 and the number of years of professional experience was 30 years. The representation of disciplines was composed of humanities (39%), sciences and medicine (28%), social sciences (22%) and technical sciences (11%). An average duration of an interview was 72 min. The interviews were carried out from October to December 2015 and from January to May 2016. The data were coded and frequencies of derived categories were interpreted. Deeper semantic analyses are going on with the use of concept modelling.
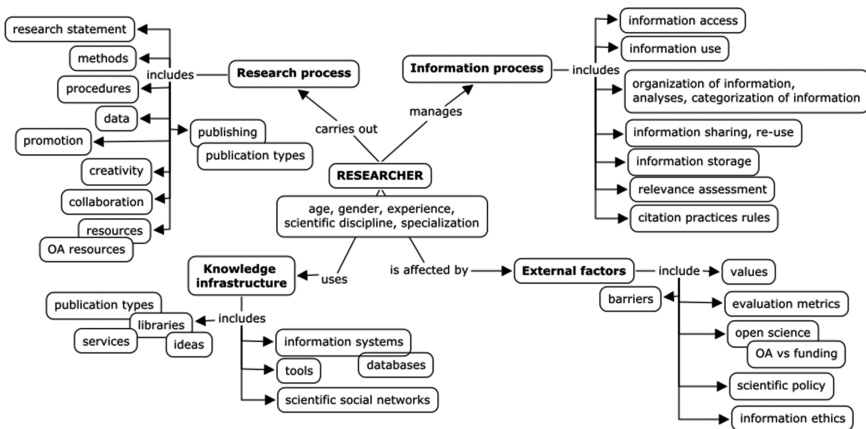
Fig. 1. Methodological design of the study (conceptual map)

First analyses point to common patterns and disciplinary differences in perceptions of knowledge infrastructure. Common patterns revealed common critical analytical information pratices (information fluency). Practical experience and expertise is manifested by reliance on authoritative information sources, personal international expert networks and the long-term domain expertise. Research statements are interdisciplinary, often reflect the sociotechnical complexity of current research practices, including the use of electronic sources and web systems and services. Data management and digital literacy are an integral part of the research process. Commonalities are also connected with expert understanding, needs of keeping up to date and peer interactions. The domain expertise is integrated with enthusiasm, deep motivation and interest. As one researcher put it: "we enjoy our work".

Open science factors were identified by researchers, especially promotion of results for broader public and open access. It is also connected with participation, collaboration, peer networking, and information sharing. Technological determination was found especially with "big data" sciences, that is, astrophysics, physics, genetics, archaeology, social sciences. In the humanities, the tendency towards building digital collections and digital libraries was noted (e.g. archival memory system PamMap, Slavic languages atlas, archaelogical photographic digital collections). Further open science factors included policies, evaluation of results, access to data and publishing. Awareness of researchers' social networks has been noted, including trends of alternative metrics.

Our understanding of differences between disciplines based on researchers' activities and the culture of disciplines has been deepened. Main differences emerged from domain-specific research objects, research statements, methodologies, procedures, data acquisition and data management. These differences are reflected in publishing activities, communication and information use patterns and culture. Methodological modes of social sciences, humanities, sciences and technical sciences were identified. It has been confirmed that in the humanities the focus is on human beings, products and cultures with the use of interpretations, description, heuristics and reconstruction. In some cases one's own experiences and emotions are activated. Researchers publish especially in conference proceedings, monographs and journals. Digital humanities are formed in contexts of cultural heritage. In the sciences the mode of problem solving and practical expertise dominated. Observation, experiment and measuring emerged as the main methods. In information behavior monitoring of selected information sources (journals) dominated. Traditions of the use of digital repositories and university networks have been strong (e.g. arXiv.org, PubMedCentral). Publications are focused on top professional journals. In the social sciences, surveys, analyses, deep categorization and interpretations were confirmed. Electronic sources and monographs are used, such as social data archives and international social and economic databases. The focus is on human and social interactions, social communities and societal development. In publishing behavior they prefer journals and proceedings. In the technical sciences, simulations, systems design and experiments prevailed. The methodological mode includes problem solving and development of new methods and systems. Electronic sources and digital libraries dominate in information use. Publishing is focused on conference proceedings and journals. The majority of researchers confirmed interdisciplinarity and mixed methodologies; those in the digital humanities and social sciences especially confirmed the need for efficient knowledge infrastructure and data management services.

5   Ecological Framework of Research Information Interactions

Based on the results of our analyses we developed an ecological framework of encapsulated research information interactions (Fig. 2) composed of three sets of factors. Factors of open science include promotion, open access and participation. Several gaps with regard to open science were identified with researchers, namely the awareness of OA potential and promotion of research results. Factors of expertise are connected with domain-specific analyses, data management, procedures, interpretations, and publishing. Methodological factors represent connected methodological research procedures based on understanding, description, exploration, explanation, prediction, and collaboration integrated by metaliteracy as expert cognitive strategies and research management.
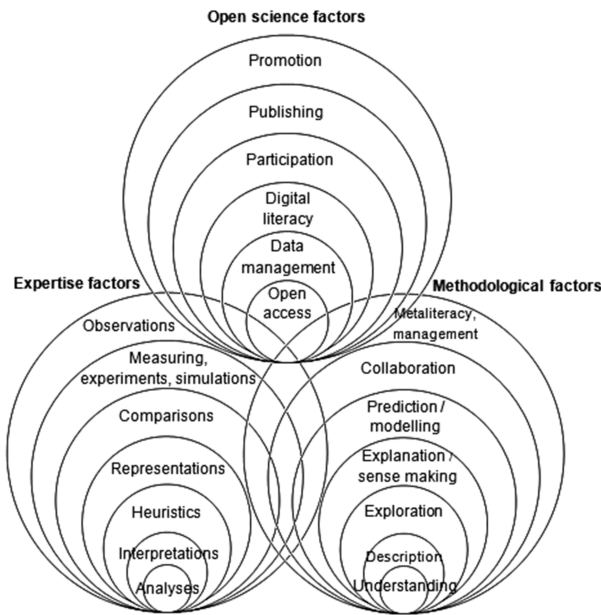
Fig. 2. Ecological framework of research information interactions

The three components of these interactions are interconnected and complementary and represent the expertise of researchers, methodological procedures, and open science perspectives. Participation in open digital spaces, scholarly social networks, open peer review, digital publishing and alternative metrics (altmetrics) enrich the traditional models of information behavior and information literacy of researchers. The proposed framework helps re-conceptualize research information literacy as a complex multilayered notion based on understanding, critical thinking and sense making encapsulated in domain expertise. Its ecological factors include information access, multiple use of data, methodologies, procedures and knowledge infrastructure integrated by creative research process. Information activities support construction of contexts, knowledge discovery,

data management, interpretations, social networking and trust. Ecological principles cover holistic cultivation of information interactions in the three components.

6   Implications for Research Information Literacy

Following the ecological information interactions framework we can determine that research information literacy is understanding based on the complementary nested ecosystem of expertise factors, methodological factors and open science factors. İntegrative metacognitive strategies guide the holistic experiences of researchers in digital information environments. Research information literacy is based on sense making and knowledge discovery integrated with motivation and research interest. Despite the limitations of the study, practical implications lead to design of value-added services and tools, sustainable research process workflows, and creative digital representations of research results. For new models of digital scholarship we propose that we pay more attention to knowledge infrastructures based on tools of data management, visual analytics, collaboratories and conceptual models. Research information literacy is considered as part of a personal knowledge base and personal information style which can lead to the development of researchers' information spaces. Therefore, requirements for education of young researchers emphasize the promotion of research, participation in digital spaces, digital literacy, data management and re-use of successful creative strategies and methodologies.

The implications for library and information professionals determine needs for new skills in support of research process, especially research data management, active research support, adapting and partnering, preservation of research data, project management and communication and promotion of research results. Analytical and methodological skills of information professionals with regard to information management are needed, such as text mining and visualizations. For building knowledge infrastructure in open and digital environments we propose to build the researchers' information spaces composed of expertise dimension, methodological dimension and open science dimension as support of information behavior and research advancement. For educators, more emphasis on digital literacy is recommended. More empowerment of academic libraries with other partners in common projects are needed.

7   Conclusions

Open science contributes to conceptual advancement of research information literacy for further generations of researchers. We determined the factors that make an impact on development of research information literacy in transformations of scholarly work into the digital environment. Several sets of factors were derived from an empirical qualitative study of information behavior of researchers in Slovakia. An ecological framework of research information interactions was developed which integrates three groups of information behavior factors, namely the expertise factors, methodological factors and open science factors. The framework was used for re-conceptualization of the research information literacy concept following trends of open science development.

Research information literacy was determined as a multilayered concept composed of domain expertise, methodological knowledge and digital skills. The framework can be useful for development of knowledge infrastructures, including systems and services which actively support researchers in information activities, communication and collaboration. Perceptions of open science and awareness of OA movement could be beneficial for building more efficient partnerships between researchers, information professionals, librarians, educators, research managers, institutions and agencies.

Further implications for libraries and information professionals point to needs of re-skilling of new information professionals in knowledge infrastructures and centers of excellence for research development. This can be reflected in education of new library and information professionals with more emphasis on analytical skills, mastering of advanced digital tools and creativity.

References

1. Borgman, C.: Big Data, Little Data, No Data. Scholarship in the Networked World. MIT Press, Cambridge (2015)
2. Chowdhury, G.G.: Sustainability of Scholarly Information. Facet Publ., London (2014)
3. Zuccala, A.: The layperson and open access. In: Cronin, B. (ed.) ARIST, vol. 43, pp. 359–396. Information Today, Medford (2009)
4. OPEN Science and Research. The Open Science and Research Handbook. The Open Science and Research Initiative, 16 p., December 2014. http://openscience.fi
5. Science as an Open Enterprise: Science Policy Report 02/2012. The Royal Society, London (2012)
6. Auckland, M.: Re-Skilling for Research. RLUK (Research Libraries UK) (2012)
7. Harnad, S.: Open access to research. Changing researcher behavior through university and funder mandates. JeDem **3**(1), 33–41 (2011)
8. Talja, S.: The domain-analytic approach to scholars' information practices. In: Theories of Information Behavior, pp. 123–127. ASIST-Information Today, Medford (2005)
9. Fry, J.: Considerations in adopting a disciplinary analysis of scholarly communication and information behaviours. In: ASIST European Workshop, pp. 63–78. Abo Univ., Abo (2013)
10. Silipigni, L., Dickey, T.J.: Towards a Profile of the Researcher of Today: What can We Learn from JISC Projects? JISC – Higher Education Founding Council for England (2009). http://www.jisc.ac.uk/
11. ALLEA Statement on Enhancement of Open Access to Scientific Publications in Europe. All European Academies (ALLEA), Berlin (2013). http://www.allea.org/Content/ALLEA/Statement_ALLEA_Open_Access_2013-11.pdf
12. ACRL Framework Information Literacy for Higher Education. ACRL 2015 Board of Directors, 1–19, 2 February 2015. http://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/infolit/Framework_ILHE.pdf
13. (Jos) van Helvoort, A.A.J.: The personal knowledge base conception of information literacy. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 31–36. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_4

14. Bawden, D.: Being fluent and keeping looking. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 13–18. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_2

15. Koltay, T., Špiranec, S., Karvalics, L.Z.: Research 2.0 and the Future of Information Literacy. Chandos, Amsterdam (2016)

16. Schneider, R.: Research data literacy. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 134–140. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_16

17. Karvalics, L.Z.: From scientific literacy to lifelong research: a social innovation approach. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 126–133. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_15

18. Vrana, R.: Promotion of scientific literacy and popularization of science with support of libraries and ınternet services. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 324–330. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_42

19. Bawden, D., Robinson, L.: Introduction to Information Science. Facet, London (2012)

20. Research Development Framework. Vitae, CRAC (Careers Research and Advisory Centre), Research Council UK (2010). http://www.researchconcordat.ac.uk/documents/concordat.pdf

21. Webber, S., Boon, S., Johnston, B.: A comparison of UK academics' conceptions of information literacy in two disciplines: english and marketing. Libr. Inf. Res. 29(93), 4–15 (2005)

22. McGuiness, C.: What faculty think-exploring the barriers to information literacy development in undergraduate education. J. Acad. Librarianship 32(6), 573–582 (2006)

23. Thompson, G.B., Lathey, J.W.: An integrated model of information literacy, based upon domain learning. Inf. Res. 18(3), paper CoLIS02 (2013). http://InformationR.net/ir/18-3/colis/paperC02.html

24. Erdelez, S., Means, T.: Measuring changes in information sharing among life science researchers. In: Knowledge Management: Nurturing Culture, Innovation and Technology, pp. 29–40 (2005)

25. Steinerová, J.: Methodological literacy of doctoral students – an emerging model. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 148–154. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_18

The End of Information Literacy (?)

Michaela Dombrovská[✉]

Charles University in Prague, Prague, Czech Republic
michaela@dombrovska.cz

Abstract. The paper, "Information Literacy as a Right and a Duty: the Experience of the Czech Republic," presented at ECIL 2014, outlined the brief history of implementing various literacies into Czech educational curricula, and uncovered three major public policy-making "waves" throughout the implementation. When considering general literacy, information literacy, and financial literacy case studies, it has been shown that information literacy in particular is failing to be adopted by the legal system, This prevents information literacy from being adopted at a national level. The current paper aims to go further in analysis of the legal system (using content analysis of laws as a method), and asks how different types of literacy are realised in law. The paper also investigates whether or not the term information literacy is even relevant and useful in the context of existing educational laws and social development (in the Czech Republic).

Keywords: Literacy · Information literacy · Education · Access to information · Citizens' rights

1 Introduction

Over the past decade, the Czech Republic has gone a long way to design, develop, test, implement, assess, and evaluate information literacy (IL) policies and best practices, mostly focusing on the higher education sector. However, IL is rarely considered by politicians, policymakers and lawmakers and, thus, IL itself generally fails to be adopted into laws or policies at a national level.

The paper *Information Literacy as a Right and a Duty: the Experience of the Czech Republic*, which was presented at ECIL 2014, outlined the brief history of implementing various literacies into Czech educational curricula. [1][1] While taking a closer look at general literacy and financial literacy case studies, three major public policy-making "waves" were found to be present in the process (and tend to be present in general):[2] First, **key actors and professionals identify the issues and challenges**, and set an agenda to address them; Second, **politicians and policymakers support the agenda as of public interest**; Third, **the whole agenda is integrated into the legal system**. Furthermore, the legal system adopts a given curriculum via the following five (simplified) progressive stages: (1) a citizen has a right to be taught a specific set of skills (a particular literacy); (2) a citizen has a duty

---

[1] http://link.springer.com/chapter/10.1007/978-3-319-14136-7_22.
[2] As it is shown in other case studies further developed in Ph.D. thesis (to be submitted).

to learn those skills; (3) the state has a duty to teach citizens those skills; (4) the state has the right to expect its citizens to learn those skills (the so-called presumption of literacy); (5) some learning-disabled citizens may require additional special care and assistance. While acknowledging that laws and legal procedures can vary from country to country, it is anticipated that the results of this research will be of interest and relevance to policymakers in other countries.

In 2015, an explanatory memorandum of Act No. 222/2015 (which changes Act No. 106/1999 Coll., on free access to information) mentioned the "assumption of computer literacy".[3] Any citizen who requests information via electronic means, such as e-mail, should receive the answer using the same electronic means. It is assumed that he or she will be capable of reading that answer. This is the first time that **an assumption of a literacy** made it into (Czech) law, and demonstrated the validity of the above-mentioned "three waves" and "five stage process" of adoption.

General literacy and financial literacy have completed all five stages within the third wave, and both were adopted by the legal system in the Czech Republic. Information literacy in the Czech Republic, however, appears to have failed to advance even to the second wave.

To uncover the cause we must study laws that include and operate with related terms. Based on content analysis of laws as a method we must ask how different types of literacies defined by professionals are realised in laws and policies. The term media literacy has been a well-developed example, because it is already present in laws and, therefore, is used in legal practice. Financial literacy is also present as a concept in several laws even though it does not appear explicitly as a term. Rather, it appears as a set of assumptions further being developed by particular policies.

IL, on the other hand, seems to have a very low appearance in law. As already stated, IL has never passed beyond the first of the three waves of adoption. To proceed to the second wave (gaining support from politicians and policymakers, and seeing IL as a matter of public interest) we need to resolve which of two potential strategies will be most effective: (1) either increase efforts to explain IL to politicians, or (2) replace IL with a more appealing term with a higher likelihood of uptake.

2   Information Literacy in Czech Laws and Policies

Information Literacy as a term has been used among Czech professionals, mostly teachers and librarians, since about 1990. The term was apparently first included in Czech public policy documents in 1999 when the *National Information Policy*[4] was published as a strategic document. IL was defined therein as one of the main priorities of national policy. The *National Information Policy for Education* soon followed (2000) and the *White paper on Education in the Czech Republic* (2001) referred to both of these information policy documents. Unfortunately, both information policy documents

---

[3] https://www.psp.cz/sqw/sbirka.sqw?cz=222&r=2015.
[4] http://www.vlada.cz/cz/clenove-vlady/historie-minulych-vlad/statni-informacni-politika---cesta-k-informacni-spolecnosti---dokument-2089/.

misused the term IL to cover computer literacy in general, which led to a widespread **misconception about the nature of IL among politicians and policymakers**.

Separate efforts by academic libraries to support IL led to teaching librarians forming the *Working group for information literacy and information education* (IVIG) within the framework of the Academic Libraries Section of the Higher Education Council of the Czech Republic. After the establishment of the Association of Libraries of Czech Universities[5] in 2003, IVIG[6] became one of its active standing committees. IVIG's necessary first step was defining the information literacy concept by consensus-building.[7] The IVIG concept of IL, first formulated in 2000, was revisited and revised in 2010. The *Information Literacy Standards of a University Student* were first established in 2004, and were later refined in 2007. A pilot survey of university students´ level of IL was carried out in 2004, and was repeated in 2005 to verify both the method and hypothesis. Finally, the *Information Education Strategy at Universities in the Czech Republic* was published in 2008. No specific strategy for implementing IL in primary and secondary level curricula exists in the Czech Republic.

While IVIG members became involved in preparing a new draft of the *National Information Policy*, in order to influence the understating of IL among politicians and policymakers, this revised policy document was neither finished nor approved by government. Instead, the *National Information and Communication Policy*[8] was approved by the government in 2004, and continued to emphasise computer literacy and the use of tools rather than focus on the understanding of content and context of information. It was followed by a strategic document on developing ICT in schools approved by the Ministry of Education (2008), which was never fully implemented.

IVIG members, together with a similar group of professionals based at Masaryk University in Brno, are now focusing on promoting IL in higher education, mostly through courses and targeted tools. Another survey of university students´ level of IL has taken place. No national policy on IL with a potential to influence educational curricula is planned.

IL appears minimally in Czech law, but only as a side issue without notable influence. IL is mentioned in Act No. 58/2000 Coll. (on the National Budget for the year 2000), presumably relating to the *National Information Policy*, and Act No. 257/2001 Coll. (on libraries). Both appearances aimed to allocate money for IL activities organized by Czech libraries. The term computer literacy is not mentioned at all in any of these appearances, but a closer look into related policies (*National Information Policy*) shows that IL was mostly understood as an ability to use ICT. It seems unfortunate that, when there was an open window for IL to become recognized by politicians and policymakers, it became confused with computer literacy.

Numerous financial scandals[9] during 2001 involved the misuse of public funds to procure what turned out to be outdated computers for schools, allegedly in the name of boosting information literacy. The fallout of these scandals was that computer and

---

[5] http://www.akvs.cz/en/.
[6] http://www.ivig.cz.
[7] http://www.ivig.cz/Understanding-IL-concept.pdf.
[8] http://www.culturenet.cz/res/data/002/000269.pdf.
[9] http://www.lupa.cz/clanky/kostlivec-internetu-do-skol-znovu-vypadl-ze-skrine/.

information literacy became tainted terms in public policy proposals. However, specific key competences related to IL remained steadfast in educational curricula. IL has never reappeared in Czech laws, while computer literacy has been mentioned in an explanatory memorandum to just one law in 2015, as mentioned above.

A new policy document, *Digital Czech (National Policy on Electronic Communication)*, approved by the government in 2012 as Government Resolution No. 582/2012, and updated by Government Resolution No. 235/2013,[10] offered a new opportunity for IL. This document advocated increasing the level of digital literacy, among other priorities, as a response to the ongoing digital revolution. It was followed by the *National Plan on Reforms* (2014), *National Educational Policy 2020* (2014; Government Resolution No. 927/2014),[11] *Action Plan on Digital Trade Development* (2015; Government Resolution No. 694/2015), and a proposal of *Strategy on Digital Literacy for 2015–2020* (June 2015; Government Resolution No. 523/2015) by the Ministry of Education. The whole agenda is due to be represented by a newly appointed State Secretary on Digital Agenda (2016),[12] who should bring attention to digital literacy, and hopefully IL, at a national level.

3   Literacies in Laws and Policies

The 2014 ECIL paper [1] was focused on general and financial literacies as case studies. Three major "waves" were identified in the process of adopting a literacy into law. Both general and financial literacies have successfully gone through all three stages of adoption into law.

The three-phased adoption of general literacy has proceeded slowly, starting as far back as the 18th century, whereas the adoption of financial literacy, in contrast, has proceeded rather quickly since its inception in 2007. General literacy is widely considered **fundamental, long-term, and non-controversial**; financial literacy is generally perceived and promoted as **an urgent response to growing debts** in Czech households.

The 2014 ECIL paper's case study of financial literacy shows, in particular, how the process of adopting a literacy into law can proceed rapidly when professionals work together to inform and persuade politicians and policymakers. [9] It also demonstrates that the adoption of an agenda by the legal system is helped if at least **two of the following three conditions** are satisfied: (1) stable or **increasing public interest** in developing the agenda; (2) existing European or **international policies** on the agenda; and (3) overall cooperation among (agenda) professionals, leading **to simple concepts and definitions** for use in public policies and laws.

Financial literacy is present as a concept, if not in name, in several laws, mostly related to consumer protection, for example, Act No. 43/2013 Coll. (on consumer credits). It is further developed by a specific policy, the *National Strategy on Financial*

---

[10] http://www.vlada.cz/assets/media-centrum/aktualne/Digitalni-Cesko-v--2-0_120320.pdf.

[11] http://www.vzdelavani2020.cz.

[12] http://m.lupa.cz/clanky/narodnim-koordinatorem-pro-digitalni-agendu-se-stava-tomas-prouza-provede-revize/.

Education [7],[13] that was prepared by professionals and approved by the government in 2010. The current government has made it a priority to follows EU and OECD policies to increase the level of financial literacy among citizens. The Ministry of Education, the Ministry of Finance, and the Ministry of Social Affairs are working together to create relevant strategies and to finance ongoing programmes.[14]

The case of media literacy[15] can also be considered well-developed because it is already present in laws and, therefore, is used in legal practice. For example, it is mentioned in Act No. 231/2001 Coll. (on TV and Radio Broadcasting). Media literacy is a mandatory part of Czech educational curricula, where it is usually mentioned as "understanding media" but includes all key competencies relevant to media literacy. The concept of media literacy in the Czech Republic does not include all competencies crucial to IL. Therefore, the inclusion of media literacy in law is not sufficient for increasing the level of IL.

IL, as mentioned above, seems to have no significant appearance in laws or national policies. It is, however, mentioned in Government Regulation No. 222/2010 Coll. as one of several competences required for different jobs in the public sector. Unfortunately, politicians and policymakers seem to view IL as being related primarily to the activities of libraries and librarians.

Digital literacy, as described in the above mentioned strategy for 2015–2020, tends to be more focused on using ICT and social media and less on understanding the content and context of information.[16] The whole agenda is supported by politicians primarily because of its relationship to digital commerce, and also due to similar agendas at European and international levels.[17] Looking again at the three conditions that help an agenda to be adopted by the legal system, we can observe that, while IL meets only the second one, digital literacy already fulfils the first two.

The **digital literacy strategy will have a major impact on which activities and tools will be financed and supported** by the public sector. This strategy, then, provides a great opportunity for IL professionals to become involved in defining what digital literacy means and **incorporate competences crucial to IL** into its agenda. Digital literacy is currently completing the second wave and its adoption by the legal system seems likely.

---

[13] http://www.mfcr.cz/en/about-ministry/financial-education.

[14] I.e. http://zivot-bez-dluhu.cz.

[15] http://medialnivychova.fsv.cuni.cz/.

[16] The strategy refers to the van Derusen, Helsper, and Eynon study of digital literacy that includes information skills. However, a closer look into priorities and actions of the strategy shows that it is focused on tools ("use of digital technologies"); see also https://www.researchgate.net/publication/267037582_Meas-
uring_Digital_skills_From_Digital_Skills_to_Tangible_Outcomes_project_report.

[17] https://ec.europa.eu/epale/nb/tags/digitalni-gramotnost; see also http://ipts.jrc.ec.europa.eu/publi-cations/pub.cfm?id=6359.

4 End of Information Literacy (?)

We now turn back to IL in relation to public information. Czech citizens have a right to access public information and the public sector has a duty to provide that information, as stated in Act No. 106/1999 Coll. (on free access to information).

The law only recognizes the presumption of computer literacy (as mentioned above), but there is no corresponding presumption of the level of information literacy. What this means is that there is no relationship between the basic level of education provided by the state to all citizen and the level of education assumed by public sector staff when answering information requests from the public. Consequently, a citizen can receive information from public sector staff that they cannot possibly hope to understand. This imbalance can be, and has been, exploited not to inform but to confuse citizens.

This, however, should not happen, since one of the most important legal principles in the Czech republic, guaranteed by the Constitution, is that the public sector can only require such duties from a citizen that are expressly listed in laws. [4, 8, 9] In the context of responding to queries from citizens, public sector staff should not be legally permitted to assume that those citizens have a higher level of education than the basic education that is mandated by law.

The legal system does not exist in isolation. It reflects the ever changing demands of the society it serves. Only increased public awareness of IL, and **public concern for citizens' right to receive information in a form that they can understand**, can force through the necessary changes at both the political and legal levels [4, 5].

IL is no longer a topic of particular interest to politicians and policymakers. This is partly because of disenchantment arising from the 2001 scandals mentioned above and partly because IL professionals are failing to explain the importance and relevance of IL convincingly. Also, digital literacy is now becoming the agenda of general importance.

Some of the key competences related to IL are already embedded in the concept of general literacy. Thus, rather than focusing on redefining IL, we could shift attention to expanding general literacy to embrace all competences of IL. As society has changed under the influence of ICT and social media, we now face, on a daily basis, different kinds and a larger amount of information than in the past. General literacy, then, must evolve to enable citizens to understand, utilise, and evaluate these new kinds and higher volumes of information. Additionally, IL professionals can cooperate with politicians, policymakers and lawmakers to ensure that digital literacy embraces not only electronic communication tools, but also the ability to understand the content and context of information being delivered.

Above all, we should aim to **express key IL competences** (no matter in which literacy concept they may be included) **in clear relation to existing national educational curricula and to every citizen's right to receive public information they are able to understand.** We will then be better positioned to advocate the complexity of language that the public sector is permitted to use when communicating with citizens, based on the level of mandatory education that those citizens can be expected to have completed. IL does not have to appear in law explicitly, but should be present as a **basic principle of understanding public information**.

5   Conclusion

The three major public policy-making "waves" are evident in the process of implementing literacies. Firstly, key actors and professionals set the agenda. Secondly, politicians and policymakers support the agenda as of public interest. Thirdly, and finally, the whole agenda is integrated in the legal system.

The Czech experience of failing to complete the third wave of adoption for IL may help IL professionals recognize that the uptake of the term IL is far less important than the uptake of the competences that the term covers and the social issues it addresses. In other words, the content of IL is far more important than the label.

If the content of IL can be separated from the current IL label, then its uptake may be more successful if it is embraced **as part of a more general literacy or upcoming special focus on digital literacy**. If we want to increase the level of IL among citizens, therefore, we may be better off abandoning the fight for Information as a separate Literacy, and re-evaluating general literacy or digital literacy as embracing the content of IL as an integral part.

We can view IL as simply an expansion of general literacy or digital literacy to accommodate the developing needs of a society influenced by ICT and social media. The question, then, is no longer what IL means, nor even how to promote IL among politicians and policymakers, but rather **whether or not our education system adequately prepares citizens to understand public information made available to them** and whether or not that information is served to citizens in a form they can comprehend.

Several areas of **follow-up research** are envisioned:

- Establishing the level to which IL competencies are embedded in existing educational policies relating to general literacy and/or digital literacy.
- Examining **the relationship between the education system and access to public information,** with a particular focus on the extent to which citizens are receiving information from public sector staff that they can be expected to comprehend with a basic level of state education.
- Although the current paper focuses on the Czech Republic, its findings may prove of interest and relevance to other countries too. Consequently, comparative research and experience sharing between countries[18] is anticipated to be a highly beneficial field of further investigation.

---

[18]   I.e. https://en.wikipedia.org/wiki/Plain_English_Campaign.

References

1. Dombrovská, M., Landová, H., Tichá, L., Zizienová, M.: Information literacy as a right and a duty: the experience of the Czech Republic. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 210–216. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_22
2. Dombrovská, M., Landová, H., Tichá, L.: Country paper: Czech Republic. In: Pejova, Z., Catts, R., Tichá, L., Dombrovska, M. (eds.) UNESCO-CEI Workshop on Information Literacy Initiatives for Central and South East European Countries. ICPE, Ljubljana (2006)
3. Horton, F.W.: Public access to government information and information literacy training as basic human rights. In: White Paper prepared for UNESCO, the U.S. National Commission on Libraries and Information Science, and the National Forum on Information Literacy, for use at the Information Literacy Meeting of Experts, Prague, The Czech Republic (2002). http://arizona.openrepository.com/arizona/bitstream/10150/105882/1/horton-fullpaper.pdf
4. Klíma, K.: Ústavní právo (Constitutional Law). Aleš Čeněk, Dobrá voda (2002). ISBN 80-86473-20-1
5. Knapp, V.: Teorie práva (Theory of Law). C.H. Beck, Praha (1998). ISBN 80-7179-028-1
6. Landová, H., Tichá, L., Dombrovská, M., Šedinová, P.: Information literacy programmes in higher education in the Czech Republic: the path of theory and practice. In: Basili, C. (ed.) Information Literacy as the Crossroad of Education and Information Policies in Europe, pp. 72–91. CNR, Rome (2008)
7. National Strategy on Financial Education, Ministry of Finance of the Czech Republic (2007/2010). http://www.psfv.cz/cs/pro-odborniky/strategicke-dokumenty
8. The Charter of Fundamental Rights and Basic Freedoms (the Constitutional Law of the Czech Republic). http://www.psp.cz/docs/laws/listina.html
9. The Constitution of the Czech Republic. http://www.psp.cz/docs/laws/constitution.html
10. Veselý, A., Nekola, M. (eds.): Analýza a tvorba veřejných politik (Analysis and Development of Public Policies). Slon, Praha (2008). ISBN 978-80-86429-75-5

Relationality Is the Key: The Family of Digital Competencies' Catalogues and Their Potential Applications

Małgorzata Kisilowska[✉], Justyna Jasiewicz, and Anna Mierzecka

Faculty of Journalism, Information and Book Studies, University of Warsaw, Warsaw, Poland
{emka,justyna.jasiewicz,anna.mierzecka}@uw.edu.pl

Abstract. The family of digital competencies' catalogues (DCCs) is being developed as a tool for diagnosis and evaluation of digital competencies of different social groups. It is built on the relativity theory and the concept of functional digital competencies. Different methodologies have been used in the project: desk research, field studies, FGIs and IDIs with experts and professionals. Three DCCs has been developed so far. The most universal DCC framework is currently being applied by the Polish Ministry of Administration and Digitization in information literacy diagnosis and education projects, as well as a benchmark for e-integration programmes within the Operational Programme Digital Poland - 3rd Axis. The other relates to the needs of the 50+ group, considering different levels of their ICT skills and the specifics of their status. The third refers to the SME sector: information competencies, needs, and professional practice of Polish entrepreneurs.

Keywords: Digital competencies' catalogue · Digital competencies · Information competencies · Information literacy · Relativity theory

1 Introduction

Although the information society has been widely accepted as a common formation of social life in developed countries, the problem of the digital divide and information illiteracy still challenges either researchers, educators, or politicians. There are many projects and programs concerning development of information and digital skills addressed to seniors, children, immigrants, unemployed, or people living in distant rural areas, aimed in enhancing their competencies as active members of a modern society. Just as the experience and knowledge of people's needs grow, it has become obvious there is no such a thing as universal training for any recipient: their skills, situations, needs or preferences differ significantly.

This observation became an incentive to change a way of perceiving information and digital literacy needs and training, and to construct the digital competencies' catalogues (DCCs). The family of DCCs is being developed as an effective tool for diagnosis and evaluation of digital (including information and media) competencies of different social groups. The article starts with theoretical background and concepts to which the

DCCs refer. Then the project in general is discussed, including methodologies used in DCCs construction processes, followed by detailed overview of each of three specific catalogues. In the conclusion the authors refer to actual and potential applications of these tools in either evaluation, education, or policy development practices.

"Information", "digital", "media" or "Internet" skills/literacy are being used synonymously in the text below, although the authors are aware that their meaning can differ in their appearance in the literature depending on broader context or aims. This project refers mostly to skills enabling effective usage of digital content for both private and professional goals.

2   Theoretical Background

Pierre Bourdieu's [1] theory of class distinction coming from unequal distribution of social, economic and cultural capital is central for the project concerning problems of digital media usage. According to this author, the range of people's competencies depended heavily on their social status. Information and digital skills have often been perceived as other types of competencies to be learned, alongside, for example, reading and writing, calculation, or professional competencies. Information literacy is defined as a set of abilities enabling individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" [2], while digital literacy is a set of skills required for information and communication technologies' (ICT) usage in different contexts. As Christine Bruce says [3], due to the rapid development of ICT, information literacy is a necessity in the increasingly complex environment. Therefore, the meaning of information literacy and digital skills, as adjacent problems of information science, requires more attention and new ways of understanding. According to Jan van Dijk [4], motivation was the main question concerning access and usage of digital media and content. It influences strongly decisions concerning purchase of hardware, software, and Internet access, learning and usage of digital technologies. Poor information skills can be another barrier, including problems with Internet searching, evaluation of information, its processing and application. Perceived ICT impact on one's life is also important. Medium- and content-related Internet skills – as seen by Alexander Van Deursen – were influenced by traditional literacy levels, but they could be seen as a tool of overcoming social inequalities [5, 6]. However, Mirosław Filiciak, Paweł Mazurek, and Katarzyna Growiec [7] found that media literacy should be perceived not as a separate group of skills, but as an added value to all other competencies. In other words, they can enhance people's functioning in different spheres of their lives, like family life, professional activity, health, finances, beliefs, leisure and entertainment, or citizen engagement. Digital skills enable more efficient usage of Internet resources. The relativity theory emphasises objective differences in information needs and behaviours within the society, related to one's social, economic, cultural, and/or educational status and perspectives. People do not have to attempt to reach a "theoretically optimal" level of digital literacy, but instead they should improve their competencies in those areas of life they find useful and reasonable. However, according to Reino Savolainen's Everyday Life Information Seeking Model

[8], a choice of information resources depended also on a relatively stable social and cultural system of customs, perceptions and evaluation. Introducing digital communication channels to people's lives may require additional effort and changing that system.

3   Research Aims and Methodology

Referring to the relativity of media usage theory mentioned above, the concept of functional digital competencies was defined. They are no longer separate types of skills. Instead – they are added to any other type of competencies, to enhance them and make them useful within a society based on digital technologies. Functional digital competencies include knowledge, skills, and attitudes concerning digital technology usage in answering current needs and obtaining measurable benefits. They are not the goal itself, but a means enabling realisation of different needs or goals. The relational approach emphasises individual needs and motivations of the users, defined in regard to the needs and benefits concerning all areas of life. Digital competencies become, then, functional digital competencies, as their purpose is not only to support ICT usage, but to enhance one's functioning in every area of his/her life.

Consequently, the process of DCCs construction was focused not only on pure digital capabilities (such as, software efficiency, online banking, buying and downloading or streaming music/films/ebooks), but on so-called benefits: the improvement resulting from applying digital skills into selected activities. In other words – benefits or goals' achievement is more important than digital literacy alone.

Three DCCs has been developed so far: the most universal "The Framework Catalogue of Digital Competencies" [9], the one adapted to the seniors' (50+) needs and competencies [10], and last, but not least – "The Catalogue of Digital Competencies of Small Enterprises" [11].

The general rule of the DCCs is a three-level construction, including: life area – benefit – and functional digital competence. It starts with recognition of significant life areas of a given social group, to which the catalogue is addressed. These key areas are usually drawn from Filiciak, Mazurek, and Growiec's categorisation of media usage and social divisions [7], and differ slightly among the following catalogues. Boundaries among areas are not rigid; some of them permeate each other. However, development of such a typology is important for methodological reasons. Specific application of media and thus precisely defined competences may vary significantly also within one area. Subsequently, inside every specified area of life the benefits were identified, potentially supporting people's activities in particular areas of ICT usage. Lastly, functional digital competencies necessary to gain given benefits were determined. Thus the catalogue has a tree structure: relevant areas of life –> benefits of digital technologies' usage –> functional digital competencies. Finally the matrix was developed, in which specific competencies are described from the broader perspective of benefits to be achieved.

However, due to the specifics and complexity of each individual's life, catalogues do not aim at completeness, but offer the most typical situations and solutions. They include competencies, not practices; that is, people with a given digital competence

should be able to perform adequate activity, but actual execution of such e-competence depends on their choice.

Although built within the same framework, each catalogue required a different methodology. The one concerning specifics of the seniors' life, developed first, was based mostly on concept work and desk research, as plenty of surveys and trainings concerning either general population or seniors' digital, information, ICT or media competencies have been conducted and presented in literature so far. The Framework Catalogue referred to earlier models and literature [4–6, 12], as well as experiences gained from previous works. The DCC for small and medium enterprises (SME) sector was developed with a mixed methodology, presented in detail in the following Sect. 4.3.

4   The Family of Digital Competencies Catalogues

The general idea of a top-to-bottom construction, referred to the relativity theory at the beginning and deepened knowledge of specific life areas of either individuals or groups (like entrepreneurs), make strong foundations for finding and naming digital competencies enhancing particular skills. The DCCs refer to two main assumptions: (1) IT skills excluded from the core body of the catalogue, as mostly technological, fundamental skills concerning hardware, software and Internet usage, and preliminary, essential condition of learning digital or information competencies [9]; (2) information literacy, as defined by American Library Association in 1989 [2], and information problem solving skills, as defined, for instance, in Eisenberg's and Berkowitz's the Big6 Skills Model [12], developed in 1990, make another basis for effective functional, digital skills, applicable in a given environment.

4.1   The Framework Catalogue of Digital Competencies (FCDC)

The purpose of The Framework Catalogue of Digital Competences was to create a tool that would allow both: to evaluate digital skills of adult ICT users, and design various kinds of e-inclusion activities, such as trainings, e-learning or blended learning courses. Authors aimed at creation of a framework "which will be the point of reference for activities aimed at ensuring and increasing the digital competences" [9, p. 2].

Theoretical background of that work was a study of social inequalities and use of media [7]. The Framework Catalogue should not be treated as a list of mandatory or necessary competences for all citizens. Instead, it defines the area of the most important competences, which may be the point of reference for individual people wishing to increase their competences, trainers and educators teaching others or organizations planning activities for development of digital competences.

At the same time, authors were aware that people have different needs and priorities that influence use of mass and digital media. Therefore, one of the main assumptions was the connection between digital competences and the users' needs and the benefits they may gain in key areas of their lives.

The Framework Catalogue of Digital Competences was ordered by the Ministry of Administration and Digitization (now: Ministry of Digitization). The Delphi method

Table 1. Key areas of life and benefits as defined in the FCDC.

The framework catalogue of digital competences	
Key area of life	Benefits
1: Work and professional development	I find a job
	I increase my professional qualifications
	I take care of my career
	I establish and conduct a business
	I hire employees
	I work more effectively, comfortably, faster
2: Relationship with relatives	I perform my parental duties
	I maintain social relations
	I protect privacy
	I manage my image and information about me
3: Education	I gain new qualifications
	I learn via the Internet
	I create educational resources and share them with others
4: Leisure and hobby	I fill free time with content
	I develop my hobby
	I protect my personal development
5: Health	I have a healthy lifestyle
	I use the health care system
	I obtain information and health self-care
	I take care of the health of people I look out for (children, elderly, sick with disabilities)
6: Finance	I manage my finances
	I buy cheaper
	I earn online
7: Religion and spiritual needs	I satisfy spiritual/religious needs
8: Everyday issues	I handle official matters without leaving the house
	I do online shopping
	I plan commutes and travels
9: Civil commitment	I gain knowledge about the community, the country, and the world
	I participate in civil life
	I participate in political life

was applied to the FCDC development process, including field experts: researchers and trainers. During the preparatory phase eight key areas of life were defined (see: Table 1).

These areas were defined according to the theoretical background [4–6] and research outcomes of Filiciak et al. [7], as well as previous experiences gained during work on the catalogue of competences of seniors [10]. Within every specified area, benefits that can be achieved through digital technologies usage were identified. Lastly, digital

competences necessary to gain a given benefit were determined. A more detailed, practical description of each competence was developed as well, including, for example, precise skills or even tools or applications recommended for potential use.

The Framework Catalogue of Digital Competences was reviewed by a wide range of specialists and organizations engaged in the area of digital education. Finally, it was implemented as a reference document for the Operational Programme Digital Poland for 2014–2020, in Priority axis III: Digital competences of the society. Thanks to that, all the initiatives financed within the Programme will be obliged to include the relational model of digital skills and therefore encourage people affected with digital exclusion to incorporate digital technologies in those areas of life that are important to them in particular.

4.2 The Taxonomy and Measurement Methodology of Digital Competencies of People Aged 50+

The main goal of this catalogue was to prepare a tool for evaluation and training of digital competencies of seniors, considering that there are huge disparities within the group of people aged 50+, including either the oldest, retired, or those achieving their major professional successes, both grandparents caring for their grandchildren, individual travelers enjoying their retirement, the sick or disabled, in poor and quite well financial situations. Therefore, the authors tried to find common key areas, and, as a next step, to name competencies which may differ according to individual predispositions and/or circumstances [10, p. 87] (see: Table 2). The list is very similar to the one in the FCDC, with professional and personal development joined together, social instead of family relations, and education excluded (as limited to formal education systems).

Extracting these areas, the authors referred also to the concept of M. Powell Lawton's and Elaine M. Brody's Instrumental Activities of Daily Living (IADLs) [13], including activities of either private or public and professional life, like: finances, shopping, communication (including telephoning), travelling, housekeeping, medication adherence, using technologies at work, using transport means. Aids, in particular, e-aids for activities of daily living [14, 15], also provided an important hint in discussing both key life areas and digital competencies. A crucial condition is for the seniors to understand the necessity, validity, and reasons for introducing digital solutions into their lives.

People aged 50+ are the largest social group digitally excluded, requiring e-integration, and, though beneficiaries of different e-training initiatives, their professional aspirations weaken, along with an increase in psychological needs of acceptance and well-being. Their learning capabilities differ, so teaching effects increase if realised more as an intergenerational exchange of knowledge, experience, and attitudes. This specific was also observed in the DCCs development process.

Functional digital competencies can be defined in a more detailed way on a basic or advanced level. Practical examples of these competencies concerning Key Area 3: social relations, and the benefit "I maintain social relations", include:

- I can meet new people on the Internet - using service functionalities, protecting own privacy and security;

Table 2. Key areas of life and benefits as defined in the DCC for people 50+.

The taxonomy and measurement methodology of digital competencies of people aged 50+	
Key area of life	Benefits
1: Professional and personal development	I find a job
	I increase my professional qualifications
	I take care of my career
	I take care of my personal development
2: Leisure and hobby	I fill free time with content
	I develop my hobby
3: Social relations	I maintain social relations
	I protect privacy
	I manage my image and information about me
4: Everyday issues	I handle official matters without leaving the house
	I do online shopping
	I plan commutes and travels
5: Health	I have a healthy lifestyle
	I use the health care system
	I obtain information and health self-care
6: Civil commitment	I gain knowledge about the community the country, and the world
	I participate in civil life
	I participate in political life
6: Finance	I manage my finances
	I buy cheaper
	I earn online
7: Religion and spiritual needs	I satisfy spiritual/religious needs

- I can receive, read, and answer mails and news, adequately to the needs;
- I can use functionalities of communication services (finding people, running conversation).

4.3   The Catalogue of Digital Competencies of Small Enterprises

The idea of DCC for SME sector came with the initiative of Google Poland to support development and/or enhancement of digital tools usage in the Polish SMEs. The research was conducted and related to Polish local conditions, although the results seem to be representative of a more general (international) perspective. The DCC for SME sector was developed with mixed methodology, including: (a) desk research limited to ICT usage within the SME sector (as digital literacy within the SME sector turned out to be unknown or poorly investigated), (b) field studies, (c) focus group interviews (FGI) with experts, and (d) individual in-depth interviews (IDI) with both experts and entrepreneurs. All the participants were asked about their experiences, perceived and/or actual benefits and barriers in ICT application regarding specifics of their area. This DCC

Table 3. Key areas of business activity and benefits as defined in the DCC for SME.

The catalogue of digital competencies of small enterprises	
Key area of business activity	Benefits
1: Sales	Presenting products or services for the purposes of sales
	Performing financial transactions
	Supporting sales of products or services
	Having access to sales data
2: Communication and promotion	Online visibility and searchability
	Communicating with potential customers
	Conducting promotional activities
3: Customers	Gathering customer data
	Building customer loyalty
	Establishing and maintaining relations with customers
	Analyzing customer feedback
4: Product or services	Service or product manufacturing support
	Creating service or product database
	Determining the range of offered products or services
5: Market and competition	Gathering market data
	Knowing the industry in which the company operates
	Knowing the competition's offerings
6: Company management	Managing company documentation
	Team management and working with contractors
	Communicating with the team and contractors
	Managing company finances
	Monitoring human and material resources of the company

required not only development of sets of competencies enabling achievement of particular benefits, but also general areas of SMEs' activities.

Desk research included analysis of existing classifications of business entities according to the type of economic activity (process of production), as the benefits resulting from digital skills' application depend strongly on that variable. That enabled distinguishing of six key areas where SMEs can operate online: (1) sales, communication and promotion, (2) products or services, (3) customers, market and competition, and (4) company management. Another crucial sort of typology is based on the level of the company's digitalisation. The 5-degree scale was prepared, describing to what extent the company is "Web-embedded": (1) completely digitalised company – the core of business is based on digital solutions – programming, IT services, remote access services; (2) mainly digitalised company – business implies significant usage of Web network and taking considerable

advantage of its resources; (3) half-digitalised company – with some types of operations realised on the Web; (4) partially digitalised company – digital solutions are applied to single tools only; (5) minimally digitalised company – with activity based on handicrafts or manufacturing, digital competence is not necessary to maintain operations. These two typologies were evaluated and validated in focus group interviews with experts.

In the next step, the sample of SME sector was selected, including enterprises representative of all categories of the matrix developed on these typologies (six key areas of business and five levels of digitalisation).

Thirty in-depth interviews were conducted to determine the entrepreneurs' beliefs, attitudes, experiences, and plans concerning the company's management and its potential digitalisation, as well as perceived and/or actual benefits and barriers in ICT application in particular areas of business activity. The IDIs' results formed the basis of the DDC for SME. As the six key areas within small businesses listed above could operate online, they were used as main categories to relate the entrepreneurs' everyday needs to digital competences (see: Table 3).

The DCC for SME has a tree structure analogous to catalogues described above. It starts with key areas of SME activity; then come benefits to be reached, and digital competencies on the level third. The latter refers to knowledge and practical skills indispensable for achievement of these benefits. The catalogue offers mostly (but is not limited to) intangible and/or functional benefits, it can also be examined regarding potential measurable, financial results. Moreover, three main meta-benefits have been discovered after IDIs: saving time, saving money, and generating profit.

The project's product will be used to develop tutorials explaining how digital solutions can improve SMEs activities. The DCC can obviously be applied to education and training.

5   Conclusions

The concept of functional digital competencies has been verified as a reliable tool in evaluating and/or developing digital skills of people with different social and/or professional backgrounds. A common framework for developing DCCs has been proved as applicable in different contexts. The FCDC is currently being applied by the Polish Ministry of Digitization in information literacy diagnosis and education projects. The DCC for SME is going to be applied as a tutorial or educational material in Google Poland education activities. Both the relativity theory and the concept of DCCs' construction were verified in practice as useful and applicable in defining digital competencies as a means of enhancement of key areas of life for different social entities. The relativity theory changes the way of thinking about digital literacy as a set of skills enhancing different spheres of life, not as a separate competence. The concept of functional digital competencies was found to be flexible and applicable in different contexts and to specific needs. The CDCs dedicated for different groups seem to be effective tools of education, as people are more willing to learn skills they find useful in their everyday lives. Finally, the following recommendations can be offered as important findings of the project. (1) Catalogues should be revised regularly, due to permanent changes of virtual environments, as well as people's needs and competencies. It

refers mostly to the last levels of their structure. (2) Development of each catalogue requires in-depth analysis of a target group, and includes its sociological characteristics, and behaviour patterns. (3) Last but not least, any practical implementation of such a tool requires evaluation for further improvements.

References

1. Bourdieu, P.: Distinction: A Social Critique of the Judgement of Taste. Routledge, London (2010)
2. Information Literacy Competency Standards for Higher Education. American Library Association (2000). http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/standards.pdf
3. Bruce, C.: Information literacy as a catalyst for educational change. A background paper. In: Danaher, P.A. (ed.) The 3rd International Lifelong Learning Conference Proceedings "Lifelong Learning: Whose Responsibility and What is Your Contribution?", Yeppoon, pp. 8–19 (2004). http://eprints.qut.edu.au/4977/1/4977_1.pdf
4. Van Dijk, J.: The Deepening Divide: Inequality in the Information Society. Sage Publications, Thousand Oaks (2005)
5. Van Deursen, A.J.A.M., Helsper, E.J., Eynon, R.: Measuring Digital Skills. From Digital Skills to Tangible Outcomes Project Report. Oxford (2014). http://www.oii.ox.ac.uk/publications/Measuring_Digital_Skills.pdf
6. Van Deursen, A.J.A.M., Van Dijk, J.A.G.M.: Toward a multifaceted model of internet access for understanding digital divides: an empirical investigation. Inf. Soc. **31**(5), 379–391 (2015)
7. Filiciak, M., et al.: The Use of Media and Social Divisions. Centrum Cyfrowe, Warszawa (2013). http://ngoteka.pl/bitstream/handle/item/215/the_use_of_media_and_social_divisions.pdf?sequence=6
8. Savolainen, R.: Everyday life information seeking: approaching information seeking in the context of "Way of Life". Libr. Inf. Sci. Res. **17**(3), 259–294 (1995)
9. Jasiewicz, J., et al.: The Framework Catalogue of Digital Competencies. Ministry of Administration and Digitization, Warszawa (2015). https://mc.gov.pl/files/ramowy_katalog_kompetencji_cyfrowych_final_ang_jj_2.pdf
10. Tarkowski, A., et al.: Taksonomia Funkcjonalnych Kompetencji Cyfrowych oraz Metodologia Pomiaru Poziomu Funkcjonalnych Kompetencji Cyfrowych Osób z Pokolenia 50+. Stowarzyszenie "Miasta w Internecie", Warszawa (2015). https://depot.ceon.pl/bitstream/handle/123456789/8309/taksonomia_funkcjonalnych_kompetencji_cyfrowych.pdf?sequence=1&isAllowed=y
11. Buchner, A., Zaniewska, K.: Katalog Kompetencji Cyfrowych Małych Firm. Centrum Cyfrowe, Warszawa (2016). http://centrumcyfrowe.pl/wp-content/uploads/2016/03/IR-katalog-kompetencji.pdf
12. Big6 Skills Model. http://big6.com/
13. Lawton, M.P., Brody, E.M.: Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist **3**(1), 179–186 (1969)
14. Miskelly, F.G.: Assistive technology in elderly care. Age Ageing **30**(6), 455–458 (2001)
15. Roley, S., et al.: Occupational therapy practice framework: domain & process. Am. J. Occup. Ther. **62**(6), 625–683 (2008). 2nd Edition

Information Literacy Competencies as Part of Content Curation

Terttu Kortelainen[✉]

Faculty of Humanities, Information Studies, University of Oulu, Oulu, Finland
terttu.kortelainen@oulu.fi

Abstract. The meaning of curation has been connected to art and historical museums but, in the web context, it is also connected to information or content that can have many forms such as text, pictures, video, or music. Content curation is not a new phenomenon, although the term has not been used for a long time, and appears more often in short articles or web pages than in research papers. It has links to several professions and information literacy. The purpose of this paper is to study as to what degree the elements of information literacy can be found in the definitions of content or information curation. The study is based on 18 articles and 12 web pages concerning information or content curation. In the results, elements of information literacy, consisting of the information need, searching and finding information, evaluating it, incorporating into one's knowledge base, and using it ethically and legally are present in the definitions of content curation, although some of them implicitly, and they are described by many different terms. Although the elements of information literacy would be present in the definitions, references to information literacy literature are rare. The definitions also include elements outside the traditional definitions of information literacy. The results imply to the relevance of information literacy skills and importance of information literacy education in many different fields. Information or content curation have been proposed as future career opportunities for information professionals.

Keywords: Information curation · Content curation · Information literacy

1 Introduction

In art and historical museums, curation means organizing exhibitions of concrete artefacts representing a specific theme, while content curation mostly happens on the web. According to Herther [1], the term "content curation" was apparently first used in 2009. It means collecting content – not creating it - from various sources and disseminating it in an organized fashion. The results of content curation can appear in the form of RSS feeds, links posted on blogs, social media feeds, an online news mashup [2], or a newsletter, and nowadays there are also special platforms for this purpose, such as Scoop.it [3] and Curata [4]. Content curation is purposeful [5, 6], continuous [1, 7] and contains a human element [8]. Information or content curation encompasses several competencies familiar to information professionals such as information searching and evaluation, and sharing it [9–11].

A curator needs to be aware of the interests of his or her target audience [9–11] and helps to solve the information flood problem of the Internet [10–12]. More than just resending previously published material, curator retells a story in a personalized way. It has added value and includes a human element [8, 10, 13]. Producing and sharing content can contribute to building trust with the target audience of, for example, a company [14]. A content curator manifesto [15] defines curators as people whose job is not to create more content, but to make sense of all the content that others are creating, to find the best possible relevant content and bring it forward and, in doing so, save the readers' time [11]. Content can be text, images, or videos originating from elsewhere [16]. Mihailidis [17] describes curation as a "foundational competency for information consumers, sharers and creators".

Several of the above mentioned competencies are among the elements of information literacy that has been defined by the Association of College and Research Libraries [18] as the abilities to

- determine the extent of information needed,
- access the needed information effectively and efficiently,
- evaluate information and its sources critically,
- incorporate selected information into one's knowledge base,
- use information effectively to accomplish a specific purpose and
- understand the economic, legal and social issues surrounding the use of information, and access and use information ethically and legally [18].

The framework for information literacy for higher education [19] states that authority is constructed and contextual, reflecting the creators' credibility and expertise, and is evaluated based on the context in which the information is used. Information also has several dimensions of value, as a commodity and as a means of education or influencing. Moreover, the framework [19] emphasises that the production and dissemination of information are influenced by legal and socioeconomic interests.

Content curation is linked to information professions [20], education [6, 21] knowledge management, marketing [22, 23], journalism [24], and staff development [1], while it can also have a role in social movements [25]. In the field of marketing, content curation can contribute to the creation of trust and, according to Desphande [22], it can have an effect on search engine optimization. Curation also indicates the curator's attention to the curated content, creating web attention data [26, 27] on which altmetric research is based [28].

In previous literature, Faure [23] has combined curation with knowledge management and information literacy. He describes the sharing of information concerning immunology by the Scoop.it curation tool. Mihailidis [17] sees content curation as a way to teach information literacy. He has studied curation through a survey to make out sources and social media platforms applied by students in their content curation, conducted as part of their university education.

Information literacy can be considered as a relevant and important competency for a curator. If the task of a curator is to search and find information from various sources and to present it on his or her web page, blog, or curation platform and, if he or she is advised, to display only the best, most relevant content [2], the curator no doubt needs

the ability to evaluate its reliability. Moreover, it is important to identify the information needs of the targeted audience to concentrate on relevant information.

The purpose of this paper is to enhance the understanding of the elements of content curation. The research question I posed in this study is: What elements of information literacy are present in the definitions of information or content curation in articles and on relevant web sites?

2   Research Materials and Methods

My research is based on the content analysis of research articles I retrieved from three scientific databases: ERIC, representing educational research; LISTA, representing information science; and Communication & Mass Media Complete, representing communication sciences. I searched the databases by using keywords "content or information" and curation, limiting the search to the title field of the record, and curation alone, limited to the title field. The search results were: ERIC: 24 articles; Communication & Mass Media Complete: 23 articles; and LISTA: 222 articles. To be included in this study, articles had to be published in English and concern information or content curation. I excluded articles concerning data curation, archiving, digital storage or preservation and articles concentrating merely on curation tools. Also, I excluded book reviews. Forty-six articles fulfilled these requirements and I was able to locate copies of 18. My research was limited to the search results of three databases and receiving only 18 of the articles. However, the databases represent many fields of social sciences and searching the databases showed that content or information curation have not yet been widely studied. Moreover, the 18 articles I located, produced a multifaceted view to the concept of information or content curation.

I used the Ulrichsweb Global Serials Directory database [30] in order to study the fields of research represented by the articles in the research material, to determine the scholarly fields represented by the publishing journals.

Because content curation is much more frequently present on the web than in scientific databases, I directed another search to the world wide web using key words "content or information curation". I found the former more than 1.2 million times and the latter, 8.2 million times (May 3rd, 2016). Although the search would have concerned information curation, it mostly included web pages concerning content curation. In this research I considered these phrases as synonyms. Because I focused this study on the definitions of content curation, I left websites concentrating merely on tools for content curation out of the analysis. I chose twelve websites on the basis of their focus on the nature of content curation.

I conducted the research by theory guided content analysis. This involved studying elements of the definitions by comparing them to the definition of information literacy [18] and its framework for higher education [19], the elements of which were used as criteria for a qualitative content analysis. However, I also took into account other elements present in the research material. I considered these elements of information literacy: defining the information need, searching and finding information, evaluating it, incorporating into one's knowledge base, and using it ethically and legally [18]. I also described the terms incorporated into the definitions of content curation by a

Wordle (2014) tool [29]. A larger research material would perhaps represent a wider selection of definitions of content curation. Therefore the limitation of my research is that it was based on eighteen articles and twelve websites because there are not very many published articles on the definition of content curation. The research material, nevertheless, includes varying ways to define the concept, and also reached saturation.

3   Results

Content curation has been widely present on the Web, especially since 2015, although there were earlier articles both on the Web and indexed in databases. However, fewer research articles were published on this topic.

Table 1 lists the journals in which research articles on content curation were published along with subject classification given to the journals by the Ulrichsweb Global Serials Directory database [30]. If the database specified more than one field for a journal, I took the first one into account in the column labeled, "Articles", and the second field was mentioned in the last column. The most often mentioned field was computers; this field was mentioned four times, often in combination with the field, internet. Sociology and library and information sciences were both represented by three articles. As a whole, Table 1 shows that articles concerning content curation are scattered among several different fields.

Table 1. Fields represented by the journals.

Field	Articles	Field mentioned as second in UGSD subject classification
Business and economics	2	1
Communication		2
Computer applications	1	1
Computers	4	
Education	2	1
Information science and information theory		1
Internet		3
Journalism	2	
Library and information sciences	3	
Management		3
Publishing and book trade	1	
Sociology	3	

Figure 1 presents words mentioned in the definitions of content or information curation in the articles and web sites of the research material. The largest words represent those mentioned most often in the research material. They are connected to finding and collecting material, selecting, organising, presenting, and sharing it. The definitions in both articles and on Web sites described the elements of curation by

many synonyms. Consequently, for example, adding value, contextualization and personalization are shown in small letters, although the phenomena were rather often mentioned in the material but were described by several different terms.

Fig. 1. Words contained in the definitions of content or information curation

The first step in the actions described in the definition of information literacy [18] is determining the extent of information need. The absence of this step in this word cloud on information curation is striking. However, in the definitions, curation is said to be purposeful. The resulting content should correspond to the interests of the audience, implying that selection of the topic and information need are in the background. Moreover, in Jorg's [32] list of the four things you had to know about content curation, the first one is: "you have to determine which the key topics are for you", while in Desphande's [22] list the first item was: define your objectives.

The second element of information literacy defined by the ACRL [18], accessing the required information effectively and efficiently, was clearly present in Fig. 1. In the research material, it has been described as finding, collecting, searching, assembling, locating, identifying, discovering, and gathering. Kumar [31] recommended the searcher to vary sources, not using continuously the same source, as did ACRL [19].

The critical evaluation of information and its sources [18] is clearly present in the research material. Evaluation has been described by the words filter, sift, select, reject, assess, analyse, critique, evaluate, judge, and choose. According to Jorg [32], content should be relevant, reliable, trustworthy, accurate, timely, and have high quality, and it should elevate the curator's brand. In Desphande's [22] description, the content should be relevant, credible, diverse, validating, and unique. Antonio and Tuffley [5] studied curation in the higher educational context. Students were asked to curate digital content

for the research component of an assessment task. They were required to create a Scoop.it presentation on a particular area of technology and curate content that would assist in essay-writing. Fifty-three percent of 258 participants felt that the primary benefit of using the digital curation tool was assessing the value of the curated Web content [5].

Incorporating selected information into one's knowledge base [18] is implied by words such as preserve, pull together, arrange, manage, and organise. However, in curation, this is not enough. Simultaneously, the information must also be used effectively to accomplish a specific purpose [18]. Jorg [32] recommended adding to the content the curator's educated perspective, comments or anecdotes, which are the keys to separating curation from simple aggregation. In this respect, in an educational context, Deschaine and Sharma [6] used the term conceptualization. It required a professor to reorganize teaching items and materials so that they can be repurposed and linkages can be made between different items, so that "new truths can not only be identified, but also exemplified". In the research material, this phase was represented by the following terms: add something new, add value, add one's own perspective, articulate new meanings, conceptualise, give meaning, highlight, personalize, customize, contextualize, make sense, present, promote, represent, synthesise, take care, use content, comment, and repurpose. This may incorporate the development of the curator's own authoritative voice in a particular area [19].

Understanding the economic, legal, and social issues surrounding the use of information, and accessing and using information ethically and legally [18] are represented in the research material as attributing, crediting or mentioning sources or linking to a source. A curator not only receives value from the curated information, but also pays attention to it, sometimes providing highly valued attention data. A mention on a curating platform, a blog or elsewhere on Social Media has a meaning for the original author similar to that afforded by citations in scientific articles. It produces attention data on which altmetric research is based, and the use of which is rapidly growing. The importance of crediting sources is emphasised by most authors (for example Jorg [32]). Not giving credit to sources can lead to failures in content curation [2]. To support curators to credit their sources, Curator's code [33] and a bookmarklet have been developed for this purpose, although these may not yet be in general use.

According to ACRL [19], learners developing their information literate skills simultaneously develop their own authoritative voices in a particular area. Information has several dimensions of value, as a commodity and as a means of education or influencing [19], also originating from the aim of developing trust [14] in the eligible audience. The value of information in marketing appears in publications where content curation has been described as the most accessible form of content marketing [31, 32], the difference between which two is that content curation does not mean generating content, but, instead, amassing it from a variety of sources [2]. All of this emphasises the importance of the evaluation, accuracy and quality of the information a curator is sharing.

In the definitions of content curation often the last or second last item is circulating, sharing, or disseminating. Usually this happens by social media tools [2], by a dedicated site, a newsletter [22, 32] to which Kumar [31] and Taylor [7] add e-mail. The interests of the audience are the purpose of content curation, whether it is connected to

marketing, knowledge management or education, and therefore disseminating the results is an organic part of the process.

Some definitions mentioned evaluation of the curation process as the last element of content curation. It is called analyzing [22] or measuring one's success [32]. It appeared mostly on Web sites and was connected to the field of marketing. Other terms not suitable to the above categorization of information literacy, but included in the research material, were arranging, cataloguing, grouping, healing, preserving and creating. Arranging, cataloguing, preserving and grouping could perhaps have been added to categories of finding and evaluating information. Healing and creating could be part of adding value or personalizing, the category which implied creating one's own personal view to the found information and that differs curation from aggregating.

Finding and sharing information were mentioned by almost every source, followed by selection. Being aware of the audience's interests and adding value or personalizing the content was mostly emphasized on definitions published on the Web sites. The evaluation or analysis of the sources was explicitly mentioned in articles, while on websites it was more often present implicitly in mentions of high quality content. Web sources mostly regarded curation as a tool for marketing, but it was also used for knowledge management, and to teach students information literacy.

4   Conclusions

Content curation is part of the work of teachers, journalists, knowledge managers, marketing people, staff educators, information professionals and contributes also to social activities. Competencies necessary for a curator are identifying the interests or information need of the target audience, searching and finding relevant, often new, information, evaluating its relevancy and reliability, personalizing it or adding value to it, presenting it in a form easy to reach for the target audience and in a way that respects the copyright of the original creators of the information and the economic, ethic and legal issues connected to its use. Several of the previously mentioned competencies are among those of information literacy. However, often personalizing the information, customizing it or adding its value also requires expertise in the field of the topic. According to the found definitions, curation is more about transferring already existing information, than "creating" or producing it, while, adding value and personalizing nevertheless to some degree include creation of new information.

One key finding in the analysis was that most authors of content curation articles or web sites did not refer to information literacy although they write about its elements. There were exceptions, such as Mihailidis and Cohen [21], Antonio and Tuffey [5] and Bhatt [34] who applied curation in teaching information or digital literacy to students. These authors mostly represented information science, while most other authors represented a great variety of other fields. Nevertheless, in their articles they recommended most information literacy skills to be applied by future curators. This suggested to the necessity of information literacy education in various fields. It also implied the relevance of information literacy skills in tasks also outside the traditional information profession and supports Farrier's [10] proposition of content curation as a future career for information professionals.

Content curation is not a new phenomenon, although the term has not been used for many years. It is part of contemporary web communication. Although its most visible element is sharing information, the curator also pays attention to previous (web) publications by links, mentions and comments, that represent attention data and value for their original authors.

References

1. Herther, N.K.: Content curation. Searcher **20**(7), 30–41 (2012). http://connection.ebscohost.com/c/articles/79853398/content-curation
2. Mullan, E.: What is content curation? Econtent (2011). http://www.econtentmag.com/Articles/Resources/Defining-EContent/What-is-Content-Curation-79167.htm
3. Scoop.it. http://www.scoop.it/
4. Curata. http://www.curata.com/
5. Antonio, A.B., Tuffley, D.: Promoting information literacy in higher education through digital curation. M/C J. **18**(4), 1 (2015). http://journal.media-culture.org.au/index.php/mcjournal/article/view/987
6. Deschaine, M.E., Sharma, S.A.: The five Cs of digital curation: supporting twenty-first-century teaching and learning. InSight J. Sch. Teach. **10**(6), 19–24 (2015). http://insightjournal.park.edu/wp-content/uploads/2015/08/1-The-Five-Cs-of-Digital-Curation-Supporting-Twenty-First-Century-Teaching-and-Learning.pdf
7. Taylor, J.: The Quick Guide to Killer Content Curation (2015). http://www.scribblelive.com/blog/2015/05/13/quick-guide-killer-content-curation/
8. Handley, A.: What content curation can do for your business and three things it can't. Commun. World **29**(1), 48 (2012). https://www.questia.com/magazine/1G1-275920973/what-content-curation-can-do-for-youri-business-and
9. Ridarch, R.: Content Curation: How Does it Build Value? (2009). https://www.flickr.com/photos/stefanomaggi/4165897362
10. Farrier, J.: Digital content curation is career for librarians. Libr. J. (1), February 2012. http://lj.libraryjournal.com/2012/02/opinion/backtalk/digital-content-curation-is-a-perfect-career-fit-for-librarians-backtalk/
11. Olander, I.: Opas Sosiaaliseen Tiedonhakuun ja Kuratointiin: Välineet, Strategiat, Ihmiset. Sometek (2012). http://sometek.fi/opas-sosiaaliseen-tiedonhakuun-ja-kuratointiin-valineet-strategiat-ihmiset/
12. Cisnero, K.: A Beginner's Guide to Content Curation. Hootsuite. Blogs (2014). http://blog.hootsuite.com/beginners-guide-to-content-curation/
13. Gunelius, S.: 5 ways to use content curation for marketing and tools to do it. Forbes Woman, 5 July 2012. http://www.forbes.com/sites/work-in-progress/2012/07/05/5-ways-to-use-content-curation-for-marketing-and-tools-to-do-it/#411d03420187
14. Salz, P.A.: Curation fills the content gap. EContent, December 2015. http://www.econtentmag.com/Articles/Column/Agile-Minds/Curation-Fills-the-Content-Gap-107819.htm
15. Manifesto for the Content Curator: The Next Big Social Media Job of the Future. Influential Marketing Group. http://www.rohitbhargava.com/2009/09/manifesto-for-the-content-curator-the-next-big-social-media-job-of-the-future.html

16. Bhattarai, U.: Content curation and its role in content strategy. Ujjwal Bhattarai's Internet Marketing Blog, 3 February 2016. http://www.ujjwal.com/search-engine-optimization/content-curation-content-strategy-965/

17. Mihailidis, P.: Digital curation and digital literacy: evaluating the role of curation in developing critical literacies for participation in digital culture. E-learning Digital Media, **13** (2016). http://www.academia.edu/25475022/Digital_curation_and_digital_literacy_evaluating_the_role_of_curation_in_developing_critical_literacies_for_participation_in_digital_culture, doi:10.1177/2042753016631868

18. Association of College and Research Libraries (ACRL): Information Literacy Competency Standards for Higher Education (2000). http://www.ala.org/acrl/standards/informationliteracycompetency

19. Association of College and Research Libraries (ACRL): Framework for Information Literacy for Higher Education (2016). http://www.ala.org/acrl/standards/ilframework

20. Ovadia, S.: Digital content curation and why ıt matters to librarians. Behav. Soc. Sci. Librarian **32**(1), 58–62 (2013). http://academicworks.cuny.edu/cgi/viewcontent.cgi?article=1012&context=lg_pubs

21. Mihailidis, P., Cohen, J.N.: Exploring curation as a core competency in digital and media literacy education. J. Interact. Media Educ. (2013). http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiFutnkudTMAhVBjiwKHaYBAJAQFggdMAA&url=http%3A%2F%2Fwww-jime.open.ac.uk%2Farticles%2F10.5334%2F2013-02%2Fgalley%2F476%2Fdownload%2F&usg=AFQjCNF8RcWlqNEkeDMZAktarQwe89y1Xw

22. Deshpande, P.: A Definitive Guide to Content Curation. Content Marketing (2015). http://www.curata.com/blog/the-definitive-guide-to-content-curation/

23. Faure, G.C.: Curation for knowledge management and information literacy in ımmunolgy using scoop.it. In: Spiranec, S., et al. (eds.) The Third European Conference on Information Literacy (ECIL), 19–22 October 2015, Tallinn, Estonia. Tallinn University, Abstracts, p. 117 (2015)

24. Rosenbaum, S.: Curation, Community and the Future News. Nieman Reports (Summer), pp. 14–16 (2011). http://niemanreports.org/articles/curation-community-and-the-future-of-news/

25. Ting, T.: Digital narrating for contentious politics: social media content curation at movement protests. M/C J. **18**(4), 1–7 (2015). http://journal.media-culture.org.au/index.php/mcjournal/article/view/995

26. Meyer, J.: What is Attention Data? Using Attention. Blog (2006). http://www.usingattention.com/

27. Kortelainen, T., Katvala, M.: "Everything is plentiful – except attention". Attention data of scientific journals on social media tools. J. Inf. **6**(4), 661–668 (2012). http://ac.els-cdn.com/S1751157712000478/1-s2.0-S1751157712000478-main.pdf?_tid=772488fa-f283-11e1-99f6-00000aab0f6c&acdnat=1346318405_9602410469160328beadb295f117c632

28. Holmberg, K.: Altmetrics for Information Professionals: Past, Present and Future. Chandso Publishing, Amsterdfam (2015)

29. Worlde (2014). http://www.wordle.net/

30. Ulrichsweb Global Serials Directory. http://ulrichsweb.serialssolutions.com/title/1463381115172/60920

31. Kumar, B.: How to Grow Your Ecommerce Business with Content Curation. Shopify (2015). https://www.shopify.com/blog/69079045-how-to-grow-your-ecommerce-business-with-content-curation

32. Jorg, C.: Four Things You Must Know About Content Curation (2015). http://www.marketingprofs.com/articles/2015/27748/four-things-you-need-to-know-about-content-curation
33. Curator's Code. http://curatorscode.org/
34. Bhatt, I.: Curation as Digital Literacy Practice. Ibrar's Space. Blog (2014). https://ibrarspace.net/2014/05/21/curation-as-a-digital-literacy-practice/

Higher Education

Information Literate or Not?: A Nationwide Survey Among University Students in the Czech Republic

Hana Landová[1(✉)], Jitka Prajsová[2], and Ludmila Tichá[3]

[1] Czech University of Life Sciences, Prague, Czech Republic
hanalandova@sic.czu.cz
[2] National Institute of Mental Health, Klecany, Czech Republic
jitka.prajsova@nudz.cz
[3] Czech Technical University in Prague, Prague, Czech Republic
ludmila.ticha@cvut.cz

Abstract. The Information Education and Information Literacy Working Group *(IVIG)* was established in 2000. In 2004 and 2005, IVIG conducted *a Pilot Survey on the Level of Information Literacy of University Students*. Based on the results as well as experiences from the pilot survey, an extensive survey among students of public universities in the Czech Republic took place in 2015. Questionnaires were submitted by 25,389 students from 17 public universities. Detailed data analysis was performed, using the SPSS software. Crucial factors affecting the level of the information literacy (IL) were: study programme, personal motivation, IL courses attendance and gender. The level of IL with the emphasis on using the academic library and information resources for academic purposes was slightly increased from the average score of 52.48 to 58.16 when comparing the pilot surveys in 2004–2005 and the nationwide survey in 2015.

Keywords: Information literacy · Survey · Methodology · Questionnaire · Czech Republic · ALCU · IVIG · University · Student

1 Introduction

In education it is always necessary to know the level of knowledge and skills of the students who are entering the courses as well as the levels for completing the courses. This knowledge is the base for course preparations and provides feedback for optimizing the content of the courses, teaching methods, and evaluation. The main objective of the survey organized by the Association of Libraries of Czech Universities (ALCU) was to monitor the level of information literacy (IL) of the university students in the Czech Republic.[1] The Information Education and Information Literacy Working Group (IVIG)[2] conducted by the study in co-operation with the university libraries in 2015. ALCU became the institutional and financial guarantee of this survey. The survey

---

[1] The website is available at: http://www.akvs.cz.
[2] The website is available at: http://www.akvs.cz/komise-iniciativy/komise-ivig/.

proposal had to be accepted and confirmed by the university management before the librarians started preparatory work.

2 Basis of the Survey

The IVIG Working Group carried out two pilot surveys on the IL of the students in higher education in 2004 and 2005 [1]. IVIG conducted the first survey at three faculty[3] libraries. Its main goal was to test the survey workflow, set of survey documents, and tools needed to conduct the survey, as well as the questionnaire itself. The second pilot survey was aimed at confirming the previous methodology and gain experiences. Both surveys became the basis of the large national survey conducted in 2015 at the Czech universities by the university librarians.

When we sought similar surveys when preparing the pilot survey in 2004, we learned that IL surveys often focused on the impact of IL courses. For example, Project Information Literacy (PIL), which was carried out later at the University of Washington in 2008, focused on the students' information behaviour. PIL became a model template for the UNESCO project, International Media and Information Literacy Survey IMILS [2].

Our survey should bring answers on the participants' conditions, motivations, and self-evaluation of skills required for using information for their study. There are certain apparent similarities in the questions we asked and those posed in previous studies but since our aims and goals differed from other studies, our questions also differed and led us to our own way. Still, we made sure that we guaranteed the possibility of comparing results with those from the pilot surveys. The main purpose of our survey was to detect conditions, limitations, and opportunities for changes in information education and to use the results to support and develop of IL as an important rationale of independent study and lifelong learning.

2.1 Theoretical Framework

The IVIG members discussed and elaborated on a number of key documents including the definition for IL [3], the Model for IL [4], and IL standards for the university student [5]. These documents enabled the IVIG to define the knowledge and skills required for particular components of the IL of the university student as well as to adapt the survey questionnaire. The questionnaire from the pilot surveys has been revised and updated.

Key milestones of the survey project workflow included:

- Formulating the survey goals and hypothesis;
- Creating the survey proposal documents;
- Setting up the basic survey rules and principles;
- Organizing and coordinating the process of data collection and,
- Analysing data and preparing the final results.

---

3   A faculty (or "FAKULTA" in Czech) is an organizational part of the university: e.g. Faculty of Medicine, Faculty of Law – as an equivalent to the School of Medicine, Law School etc.

2.2 Survey Proposal Documents

The participating librarians were responsible preparing two documents as the initial materials for the survey preparations. These documents were

- A letter of recommendation from the ALCU for the university management as a statement on the respectability of the survey. In the letter, the ALCU explained reasons for conducting the survey, as well as its objectives and benefits;
- A document describing characteristics of the setting: including the university and faculty and the local IL conditions such as teachers' demands on the students' work with information resources, support of IL at the particular university and with faculty, and the IL courses offered by the librarians at the particular university/faculty. We expected that this document would help during the interpretation of results.

2.3 Assumption of Hypotheses

We based the hypotheses on the following assumptions in order to identify the factors that could affect the level of IL were. We assumed that IL was influenced by:

- Student factors: personal (inner) motivation; personal interest of the students in information resources; participation of students in IL courses.
- Teacher factors: motivation; the obligation of students to work with information both in classes and as a part of their independent study; participating of teachers in IL courses.

We expected that 50% of the students had basic levels of IL and 75% had advanced IL levels.

2.4 Survey Support and Promotion

Librarians used different ways to promote the survey. The promotion tools included web sites, Facebook, and posters. At some universities, students could follow graphs illustrating a number of answers from their university faculty that encouraged other students to complete the questionnaire. This gamification element proved to be very successful in increasing the response rate.

3 Methodology

3.1 Instrument

The questionnaire consisted of 45 questions. We divided the questions into several parts based on the topic they were addressing: sociodemographic characteristics (ten questions), library usage habits (five), circumstances of IL courses (five), resources helping students to learn how to work with information (nine), and orientation and use of the information resources (two). The remaining fourteen questions represented items that make up the types of IL [4], as shown in Table 1.

Table 1. The components of Information Literacy

Information Literacy (IL)	
Document Literacy (DL)	Searching in specialized databases Using a search engine Collecting of citations, using citation manager Using of library services Searching scientific information on the Internet
Language Literacy (LL)	Terminology in foreign language English level Level of terminology in Czech language
Prose Literacy (PL)	Level of experience with academic writing Citation ethics during the writing
Numerical Literacy (NL)	Using numerical and technical data Level of spreadsheet use (such as MS Excel)
Computer Literacy (ICTLT)	Level of preparing of computer presentations Level of working with word processor (such as MS Word)

3.2 Ample and Data Collection

We, as members of the survey team, administered the survey to 17 out of 26 public universities in the Czech Republic. The basic sample consisted of more than 252,000 students and the data were drawn mostly from the university annual reports for the years 2013 and 2014. Each university owned the information system covering all students and their e-mail addresses. We drew the sample from a database of these addresses. We defined the minimal required number of completed questionnaires required for a data analysis based on the minimal recommended number of respondents [6]. We carried out the sample by random stratified selection by faculties/universities from the database. Based on the pilot surveys, we assumed a questionnaire return rate of 40%. We selected 87,572 respondents to receive an email invitation with the unique link to the web page where they would find the questionnaire. This email message was distributed by the university ICT administrators to the random sample of the university students. Respondents were contacted once or two times by email as reminders of their invitation to participate in the survey. We collected data from 27th April to 18th May 2015. Students returned 25,389 questionnaires including duplicates, unfinished surveys, and incomplete including those that lacked information about the university and the faculty. The average response rate per institution was 29% and data set was representative for public university students in the Czech Republic. After the questionnaire was filled out and submitted, we stored the data in an MS Excel matrix. We used SPSS 15.0 for data processing and statistical analysis.

We excluded questionnaires with missing information about university from the analysis. This resulted in excluded 798 cases (3.1%). We also excluded surveys that had more than three missing answers to questions. Thus, we excluded another 358 cases (1.4%). The final data set that we analysed encompassed 23,834 students.

3.3 Data Analysis

IL was designed as a composite score in the analysis. It was based on the IVIG IL model [4] and it was verified by reliability analysis and factor analysis (principal component analysis). Results of the reliability analysis based on the original items from the pilot survey were inconsistent in scales of individual types of IL (Cronbach's alpha is from 0.38 to 0.66). Four-factor solution was the result of the factor analysis using the principal component analysis with Varimax rotation. It turns out that the question about using textbooks may be separate from any types of IL scale. And we excluded it from the items that are included to the IL composite score. Moreover, as results of the factor analysis, we linked numerical and computer literacy in one factor together. Any questions related to the "search" in document literacy were found in one factor, regardless of whether it was a virtual search using the computer or search with the help of physical library. The newly found factors – individual types of IL – were checked by the reliability analysis (Cronbach's alpha improved from 0.51 to 0.66). We maintained a five-factor solution for the purposes of this project, due to a better comparison with the pilot surveys. However, we recommended that the numerical and computer literacy scales be merged together for the future surveys. Figure 1 shows the difference in the scores of IL scale in relation to the pilot survey ten years ago.
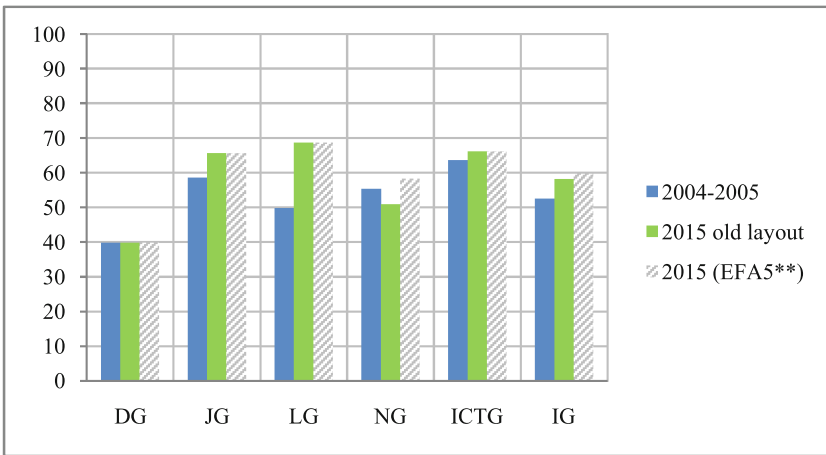
Fig. 1. The difference in the scores of individual types of IG and IG scale in relation to the pilot survey conducted in 2004–2005 from collected data (2015) *. * *Matched only sense the same items (i.e. by one for NG, LG at five, with four of DG, JG at three and two for ICTG). ** New layout by the FA five-factor solution without question about "using the textbooks"*

We used the Kruskal Wallis H test, the Mann Whitney U test, Fisher Eta 2, and Kendall tau b to test usage depending on the nature of the variables. Thus, we were able to measure differences and the relations between different types of literacy and socio-demographic characteristics, together with other relevant variables, all at a significance level of $p < 0.05$. Figure 2 shows an interesting comparison of basic field classification by the Ministry of Education [7].
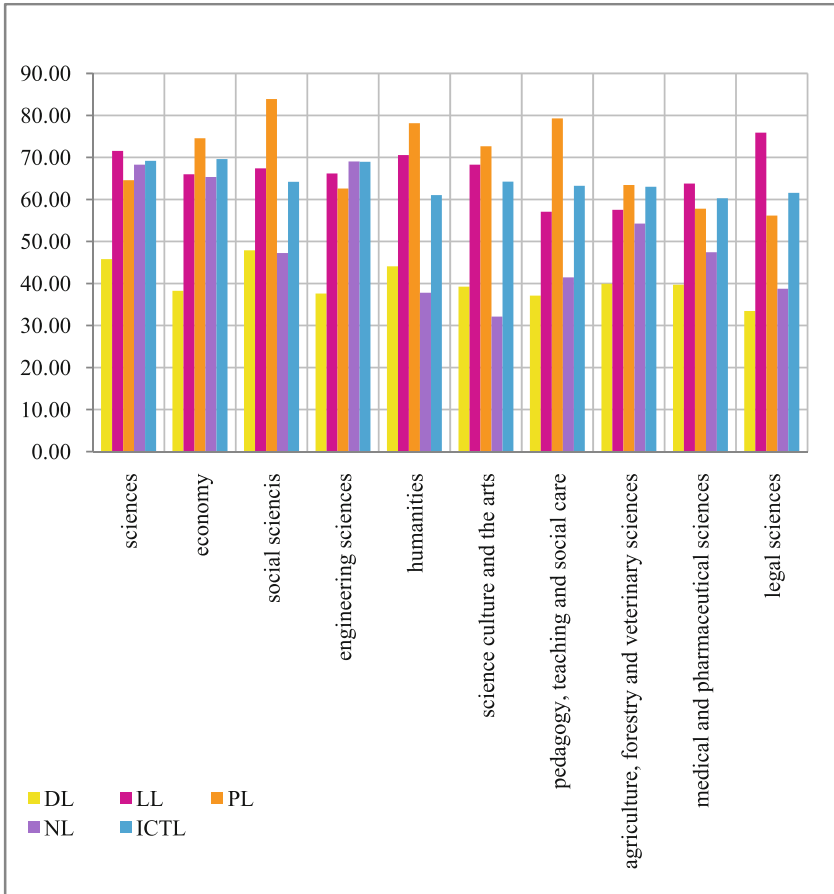
Fig. 2. Average difference in the scores of individual types of IL according to the basic field classification by the Ministry of Education *Note: The order of the basic field, given average scores of IL ranked from the highest*

We used the binary logistic multivariate regression analysis to detect a model of the student exceeding 70 points of level scores of IL. There were 15 relevant questions that entered the model as potentially independent predictors: age, gender, the length of study, studying multiple schools at once, the degree the student wants to achieve, the program and the class year, the library habits, participation in the library course, finding the orientation and information sources as important, and using other sources in addition to textbooks. The final model explains 25.3% of variability (Nagelkerke pseudo R^2). Factors that affect the passing of the 70-point cut-off included gender (men) and participation in the library course. Both increased twice the chance of passing. Other predictors were: the degree the student wants to achieve (the higher the degree the better), finding the orientation and information sources as important (the higher the importance, the better), and the program (the higher the degree, the better). Furthermore, studying

multiple schools at once, using online library services outside of the library (the higher frequency, the better), and using other sources in addition to textbooks were seen as important. We also saw longer time period since the admission to the university to a lesser extent as positive. On the other hand, the higher the age the more negative is the influence on the level of IL. Please refer to Table 2.

Table 2. Model of the student exceeding 70 points of level scores of Information Literacy

	Odds ratio	(CI 95%)	Wald test (Sig.)
Man	2,1	(1,9–2,3)	0
Participation in the library course	2	(1,9–2,2)	0
Degree the student wants to achieve	1,8	(1,7–2)	0
Finding the orientation and information sources as important	1,8	(1,6–1,9)	0
Study program	1,7	(1,6–1,8)	0
Studying multiple schools at once	1,5	(1,3–1,7)	0
Using other sources in addition to textbooks	1,4	(1,4–1,5)	0
Using online library services outside of the library	1,3	(1,3–1,3)	0
Number of years since the admission to the university	1,1	(1,1–1,1)	0
Age	1	(0,9–1)	0

4   Results

4.1   Demographic Data

The average age of the respondents was 24 years with a minimum of 17 and a maximum of 56 years. The most frequent respondent was a student in their third year at the university. Fifty seven percent of respondents were in the Bachelors program, 36 percent in the Masters program and seven percent in the Doctoral program. Sixty percent of respondents were women, 41% were men. There was a significant difference in the gender distribution when comparing various study areas. Sixty-seven percent of respondents who declared their study area as technical sciences were men; 33% were women. In education/social work the ratio was opposite: 20% of the students were men and 80% were women. The same situation appeared in the social sciences (19% were men; 81% were women) and health sciences and medicine (20% were men; 80% were women).

4.2   Searching for and Using Information

More than 28% of students did not know about online databases, 22% knew that the databases existed but they were not using them. Twenty two percent of the students searched in the databases only once per semester. More than half of the students were using Google exclusively for searching, a fifth of them were using Google in

combination with Google Scholar. Ten percent of students stated that they were using a combination of Google, Google Scholar, and the online databases subscribed by the university.

As Czech is a small national language, the importance of English as a language of academic and scholarly communication is significant. Therefore, it was a positive outcome that almost three quarters of students declared their ability to read and write in English on the intermediate or advanced level. Only three percent of respondents were not able to communicate in English at all.

Academic writing skills are very closely related to IL. Students who are motivated by their teachers to write assignments and essays were more likely to learn and utilize immediately what they have learned in the standalone and/or integrated/embedded IL courses. In our study, a quarter of students stated that they wrote only one assignment (academic text) per semester. Seven percent of the students did not write this type of text at all. More than half of them wrote two to five texts per semester. Fewer, than a third of respondents were citing information resources without using a fixed citation style; 57% followed recommended citation styles. Six percent of students who were writing texts at least once per semester did not cite information resources at all.

4.3   Selected Variables Affecting Level of IL

Study program including field of study or form of study proved to be one of the crucial variables effecting the level of IL. Students in the natural sciences had the highest average score, 63.73, in all IL components. On the other hand, students of law had the lowest average score. However, students of law scored highest in language literacy. Students of social sciences and humanities reached the best results in prose literacy. Students attending more than one university at the same time reached higher average score than their peers attending one university (64.53 compared to 59.30). The difference between the average score of distance programs students (58.98) and full-time students (59.79) was marginal. It is not surprising, that Doctoral students reached the highest score (73.56) compared to Masters students (61.02), and Bachelors students (57.46). The **personal motivation** of each survey participant was very important as well. Students who declared that their goal was to complete their Doctoral program reached higher average scores (67.00) than their peers who aimed to complete Masters program (58.70) or Bachelors program (53.83) respectively.

Gender was another very important variable: men scored higher in language literacy, numerical literacy, and ICT literacy. On the other hand, women reached better results in the area of prose literacy. Overall, men had an average score of 61.87 and women had an average score of 58.12.

In Czech higher education, there is a strong tradition of using textbooks as a main information resource for study. As other types of information resources became more available over past 20 years, the importance of textbooks has decreased. However, certain fields of study/universities/teachers still rely on textbooks and, therefore, the motivation of students to search for other information resources is very low. The survey results showed that students who only use textbooks for their coursework and assignments had significantly lower level of IL (51.20) than their peers who use other types

of information resources on a regular basis in more than half courses each semester (62.29). It was not surprising, that students declaring the knowledge of various types of information resources showed better results (61.28) than students who considered this aspect to be insignificant (52.82).

Hypotheses about the factors affecting the level of IL were proved. Motivation and participating on some of IL course stay on the first position of the factors influencing the IL.

4.4   Comparison with the Pilot Survey

A comparison with the pilot survey results showed that the prose literacy has increased: the average score in 2004–2005 was 49.83; in 2015 it was 68.59. The language literacy also improved from 58.55 to 66.12. The document literacy remained at the same (low) level: 39.78 (2004–2005) and 39.73 (2015). The level of numeric literacy decreased from 55.33 to 50.86 as well as the ICT literacy, which decreased from 63.67 to 58.17. Overall, the level of IL emphasizing use of the academic library and information resources for the academic purposes slightly increased from the average score of 52.48 to 58.16 when comparing the pilot surveys in 2004–2005 and the nationwide survey in 2015.

5   Conclusion

Each of the participating universities received an individual report. We organized a half-day workshop for the librarians in order to clarify and discuss the results. After the workshop, every university library should have been able to communicate the results, both general and institutional, to the university management. The interpretation of results should have a strong impact on the further development of IL curriculum at each of the participating universities, as the strengths and weaknesses have been uncovered, as well as key aspects that might bring positive change. For many of participating universities the results proved that IL courses delivered by the university library had a positive impact on the level of student IL. At many universities, this might be a break-through moment in the process of embedding the IL into the curriculum.

Additionally, the survey provided important feedback on the documents that have been developed by the IVIG Working Group over the years of its existence. Certain modifications will be included into the IL model [3], as well as the IL standards [4] during the coming months. Also, the questionnaire will require adjustments so it can be used for future surveys either as a recurring nationwide survey or through smaller institutional surveys focusing on definition of IL courses' impact on students´ skills and knowledge.

Last but not least, the survey and its results opened the possibility to conduct further quantitative studies allowing international comparison as well as the qualitative studies that would clarify and describe in more detail particular issues implied by the currently available results.

References

1. Pilot Survey Project on the Information Literacy Level of University Students. https://akvs.upce.cz/en/wp-content/uploads/2016/08/pilot-survey.pdf
2. Preliminary Results from the International Media and Information Literacy Survey (IMILS) of the Habits and Practices of University Students When Undertaking Research Assignments. Final Report. UNESCO (2012)
3. Understanding the Information Literacy Concept. https://akvs.upce.cz/wp-content/uploads/2016/06/Understanding-IL-concept.pdf
4. Model of Information Literacy. https://akvs.upce.cz/wp-content/uploads/2016/06/IL-definition-using-IVIG.pdf
5. Information Literacy Standards of a University Student. https://akvs.upce.cz/wp-content/uploads/2016/06/Information-literacy-standards.pdf
6. Hague, P.N.: Market research: preparing, selection of methods, implementation, results' interpretation. In: Czech: Průzkum Trhu: Příprava, Výběr Metod, Provedení, Interpretace Výsledků. Computer Press, Brno (2003)
7. Codes of Study Programs at Universities (in Czech: Kódy Studijních Programů Vysokých Škol: STUDPROG k 3. 5. 2016.xlsx). http://www.msmt.cz/vzdelavani/vysoke-skolstvi/kody-studijnich-programu-a-oboru?highlightWords=KKOV

Assessing Spanish-Speaking University Students' Info-Competencies with iSkills, SAILS, and an In-House Instrument: Challenges and Benefits

Jesus Lau[1(✉)], Juan D. Machin-Mastromatteo[2], Alberto Gárate[2], and A. Cecilia Tagliapietra-Ovies[2]

[1] PIMSA - Catedra Distinguida, Universidad Veracruzana, Veracruz, Mexico
jlau@uv.mx
[2] CETYS Universidad, Mexicali, Mexico
{juan.machin,alberto.garate,cecilia.tagliapietra}@cetys.mx

Abstract. In its ongoing assessment of information literacy competencies (ILC), CETYS Universidad first developed an in-house instrument and then applied the standardized tests, SAILS and iSkills. This paper analyzes the design of these instruments as well as data gathered from their implementation. This comparison aids in finding similarities in the ILC they measure, describe how they measure them, and study their differences. The objectives of this analysis are to describe the evolution of the Institution's ILC assessment over the past four years while providing the basis for making an evidence-based decision about improving the in-house instrument and pushing to develop a Spanish-language multi-institutional tool, and/or the continued use of international instruments.

Keywords: Information Literacy · Competencies · Assessment

1 Introduction

The assessment of information literacy competencies (ILC) is a must for any university that has the strategic goal of helping students learn how to evaluate the quality and reliability of information. The need for measuring students' ILC is related to other needs that libraries and educational institutions have, such as increased accountability, assessment and accreditation. Measuring ILC involves determining the degree to which students are information literate and asking if their information literacy attainment influences their success while finding out the library's role in their information proficiency and asserting whether the resources dedicated to the library and to information literacy (IL) programs are sufficient [1, 2]. Evaluation usually comes at the end of librarians' and educators' IL concerns [6] and scattered experiences have not been published. There are many assessment instruments available and reported in the literature, primarily from English-speaking countries. Most of them are tailored to institutional needs; iSkills, the Standardized Assessment of Information Literacy Skills (SAILS), and the Madison Research Essential Skills Test (MREST) tests stand out. The use of such tools designed in the United States and commercially available is one option

for non-English speaking universities, such as Mexican ones, with few professional library staff or resources to develop their own instruments. Available lists of instruments [3, 4] do not include any instrument in Spanish, a language spoken in more than 20 countries. Assessing ILC becomes a challenge in Spanish-speaking universities because there are no standardized or formalized tools available for review and use in the Ibero-American region. Although the development of IL instruments has been a concern in Ibero-American universities, few have attempted to create testing tools because of the complexity of this task [5]. Using these international tests is a challenge given the language, culture and information resource differences; but locally developed tests present outcome shortcomings [7].

CETYS Universidad is a three-campus educational institution, located in three cities in Baja California, Mexico (Mexicali, Tijuana, Ensenada). It offers high-school, Bachelors, and Masters degrees. One of its strategic goals is to be an information culture-oriented organization and, thus, it has been assessing students' ILC. First, CETYS developed and used an in-house instrument. Then, it administered a pilot version of SAILS and, finally, it implemented iSkills. This paper presents CETYS' experience with these IL instruments and an analysis of their characteristics and their results using the in-house instrument [8], SAILS [1] and iSkills [9]. These objective instruments allow evaluating whether students are, indeed, developing ILC and they complement other measurement materials [10] such as rubrics and evidences while evaluating the benefits of other institutional IL initiatives that have aimed to develop an information culture.

2   CETYS Experience with IL Instruments

CETYS formally started to conduct Institutional Assessment in 2008 as an answer to the Western Association of Schools and Colleges' (WASC) recommendations about the need for providing evidence of students' performance. Hence, the Institutional Learning Results (RAI) were established to provide evidence of the progress of Bachelors and Masters students' academic performance. In 2014, faculty adapted RAI to integrate the Distinctive Elements of CETYS Education (EDEC) as well as the Core Competencies that WASC, as an accreditation agency, required. RAI's first block of competencies include: (a) Spanish oral and written communication; (b) information culture (also an EDEC); (c) critical thinking; and (d) quantitative reasoning. This block is related to information management and communication skills, hence the relevance of using objective instruments for assessing ILC, especially for measuring information culture, which is both a Core Competence and EDEC. Such instruments are appropriate complements to other learning evidences such as essays or research reports and the rubrics used to evaluate them. They allow measuring students' level of competence regarding ILC by providing useful data on strengths and improvement opportunities. These instruments are useful for institutional assessment; in determining the impact of certain institutional milestones, such as the new Information Management course that is mandatory for all first semester students); and the reference librarians' (RL) activities. The CETYS Library System also supports ILC. The RL were hired in 2013 to work on the Information Culture Development Program (ICD) which includes actions catering to students and

faculty such as workshops on information and research resources, tutorials and promotional materials, and library-academia joint activities [10, 11]. The CETYS experience with IL instruments has had three distinct moments. In 2012, the Center for Academic Development and Improvement (CDMA), together with faculty and library staff, designed an in-house instrument for measuring first semester undergraduate and graduate students' proficiency in ILC with the desire of conducting a longitudinal study during the following years. The second initiative consisted of applying SAILS by the end of 2013 using a pilot version for the first time in a Spanish-speaking nation. The third action, which took place by the end of 2015, involved implementing iSkills, arguably the most dominant test among American universities. The following subsections describe the design and characteristics of these three instruments.

2.1   Development of an In-House Instrument

The CDMA, faculty, and library staff developed this instrument with the objective of identifying the ILC of students from Bachelors and Masters programs. They designed two similar questionnaires, one for first year Bachelors students and the other for first year Masters students. The instruments differed only in their demographic questions. The instrument design was guided by three basic documents:

- The Information Literacy Competency Standards for Higher Education, which state that the information literate student: "(i) determines the nature and extent of the information needed; (ii) accesses needed information effectively and efficiently; (iii) evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system; (iv) individually or as a member of a group, uses information effectively to accomplish a specific purpose; and (v) understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally" [12].
- The Mexican Guidelines 'Development of Information Skills in Mexico's Higher Education Institutions', divided into eight skills that ask students to "understand information, identify need, locate and search, retrieve, evaluate, use, communicate, and ethically use information" [13].
- IFLA's Guidelines on Information Literacy for Lifelong Learning [14], which groups ILC into three main categories: access, use and evaluation.

This instrument includes demographic questions that allow profiling the surveyed students by campus, gender, age range, academic program, and in which institution they have studied before their enrollment at CETYS. Then, it includes five sections, each dedicated to one of the Association of College & Research Libraries (ACRL) standards. It has eleven questions: five are multiple-choice questions and one is a matching question. Students have to order different lists of elements in the remaining five questions. The sections and questions cover the following content:

- Identification of the information need: students have to select cases where they know they need information, then they must order a list of information sources according to how important they are for use in assignments.

- Access and retrieval of required information: given a research topic, students must select the keywords they would use in a search engine; then, they must identify the action they take when they do not find a book in the library; and, finally, they must select from a list the four most important elements they follow in selecting a website.
- Evaluation of information sources: students have to match a column of research topics with rows of information sources, according to which source is most appropriate for each topic; then, given a research topic, they have to select the least biased source from a list; and, finally, order the importance of actions to continue searching after an initial Google or database search has yielded no useful results.
- Applying and using information appropriately: they have to order the parts of an academic essay and discard the irrelevant options.
- Ethics and legal use of information: the two remaining questions involve arranging data from a book and an academic article to construct their references, according to the Publication Manual of the American Psychological Association (APA) [8].

2.2 SAILS Pilot

Librarians at Kent State University started Project SAILS to measure students' ILC [1]. It is a 90-min. questionnaire of 45 multiple-choice questions with a bank of 140 questions. It is based on two ACRL documents: Information Literacy Competency Standards for Higher Education and Objectives for Information Literacy Instruction: A Model Statement for Academic Librarians [1]. Thus, SAILS covers ACRL's performance indicators, outcomes, and objectives. The elements measured are explicitly documented on the results provided to institutions using it. SAILS' evaluation scale ranges from 0 to 1000 and uses the measurement model of item response theory and the one-parameter Rasch model. The calculation of scores involves item difficulty and student performance and can be used in building a benchmark from all the institutions' data. Then, "student responses to the items on the test are then used to determine the difficulty level of each item. Once that determination is made, student responses are analyzed to determine an average score for each group" [1, p. 2]. Hence, SAILS provides scores for groups of students and not individual scores. To make the most of SAILS, institutions should assess large samples to ensure score accuracy, conduct statistical research to support data analysis, and ensure that sampling methods are rigorous [15]. SAILS recommends that samples must be of at least 50 students and the ideal is 200 [1]. Although SAILS is built from the five ACRL standards, the fourth standard is not used, as they claim that part of it is covered by outcomes and objectives from other standards or contain some elements that are not adequate for multiple-choice questions. The competencies assessed by SAILS are grouped under seven skill sets: (a) Developing a Research Strategy (with 32 questions); (b) Selecting Finding Tools (18); (c) Searching (26); (d) Using Finding Tool Features (14); (e) Retrieving Sources (15); (f) Evaluating Sources (21); and (g) Documenting Sources (14) [1]. They also provide how questions are distributed according to ACRL standards: Standard 1 (39), Standard 2 (74), Standard 3 (21), Standard 4 (not used), and Standard 5 (6) [1].

2.3 Implementing iSkills

iSkills is a commercial standardized test offered by the Educational Testing Service (ETS), a US-based company probably best known for the TOEFL test. iSkills is promoted as an Information and Communication Technologies (ICT) literacy test. Although presented as a way to measure digital skills, the skills measured are still closely related to ILC. iSkills contains scenario-based tasks and its scoring scale ranges from 0 to 500; students achieving at least 130 points are awarded a certificate of achievement. ETS has established three competency levels according to the score obtained: Developing (130–250), Foundational (260–340), and Advanced (350–500). Although it evaluates ICT literacy skills areas, ETS provides an equivalence between iSkills Assessment Performance Indicators and the ACRL standards and performance indicators [16]. The test has different sections with items that provide students with a series of tasks they must perform; the ICT literacy skills assessed by iSkills are: Define (5 tasks), Access (7), Evaluate (8), Manage (5), Integrate (7), Create (9), and Communicate (7) [17]. ETS offers data from individual and group results.

3 Results from the Instruments' Implementations

Analyzing the results from each instrument allowed us to know the level of detail and accuracy of data that can be gathered about ILC and information behavior. The challenge in our analysis lied in having applied the three instruments at various times and to diverse groups that corresponded to different generations of students. If we had applied these three instruments at the same time to a large population of students we would have randomly divided the population into three smaller groups in order to administer a different instrument to each group. However, presenting a summary of the results with the three tests allowed us to point out the similarities, differences, challenges, and opportunities of each instrument as well as think about which test could be the best option in a given situation. Moreover, it informed the pedagogic and administrative strategies that can be used to facilitate and foster ILC development in students.

3.1 In-House Instrument

We gathered results through the in-house instrument to a sample of 365 first year Bachelors students and 104 first year Masters students. A group of faculty administered the survey through SurveyMonkey by the end of 2012 at the three campuses. Results showed that Bachelors students knew how to search for information in the library and on the Web, they searched information when they did not know about the topic, they had doubts, or they lacked information. However, first year Masters students searched for information when they did not know about the topic, when they wanted to learn something new, or if they had doubts. The Bachelors students indicated that the three most important information sources they used for their course assignments were: e-books, printed books and journals, and academic databases. Conversely, Masters students' most important sources were: classmates, their own printed books and journals, and an expert on the topic; the printed and digital resources available in the libraries were not among

their top sources. Both groups of students know which keywords to use in search engines and, when they do not find the book they are searching for, they turned to the Web, asked librarians, or searched for a similar book. Both groups chose a website based on its contents, the organization or person responsible for the site, and the date of update. However, their critical ability for evaluating information was not optimal: both groups considered the Web as the first resource to locate information. Only 32% of Bachelors students and just half of master students identified the least biased information source among the options presented. Moreover, the majority of Masters students did not consider library resources as important sources for their assignments. When they did not find information in their first Google or database search, both groups stated that they would stop searching, but Bachelors students claimed they could try using Boolean operators, while Masters students looked for the support of an expert. Most students from each group could identify the order of the parts of an academic essay. Bachelors students partially knew about APA format: they could order the data from the book to construct its reference but they could not do it for the journal article. However, the majority of Masters students could not order the data from either the book or the journal article in order to construct the APA reference [8].

3.2 SAILS Pilot

In 2013, SAILS conducted a beta test in order to validate the instrument for using it internationally and, in 2014, they conducted a second round. In this pilot, more than 1.200 students from 80 academic institutions located in five countries allowed them to conform the benchmark. These countries were Bulgaria, Canada, China, Egypt, Mexico, Qatar, South Africa, and the USA. CETYS was the only Mexican and Latin American institution to participate in the first round of the beta test. It was administered in CETYS during December 2013 with a sample of 300 students from which 241 returned were valid tests. Of those 241, 144 were in Mexicali and 97 were in Tijuana. In order to make sure that students taking the test had a good proficiency in English. the RL and the coordinators and teachers of the College English and the course Advanced Communication in English administered SAILS., SAILS allowed the faculty and librarians clearly distinguish students' weaknesses and strengths regarding the assessed competencies. The staff compared the local results for each competence with the benchmarks of similar institutions offering the same maximum academic degrees and all institutions. Hence, if students' scores were equivalent, near, or above the values of the benchmark of similar institutions, it was assumed they had a good level of proficiency in that area. On the contrary, performances considerably below the benchmark, meant areas of weaknesses.

According to the SAILS Skill Sets, students performed 'about the same as the institution-type benchmark' in the following competencies: 'Using Finding Tool Features' (best) and 'Documenting Sources'. However, they performed 'worse than the institution-type benchmark' in: 'Developing a Research Strategy'; 'Selecting Finding Tools'; 'Searching'; 'Retrieving Sources'; and 'Evaluating Sources' [1]. It is relevant to highlight that SAILS report also included this assessment according to the ACRL Standards. According to these standards, students performed 'about the same as the institution-type benchmark' in Standard 5 (see Sect. 2.1). However, they performed 'worse than the

institution-type benchmark' in Standards 1, 2, and 3 (see Sect. 2.1). An advantage of SAILS is that it allowed adding demographic questions so questions about campus, academic program and semester were added. These allowed staff to profile subgroups within the sample and compare their performances. Thus, students who performed better were from engineering programs, followed by those in social sciences and humanities programs (Law and Psychology); and the group with the lowest performance was from business and administration programs. A common strength was the 'Using Finding Tool Features' skill, while the common weakness was 'Evaluating Sources'. Tijuana scored slightly better than Mexicali. Mexicali's best score was on 'Using Finding Tool Features', while Tijuana's was 'Retrieving Sources' [1]. Compared to similar institutions, and especially given a generally higher score for the 'All Institutions' benchmark, CETYS students' results might be largely improved if some strategies to better support ILC are developed. In addition to these results, the RL could report that they could detect that evaluation of sources was indeed a weakness in CETYS students; and that a large proportion of students taking the SAILS test did not participate in ICD's activities, which by this time were active for only about six months.

3.3 iSkills

Staff at the three campuses for Bachelors students administered the standardized test iSkills. This test was applied for the first time in November 2015 for establishing performance parameters regarding information use and management. Results allowed staff to draw students' competency profiles and determine strategies for improvement. iSkills was implemented with a sample of 554 Bachelors students from all semesters (first, third, fifth, and seventh) from all academic programs. The ETS provided results for the 503 students finished the test. A group of 13.72% of the students who took the iSkills also took the in-house instrument three years earlier. These students were in their first semester in 2012 and were, thus, in their seventh semester when they completed the iSkills test. Faculty and librarians observed that these students exhibited a certain level of improvement. However, one limitation in the data reports from ETS was that it could not take advantage of the demographic questions since it was not possible to see details of the results per ICT literacy skill for individual students; it is only possible to see the final scores. This made it difficult to compare sub-groups' performances in iSkills with results from the other two instruments. However, individual results facilitated by ETS allowed for the comparison of the total scores of students according to their profile (program, campus, and semester). Sixteen students achieved the highest scores (350–500), eleven were from the first semester and from Mexicali who were already enrolled in the Information Management course while four were from the seventh semester and one was in the fifth. Aggregate results offered by ETS established the performance of the sample of students who took the test based on 503 finished and valid tests and, similar to SAILS, it compared the sample's performance with that of a reference group of 3,115 students from all years. However, no information was provided regarding which types of students or institutions formed this reference group. CETYS students performed about the same in the Evaluate (highest skill) and Communicate skills. They performed slightly below the reference group in Create and Access (lowest skill) and their performance

was considerably lower for Define, Manage, and Integrate (lowest skill) [9]. The highest scored campus was Mexicali, followed by Ensenada, and then Tijuana. Regarding score by academic program, the tendency emerging from SAILS results repeated with iSkills, meaning that students from engineering scored the best (average score of 414), followed by social sciences and humanities programs (395); and business and administration (366) [9]. Hence, the average scores for all programs were within the advanced level of competency. In general, all students scored the best in the Evaluate skill, which was surprising considering that it was the lowest aspect scored in SAILS. However, this was probably due to different strategies, namely: a higher institutional emphasis in information culture; teachers instructing students to use reputable sources; the continued work of the RL; and the new Information Management course.

4   Conclusion

Assessing students' ILC allowed us to determining the influence of information literacy on their success (and thus retention), helped document institutional results and, thus, allowed us to compare student ILC with those of students at other institutions. It also allowed us to develop strategies for improvement, justify investments, and demonstrate variations in scores that may be caused by different actions such as more IL workshops with students, the availability of tutorials and flyers, and curricular changes that involved embedding IL in the official programs. The results of the tests allowed us to measure variables that demonstrated students' competencies, learning outcomes, and the benefits of libraries' initiatives as well as those from the academia [2]. In 2010, before assessing ILC, the strategy progressively implemented by teachers during the past six years was to use research papers and essays in order to improve students' learning and performance, both in written communication and information use. In 2012, the application of the in-house instrument drew attention to the importance of raising awareness and improve students' and teachers' usage of the printed and digital information resources that the library acquired. This attention grew progressively over time. For example, the total number of downloads from the digital library seems to be a good number to measure usage of library information resources, but when we looked at the number of students and teachers who actively used these digital information resources, this turned out to be a low percentage of the total population. Moreover, the in-house instrument also pointed toward the need for students to improve their critical ability for evaluating information sources and resources. The arrival of the RL in the Institution in 2013 resulted in an explosion in the offering of courses, workshops, training, and promotional materials through ICD. Moreover, with the application of SAILS, we observed that these ICD experiences may have helped students perform well in the test. But the RL also detected some of the challenges in the results. Our suggestions were to include ACRL's indicators, outcomes, and objectives within ICD activities, further emphasizing the evaluation of sources and search strategies. In 2015, iSkills results were comparable with those from SAILS regarding the programs with highest scores and showed an improvement regarding the competence of evaluation. However, since our students still demonstrate some ICT literacy skills below that of the reference group used by ETS, there is room

for improvement. Arguments for the continued use of the in-house instrument include that it is a local instrument adapted to our students' profiles and CETYS institutional needs. It is a Spanish-language instrument and as an assessment method it represents a stage of maturity in the development of an institutional information culture. One of the challenges is that we may not yet be on the same level of assessment as other institutions; perhaps some ILC are not being developed at CETYS. In using a local instrument, we ourselves have set the bar for achievement. As a result, we might have been too kind to our students. Given the level of the international standards, it would be difficult to compare our results with those from other institutions using SAILS or iSkills. Regarding the design of our instrument, we designed it by competencies, but its results are not directly expressed in competencies. Due to the instrument's brevity there are few questions or items per competency. This design did not allow us to assess different elements, facets or outcomes within an ILC. This instrument is an acceptable diagnostic for new students, but it is neither adequate for measuring students' advancement toward developing their ILC nor did it enable us to compare its results with other institutions. If we decide to continue using it, it must be reviewed considering these criticisms and the experiences with the other instruments. It would need to be made considerably more exhaustive in order to diagnose different facets of ILC in more detail. This is noteworthy when looking at the other instruments: while the in-house test has only eleven items for the five ACRL skills, SAILS has 45 (from a bank of 140) for the same five skills, and iSkills has 48 tasks for seven ICT literacy skills. The advantages of using SAILS and iSkills are that they are validated and trustworthy assessment instruments used at an international level. It is useful to have evidences of their implementations in order to compare results with those from other institutions with which we can have or set agreements. This is also important for accreditation purposes. We observed limitations in the SAILS instrument during the pilot. For example, SAILS does not provide individual scores, hence limiting the analyses on these particular results. iSkills does offer individual results and by cohort (the complete sample) but the individual results only include total scores, not the individual scores per ICT literacy skill, which are only offered for the whole cohort. This also hinders the possibility of performing more detailed analyses of the data, such as analyzing the performances per ICT literacy skill of students from certain academic program or semester. A final consideration regarding the feasibility of implementing iSkills is that ETS announced in 2016 that was discontinuing this test, indicating specific dates regarding the deadlines to acquire and use it. This represents an area of opportunity for SAILS and other competitors. Furthermore, it would be important to analyze, study and transfer to other instruments and IL assessment tools what we consider is one of iSkills' main strengths in its design over other instruments: its scenario-based tasks. In an Ibero-American experience with both standardized tests, the language barrier is a concern, because it may interfere students' performance in English-language tests. Even though a student might have English proficiency, it is still a second-language and its use for academic matters may not be so developed and thus the student's interpretation on what the test is requiring from them can be altered by their English level. The complicated part of this limitation is to know if the language is affecting results or is it really the student who does not have the competency. For example, the best score in iSkills (450) is from a third semester student with the

maximum level in English College. As there are not many scores that high, does it mean that the rest of the students do not have the competency or is it that they do not have enough English proficiency in order to do well in these kinds of tests?

References

1. Project SAILS: Results of the SAILS for CETYS Universidad (2013)
2. Schilling, K., Applegate, R.: Best methods for evaluating educational impact: a comparison of the efficacy of commonly used measures of library instruction. J. Med. Libr. Assoc. **100**(4), 258–269 (2012)
3. Mueller, J.: Assessments of information literacy (2014). http://jfmueller.faculty.noctrl.edu/infolitassessments.htm
4. Blevens, C.: Catching up with information literacy assessment: resource for program evaluation. Coll. Res. Libr. News **73**(4), 202–206 (2012)
5. O'Connor, L., Radcliff, C., Gedeon, J.: Assessing ınformation literacy skills: developing a standardized ınstrument for ınstitutional and longitudinal measurement. In: Thompson, H. (ed.) ACRL 10th National Conference, pp. 163–174. ACRL, Chicago (2015)
6. González, C.: Apuntes Relevantes sobre la Evaluación en la Alfabetización Informacional. Librínsula: La Isla de los Libros 331 (2014). http://eprints.rclis.org/23580/
7. Mery, Y., Newby, J., Peng, K.: Assessing the reliability and validity of locally developed information literacy test items. Ref. Serv. Rev. **39**(1), 98–122 (2011)
8. Tagliapietra-Ovies, A.C.: Resultados Medición del Aprendizaje Institucional RAI 2 y 3 en 2012 (2013)
9. Educational Testing Service: Institutional Skill Area Report (2015)
10. Machin-Mastromatteo, J.D.: Two years of information culture development for supporting higher education: initiatives, teacher's perceptions and future actions. Commun. Comput. Inf. Sci. **552**, 517–526 (2015)
11. Machin-Mastromatteo, J.D., Beltran, O., Lau, J.: Piloting a holistic information culture program: the experience of cetys universidad system of libraries. Commun. Comput. Inf. Sci. **492**, 350–360 (2014)
12. Association of College & Research Libraries: Information literacy competency standards for higher education (2000). www.ala.org/acrl/standards/informationliteracycompetency
13. Aguilar, V., Almanza, J., Cortés, J., Endean, R., García, J., Lau, J., Ríos, H.: Declaratoria: Desarrollo de Habilidades Informativas en Instituciones de Educación Superior de México. UACJ, Cd. Juarez (1997)
14. Lau, J.: Guidelines on information literacy for lifelong learning (2007). www.ifla.org/publications/guidelines-on-information-literacy-for-lifelong-learning
15. Lym, B., Grossman, H., Yannotta, L., Talih, M.: Assessing the assessment: how institutions administered, interpreted, and used SAILS. Ref. Serv. Rev. **38**(1), 168–186 (2010)
16. Educational Testing Service: ETS Higher Education iSkills Assessment Fit with ACRL Standards (2008). www.ets.org/Media/Tests/ICT_Literacy/pdf/acrl_standards.pdf
17. Educational Testing Service: The iSkills assessment (2016). www.ets.org/iskills/about

Is There a Focus on Information Literacy as a Transversal Skill Within the Institutional Accreditation Process?

Elitsa Lozanova-Belcheva(✉)

Sofia University "St. Kliment Ohridski", Sofia, Bulgaria
lozanovabe@phls.uni-sofia.bg

Abstract. The aim of the paper is to compare the standards and criteria of different organizations that accredit some of the top universities in the world according to the QS World University Rankings for 2015/2016. Regional accreditation organizations in USA support information literacy outcomes, but I found some differences between their practices and the criteria of other accrediting agencies. Information literacy is mentioned as important indicator of students' competency in some of them, but not in others. The paper also investigates the Criteria system for institutional accreditation of higher schools in Bulgaria where standards are similar with regulations of the quality of university programs around the world but without a focus on information literacy. The conclusions refer to insufficient awareness of the importance of information literacy as a transversal skill in the digital society and its role for the social inclusion of young people.

Keywords: Information literacy · Transversal skills · Institutional accreditation · Higher education institutions · Accreditation standards

1 Introduction

During recent years the importance of information literacy has increasing and has been recognized as one of the traversal competencies or "key competences", defined as "knowledge, skills, and attitudes that will help learners find personal fulfilment and, later in life, find work and take part in society. These key competences include 'traditional' skills such as communication in one's mother tongue, foreign languages, digital skills, literacy, and basic skills in math and science, as well as horizontal skills such as learning to learn, social and civic responsibility, initiative and entrepreneurship, cultural awareness, and creativity"[1]. Still, I could not identify a clear emphasis on that skill in the process of Institutional Accreditation for colleges and universities.

There are few research papers that emphasize the importance of collaboration between librarians and faculty and focus on the importance of information literacy within institutional accreditation process [1–7].

---

[1] Source: http://ec.europa.eu/education/policy/school/competences_en.htm.

Past research analysed accreditation criteria and the impact of information literacy in different aspects. For example, according to Saunders "terms related to information literacy skills …are scattered throughout the accreditation documents, and are not concentrated solely in the sections dealing with libraries" [3]. Other researchers concentrated their work on regional accreditation organizations (USA) such as the New England Association of Schools and Colleges, Southern Association of Colleges and Schools, and the North West Commission on Colleges and Universities and how they supported information literacy outcomes. Each of the documents of the six regional accrediting associations of higher education institutions included standards for educational quality and, within these criteria, we can find different views of the importance of information literacy in the context of educational process. A content analysis of their standards "illustrates that library and learning resource programs, even if not always named explicitly, are campus players in improving teaching and learning" [4].

2   Methodology

I chose one of the prestigious ranking of universities around the world as a tool for the identification of the top universities for the 2015/2016 academic year. The QS World University Rankings® [8] are based on the comparison of world universities in four major categories: research, teaching, employability, and internationalization. Each of the six indicators "carries a different weighting when calculating the overall scores. Four of the indicators are based on 'hard' data, and the remaining two are based on major global surveys – one of academics and another of employers – each the largest of their kind". These indicators are: **academic reputation (40%)** – "is measured using a global survey, in which academics are asked to identify the institutions where they believe the best work is currently taking place within their own field of expertise"; **employer reputation (10%)** – "is also based on a global survey the survey asks employers to identify the universities they perceive to be producing the best graduates. This indicator is unique among international university rankings"; **student-to-faculty ratio (20%)** – "is a simple measure of the number of academic staff employed relative to the number of students enrolled. In the absence of an international standard by which to measure teaching quality, this indicator aims to identify the universities that are best equipped to provide small class sizes and a good level of individual supervision"; **citations per faculty (20%) -** aims "to assess universities' research impact. So the more highly cited research papers a university publishes, the stronger its research output is considered"; **international faculty ratio (5%) and international student ratio (5%)** – "the two indicators aim to assess how successful a university has been in attracting students and academics from other nations".

2.1   Limitations of the Study

I originally intended to analyze the top 50 universities from the QS World University Rankings® 2015/16 and to find the accreditation standards by which those universities are accredited, to summarize the differences between them, and to explore the case of

Bulgarian higher education institutions' accreditation system. But in the process of investigation I found that it was very difficult to identify all accrediting institutions for all fifty universities and, especially, their accrediting criteria. Although I used different sources of information, such as the directory 4 International Colleges and Universities [9], an international higher education institution search engine reviewing accredited Universities and Colleges in the world including 11,606 Colleges and Universities, ranked by web popularity, in 200 countries but found that it was complicated to find equivalent documents for the accreditation of all fifty universities.

For that reason, my conclusions were based on the content analysis of the accrediting criteria of the regional agencies that accredited the top 20 US universities among the top 50 world universities (see Table 1).

Table 1. US universities accredited by six regional accrediting organizations

QS rank	University	Accrediting agency	IL in standards
100.0	Massachusetts Institute of Technology (MIT)	Commission on Institutions of Higher Education (CIHE) of the New England Association of Schools and Colleges (NEASC)	Yes
98.7	Harvard University	CIHE – NEASC	Yes
98.6	Stanford University	Western Association of Schools and Colleges (WASC) Senior College and University Commission (WSCUC)	Yes
97.9	California Institute of Technology (Caltech)	WASC Senior College and University Commission (WSCUC)	Yes
94.6	University of Chicago	Higher Learning Commission (HLC) of the North Central Association of Colleges and Schools (NCACS)	Yes
94.4	Princeton University	Middle States Commission on Higher Education (MSCHE)	Yes
92.2	Yale University	CIHE – NEASC	Yes
91.9	Johns Hopkins University	MSCHE	Yes
91.8	Cornell University	MSCHE	Yes
91.5	University of Pennsylvania	MSCHE	Yes
89.7	Columbia University	MSCHE	Yes
88.4	University of CA, Berkeley	WASC	Yes
88.2	University of CA, Los Angeles (UCLA)	WASC	Yes
87.9	Duke University	Southern Association of Colleges and Schools, Commission on Colleges (SACSCOC)	Yes
87.8	University of Michigan	NCACS	Yes
87.7	Northwestern University	NCACS	Yes
82.5	University of California, San Diego (UCSD)	WASC	Yes
81.5	Brown University	NEASC	Yes
80.5	New York University	MSCHE	Yes
80.3	University of Wisconsin-Madison	NCACS	Yes

Source: http://www.topuniversities.com/university-rankings

3   Key Findings

The comparison of the top 20 US Universities, shown in Fig. 1, and their accrediting agencies showed that six were accredited by Middle States Commission on Higher Education (MSCHE). Five universities were accredited by the Western Association of Schools and Colleges (WASC) and its Commission, the Senior College and University Commission (WSCUC). Four schools were accredited by Commission on Institutions of Higher Education (CIHE)[2] of the New England Association of Schools and Colleges (NEASC)[3] ant another four by North Central Association of Colleges and Schools (NCACS) and Higher Learning Commission (HLC) of NCACS[4]. And the last university was accredited by Southern Association of Colleges and Schools, Commission on Colleges (SACSCOC).
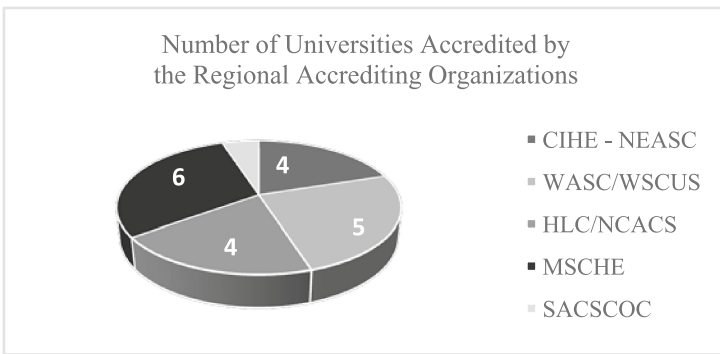
Fig. 1. Number of universities accredited by the regional accrediting organizations

I found some similarities differences through a content analysis of the criteria and standards of accreditation of those accrediting organizations, shown in Table 2.

In the accreditation documents of CIHE – NEASC, WSCUC, and MSCHE, the information literacy was part of the standards concerning students' skills and library resources and training. In HLC and SACSCOC there was indirect relation with information literacy in instruction provided by university libraries.

---

[2] NEASC's Commission on Institutions of Higher Education is the regional accrediting body for 241 colleges and universities in New England and eleven overseas institutions.

[3] Founded in 1885, the New England Association of Schools and Colleges is one of six regional accrediting bodies in the United States and provides public assurance about the educational quality of over 2,000 public and independent schools, technical/career institutions, colleges and universities in New England plus International Schools in more than 65 nations worldwide.

[4] The Higher Learning Commission (HLC) was founded in 1895 as one of six regional institutional accreditors in the United States. Through an agreement between the HLC and the Commission on Accreditation and School Improvement (CASI), the North Central Association has been dissolved.

Table 2. Accreditation organizations

Accreditation organization	Standards and criteria for accreditation	Year of publication/revision
CIHE – NEASC	Standard 4: The Academic Program. <u>4.7.</u> … The institution provides appropriate orientation and training for use of these resources, as well as instruction and support in **information literacy** and information technology appropriate to the degree level and field of study Standard 7: Library and Other Information Resources. <u>7.10.</u> The institution ensures that throughout their program of study students acquire increasingly <u>sophisticated skills in evaluating the quality of information sources</u> appropriate to their field of study and the level of the degree program [10]	July 1, 2011
CIHE – NEASC	Standard 4: The Academic Program. <u>4.12.</u> Expectations for student achievement, independent learning, **information literacy**, skills in inquiry, and critical judgment are appropriate to the subject matter and degree level and in keeping with generally accepted practice <u>4.15.</u> Graduates successfully completing an undergraduate program demonstrate competence in written and oral communication in English … and the capability for continuing learning, including the skills of **information literacy**. [11]	July 1, 2016
WSCUC	Standard 2. Achieving Educational Objectives Through Core Functions. <u>2.2a</u> Undergraduate programs engage students in an integrated course of study of sufficient breadth and depth to prepare them for work, citizenship, and life-long learning. These programs ensure the development of core competencies including, but not limited to, written and oral communication, quantitative reasoning, **information literacy**, and critical thinking… [12]	2013, Revised April 2015
HLC	Criterion Two. Integrity: Ethical and Responsible Conduct. 2 E/2. Students are offered guidance in the <u>ethical use of information resources</u> Criterion 3. Teaching and Learning: Quality, Resources, and Support. <u>3.D/5.</u> The institution provides to students guidance in the <u>effective use of research and information resources</u> [13]	August 1992; Last Revised: June 2014
MSCHE	Standard 11. Educational Offerings. Several skills, collectively referred to as **"information literacy,"** apply to all disciplines in an institution's curricula. These skills relate to a student's competency in acquiring and processing information in the search for understanding, whether that information is sought in or through the facilities of a library, through practica, as a result of field experiments, by communications with experts in professional communities, or by other means. Therefore, **information literacy** is an essential component of any educational program at the graduate or undergraduate levels. Standard 12. General Education. Institutions should identify and provide a recognizable core of general education… There is an inherent relationship among these skills. This interrelatedness is evident in the concept of **"information literacy,"** which embraces all of the specific general education skills [14]	1919; Last Revised 2006
SACSCOC	3.8. Library and Other Learning Resources. 3.8.2. The institution ensures that users have access to regular and timely <u>instruction in the use of the library and other learning/ information resources</u> (Instruction of library use) [15]	2012

Furthermore, I gave special attention to the Middle States Commission on Higher Education where information literacy was mentioned much more widely than at the others accrediting commissions:

"The information literacy skills include the ability to:

- determine the nature and extent of needed information;
- access information effectively and efficiently;
- evaluate critically the sources and content of information;
- incorporate selected information in the learner's knowledge base and value system;
- use information effectively to accomplish a specific purpose;
- understand the economic, legal and social issues surrounding the use of information and information technology; and
- observe laws, regulations, and institutional policies related to the access and use of information.

Closely tied to information literacy is the need for technological competency at all levels within an institution and its curricula….. Institutions should provide both students and instructors with the knowledge, skills, and tools needed to use the information, new technology, and media for their studies, teaching, or research. … In addition to information literacy and technological competency, the institution's curricula should be designed so that students acquire and demonstrate college-level proficiency in general education and essential skills, including at least oral and written communication, scientific and quantitative reasoning, critical analysis and reasoning, and technological competency…" [14].

Here I found a clear focus on the importance of information literacy as a core competency not only for the educational process but also for students' professional future. The Requirements pf Affiliation And Standards For Accreditation of MSCHE was an example for other accreditation agencies. Those standards corresponded with my research question about the impact of information literacy as an accreditation criteria.

4   Bulgarian Higher Education Accreditation Standards

Sofia University St. Kliment Ohridski was at the 701th place in the QS World University Rankings. So, there was not a base for comparison with the top twenty US Universities. The National Evaluation and Accreditation Agency Criteria system for institutional accreditation of schools of higher education was similar to US regional accrediting agencies in Criteria 1.4. "High School has created the necessary conditions to support training and development of students. 1.4.2.2 Access to libraries, the opportunity to work with computers, special offices and labs" [16]. Information literacy or specific library trainings in that sense is not mentioned.

There are many of reasons for this lack of attention:

- insufficient awareness of the importance of information literacy as a transversal competence from the national accrediting body;
- a lack of systematic programs for information literacy within the curriculum except at the American University in Bulgaria while information literacy is partly covered

in the curricula at institutions such as the Sofia University, Medical University, New Bulgarian University;

- ignorance of the significant role of the university library and its role in lifelong learning and building core competences.

The Bulgarian criteria system for institutional accreditation of higher education institutions needs to be revised along with the new concepts in higher education and especially with the students' expectations and attitudes and their social integration and professional realization.

5   Conclusions

A content analysis of US and Bulgarian higher education institutions accreditation systems identified that information literacy is recognized as an important skill within the educational process but is not yet a priority field in all universities. US higher education institutions had a long tradition with information literacy trainings, but there is not such practice among universities around the world.

The Middle States Commission on Higher Education Accreditation Standards are an excellent example for those national systems as Bulgarian.

The Bologna process as a European reform process aimed to creating the European Higher Education Area and harmonizing various systems of European higher education could be considered along with the necessity of information literacy education in all European Universities.

References

1. Bradley, C.: Information literacy in the programmatic university accreditation standards of select professions in Canada, the United States, the United Kingdom and Australia. J. Inf. Lit. **7**(1), 44–68 (2013). http://dx.doi.org/10.11645/7.1.1785
2. Saunders, L.: Perspectives on accreditation and information literacy as reflected in the literature of library and information science. J. Acad. Librarianship **34**(4), 305–313 (2008)
3. Saunders, L.: Regional accreditation organizations' treatment of information literacy: definitions, collaboration, and assessment. J. Acad. Librarianship **33**(3), 317–326 (2007)
4. Gratch-Lindauer, B.: Comparing the regional accreditation standards: outcomes assessment and other trends. J. Acad. Librarianship **28**(1), 14–25 (2002)
5. Oakleaf, M.: The Value of Academic Libraries: A Comprehensive Research Review and Report. Association of College and Research Libraries, Chicago (2010)
6. Thompson, G.B.: Information literacy accreditation mandates: what they mean for faculty and librarians. Lib. Trends **51**, 218–241 (2002)
7. Becher, M.: Instruction coordinators and higher education accreditation: a study of awareness and assessment documentation use. J. Acad. Librarianship **39**, 573–581 (2013)
8. QS Quacquarelli Symonds Limited. QS World University Rankings® 2015/16. http://www.topuniversities.com/university-rankings/world-university-rankings/2015
9. 4 International Colleges & Universities. http://www.4icu.org/
10. NEASC's Commission on Institutions of Higher Education (CIHE). Standards for Accreditation (2011). https://cihe.neasc.org/downloads/Standards/Standards_for_Accreditation.pdf

11. NEASC's Commission on Institutions of Higher Education (CIHE). Standards for Accreditation (2016). https://cihe.neasc.org/sites/cihe.neasc.org/files/downloads/2016_Standards_for_Accreditation.pdf
12. WSCUC Handbook of Accreditation (2013, Revised 2015). https://wascsenior.box.com/shared/static/oxgx719tnw5bn8b4kp28.pdf
13. Higher Learning Commission (HLC). The Criteria for Accreditation and Core Components. https://www.hlcommission.org/Criteria-Eligibility-and-Candidacy/criteria-and-core-components.html
14. Middle States Commission on Higher Education. Characteristics of Excellence in Higher Education: Requirements of Affiliation and Standards for Accreditation. http://www.msche.org/publications/CHX-2011-WEB.pdf
15. Southern Association of Colleges and Schools Commission on Colleges. The Principles of Accreditation: Foundations for Quality Enhancement (2012). http://www.sacscoc.org/pdf/2012PrinciplesOfAcreditation.pdf
16. National Evaluation and Accreditation Agency Criteria System for Institutional Accreditation of higher schools (2011). http://www.neaa.government.bg/images/Criteria_EN/Kriterialna_sistema_za_IA_eng.pdf

How Information Literate Are We as Teachers?

Jos van Helvoort[(✉)] and Ellen Sjoer

Sustainable Talent Development Research Group,
The Hague University of Applied Sciences,
PO Box 13336, 2501 EH The Hague, The Netherlands
{a.a.j.vanhelvoort,e.sjoer}@hhs.nl

Abstract. The purpose of the research was to provide academic staff with insights into their own information behavior and to motivate them to refer to relevant, accurate and reliable resources in their own course materials. To achieve this we used a participative research approach. Six participants assessed course materials created by themselves or by colleagues from their own department. It was found that in the course materials for the undergraduate ICT program of a university of applied sciences, in-text citations are often missing. If references are made, they are mainly references to general information sources like handbooks and popular or semi-scholarly websites. We discussed these findings in a focus group. An important additional benefit was the experience acquired with the participative research approach for improving the staff's own information behavior.

Keywords: Information literacy · Higher education · Teaching staff · Participative research · Citation analysis · Focus groups

1 Introduction

The 21st century is typified by an overabundant availability of digital information. Information literacy - the competence to search, select, evaluate, analyze and organize information - is therefore supposed to be a key competence for professionals today and in the future [1, p. 9; 2]. Most higher education programs that prepare students for their professional careers thus include some learning objectives in the field of finding and using information. The application of digital information sources in educational situations has also led to a demand for information literacy skills during the learning process [3, p. 50]. In other words, these skills are not only learning objectives intended to prepare the students for their future workplaces; they also function as learning competences that are needed to be successful during their study career itself.

Since information literacy or "information problem-solving" skills are so important in higher education, it is assumed that teachers should set a good example for their students by displaying their own information literacy. The information behavior of teaching staff has indeed been reported to have a strong impact on student perceptions of information literacy [4–6]. Little research however has been done on the actual performance of teachers. A search for relevant literature in LISA, LISTA and ERIC - the main bibliographic databases

for library & information science and education science - resulted in only one paper on the information literacy practice of teachers [7].

In the current paper we use the Scoring Rubric for Information Literacy [8, 9] as a theoretical framework. In this assessment instrument seven dimensions of the construct 'information literacy' are distinguished. The present research explored the information behavior of academic teachers on two dimensions of the information literacy construct: the reliability and authority of information sources in their course materials, and references made in the text to those sources (criterions 2 and 4 in the definitive Scoring Rubric for Information Literacy) [9]. The research method used was citation analysis. The goals of the research were to provide teachers with insights into their own information behavior by using a participative method and to reflect on the findings of the study. Research questions to be answered were:

- To what extent do teachers refer to the information sources they use in the course materials they develop, and
- To which type of literature are the teachers referring?

2   Methodology

2.1   Participants

The research is conducted at a Faculty of IT & Design at a university of applied sciences in the Netherlands. Six teachers in the undergraduate ICT program contributed to the research by serving as coders of the course content (some of which they had written themselves). Most of these teachers, three male and three female, were experienced senior teachers and were also members of the Curriculum Board of the ICT program. They were not experts in information literacy but represented either one of five subject differentiations or the professional skills training course. The representative of the professional skills course was unable to participate and was replaced by a colleague. The research design in which the participants coded their own course materials kept the researchers from being regarded as controllers or the "examiners with the red pencil". The participative research method motivated the teaching staff to reflect critically on their own and their colleagues' performance and to change their own practices if there were reasons for it.

2.2   Course Materials

The undergraduate ICT program in which the research is conducted is a comprehensive bachelor's program which started in September 2015. The program integrates, throughout the first half year, five former subject-based courses and consists of the following six domains: software engineering (SE), network & systems engineering (NSE), business and management (B&M), information security management (ISM), information & media studies (IMS) and professional skills. For each of these domains, the teaching staff produced new course materials that were used in the first ten weeks of the program (September-November 2015). The teaching method in the ICT program is that of the "flipped classroom", a type of blended learning strategy where instructional content is also delivered outside of the

classroom through videos and presentations in a digital learning environment. Examination occurs through the assessment of professional products and a multiple-choice test with items from all six subject domains.

In the research, all newly created course content that was found on the collaborative Sharepoint site (50 documents) were analyzed. Figure 1 gives the document types of the newly created course content.
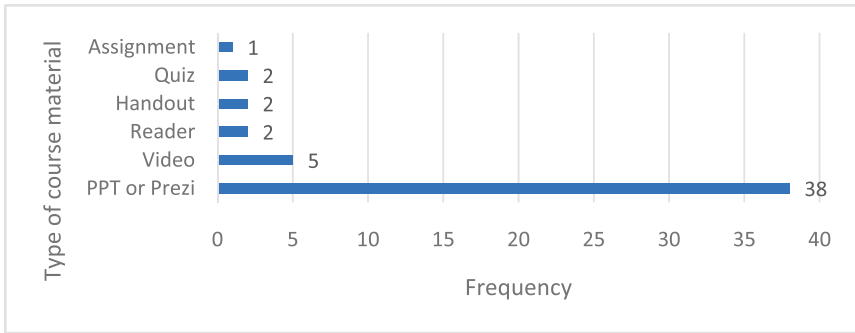
Fig. 1. Frequency of the types of course materials that were used

2.3 Procedure

Course materials were downloaded and provided to the participants beforehand by a link to a Sharepoint folder. The materials were distributed among each of the representatives of the six domains. Each participant was asked to execute a citation analysis and to assign one or more codes to each of his or her course materials to indicate the types of information sources referred to (derived from a list of types of information sources as given in Table 1). There was also an optional field that could be used for a type of content not listed in Table 1.

Table 1. Types of information sources being referred to (Students' mother tongue was Dutch)

Handbooks in Dutch	Popular article in Dutch	Report or Whitepaper in Dutch
Handbooks in English	Popular article in English	Report or Whitepaper in English
Open Educational Resource	Popular website in Dutch, for instance Wikipedia.nl	Research article or conference paper in English
Standards (ISO)	Popular website in English, for inst. Wikipedia.org	Scholarly website in English
Own content/unclear which resource is used		

The quantitative results of the citation analysis are discussed in a focus group that included all the participants and the head of the department, its intention being to find deeper insights into the findings and to formulate follow-up questions about the next step in the research into the faculty's information literacy skills.

Questions that are discussed were:

- How satisfied are the participants with the results?
- Do participants think that the academic staff should take steps to improve their use of information sources?
- Do participants have suggestions for further research?

The discussion is recorded and transcribed verbatim using an intelligent verbatim style: pauses and phrases with no meanings like 'uuh' and 'you know' were omitted [10].

2.4   Data Analysis

The outcomes of the citation analysis are presented by ranking the types of resources. A thematic analysis was conducted on the verbatim transcript made of the focus group's discussion in order to provide a descriptive account of issues and illustrative quotations to highlight these issues in participants own words [11].

3   Findings

3.1   Quantitative Results

Figure 2 gives the distribution of the types of information sources referred to in the 50 course documents.
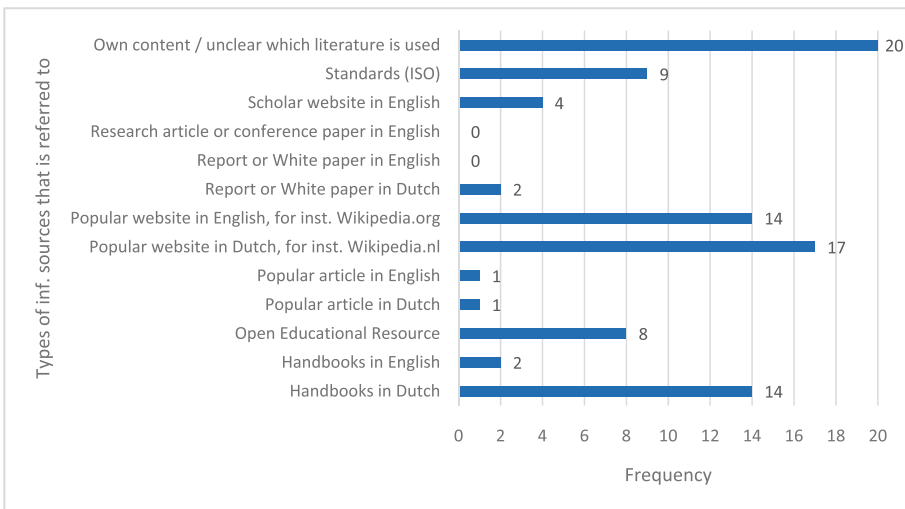
Fig. 2.   Distribution of reference types in 50 course documents

When we focus on the PowerPoint and Prezi presentations we find a distribution as displayed in Fig. 3.
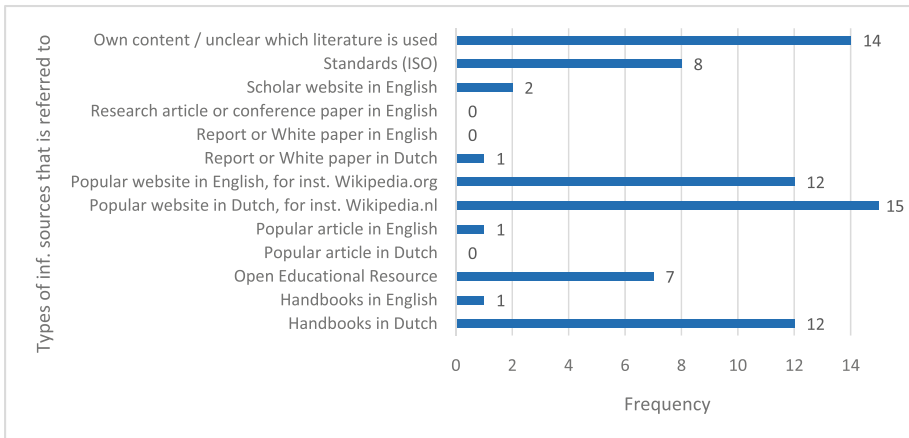
Fig. 3. Distribution of reference types in 38 PowerPoint or Prezi presentations

Both Figs. 2 and 3 show that teachers use a broad range of information sources for their course materials but that there is an obvious top three:

1. Popular websites in Dutch
2. Popular websites in English
3. Handbooks in Dutch.

However, there is also a lot of content without any references (the last category in Figs. 2 and 3 in which the source is unclear).

3.2   Qualitative Results

The quantitative results from Sect. 3.1 are discussed in the focus group. The participants agreed that they often refer to rather popular and generic information sources (websites, handbooks) because these information sources are more appropriate for students in their first year of an undergraduate program. According to the participants, academic journal articles and conference papers are often too hard to understand for undergraduate students. This is why they preferred to refer to sources in which the same information is explained in a more easily understood manner.

The second observation from the quantitative results in Sect. 3.1 – the fact that there is a lot of content without any references – was an important topic in the discussion. According to the participants, there is a lot of knowledge which is rather generic and which can be found in many different books. This type of knowledge is also referred to by the participants as "knowledge acquired by experience". One of the contributors said: "Sometimes I don't even remember where I acquired it". In their opinion, this – but also the fact that this knowledge is quite basic and does not change over the years – explains the rather high number of course materials that contain content for which the information source is not clear. One of the participants remarked however that relying on "common knowledge" also carries the danger of ignoring new developments in the domain. She also mentioned another

reason to refer to various types of resources: "We know that students have different learning styles. Some of them learn best by listening to the explanations given by a lecturer; others prefer to have the opportunity to re-read this material at moments that suit them best."

A second reason why teachers do not always refer to information sources, according to the participants of the focus group, is that a lot of learning content in the undergraduate program refers to skills that need a lot of training. In this case, "learning by doing" is the best instructional strategy while referring to scholarly literature seems rather unnatural. The undergraduate ICT program prepares students for jobs in private and not-for-profit organizations. Most of these students do not need to be educated for research work. The participant representing the software engineering domain was thus of the opinion that "the academic literature addresses topics that are really different from the topics that we see as important for our educational program". However, other participants replied that it is not enough to be competent in programming or "to be able to write codes" in the current work environment. Young professionals also need to be able to solve problems, gather data, and to compare different solutions.

At the end of the focus group discussion, the members of the group concluded that most of the participants are the opinion that referring to academic papers is not preferred in the more technical domain at the undergraduate level. The representative of the business domain (Business & Management and Information & Media Studies) had a slightly different opinion. He tries to stimulate paying attention to scholarly literature.

The key question, of course, was whether the teachers would change something in their information behavior. The participants expressed their intention to give more attention in their PowerPoint and Prezi presentations to references to literature in which the learning content could be re-read. This should be done at least for ethical reasons – to give an author or creator the credit for his or her work – but also for didactic purposes.

4   Conclusions

In this research we tried to find out to what extent teachers in the undergraduate ICT program at a university of applied sciences refer to information sources in their course materials and, if so, to which type of literature they refer.

Most of the course materials in the investigated bachelor's course were PowerPoint presentations. These presentations, due to the undergraduate level of the ICT program, most often referred to rather generic information sources like handbooks, and non-academic websites. It also appeared that academic staff "forget" to refer to information sources in their slides and handouts because this information is based on "common knowledge" that is not derived from one specific information source. The participants in the focus group agreed that they could improve their own and their colleagues' behavior on this point. It was interesting that the discussion about references in PowerPoint presentations is also found on academic forum websites like Academia Stack Exchange [12].

By applying a participative research method in which faculty staff gathered data about the course materials created by themselves and their own colleagues, the researchers succeeded in their attempt to stimulate staff members to reflect on their own information literacy behavior and to seek to improve it. Limitations of the research, however, were the

restriction to only two dimensions of the information literacy construct (availability of in-text citations and the quality of the cited information sources) and the restriction to 50 pieces of course materials from a freshman's year in an undergraduate program.

In the focus group discussion, the participants explicitly expressed that they intend to pay extra attention to the available information sources in their presentations in the future. If they do, this would not only be an improvement in the ethics of teaching but also an improvement in the didactic approach since it would provide students with the opportunity to process theory in different ways and through different channels.

In future research, we would want to find out whether the intervention had succeeded. Our present research can thus be considered as the start of a longitudinal research project. One of the questions we still have is whether the types of literature referred to during later years of the degree program differ from those referred to during the first year. We also have plans to extend this type of research to include other faculties at our university and to conduct it on a larger scale.

References

1. Ananiadou, K., Claro, M.: 21st Century Skills and Competences for New Millennium Learners in OECD Countries. OECD Education Working Papers 41 (2009)
2. de Haan, J., Huysmans, F.: Informatievaardigheden in een Kennissamenleving. In: Investeren in Vermogen: Sociaal en Cultureel Rapport 2006, pp. 92–115. Sociaal en Cultureel Planbureau, Den Haag (2006)
3. Smith, J., Oliver, M.: Exploring behaviour in the online environment: student perceptions of information literacy. Res. Learn. Technol. **13**(1), 49–65 (2005)
4. Moore, A., Ivory, G.: investigating and improving the information literacy of college faculty. In: Paper presented at the University Council of Educational Administrators Convention, Albuquerque, New Mexico (2000)
5. Godwin, P.: making life easier for academics: how librarians can help staff weather the technological storm. J. eLiteracy **2**(2), 68–79 (2005)
6. Urquhart, C., Rowley, J.: Understanding student information behavior in relation to electronic information services: lessons from longitudinal monitoring and evaluation part 2. J. Am. Soc. Inform. Sci. Technol. **58**(8), 1188–1197 (2007)
7. Probert, E.: Information literacy skills: teacher understandings and practice. Comput. Educ. **53**(1), 24–33 (2009)
8. van Helvoort, J.: A scoring rubric for performance assessment of information literacy in Dutch Higher Education. J. Inf. Liter. **4**(1), 22–39 (2010)
9. van Helvoort, J.: Beoordelen van Informatievaardigheden in het Hoger Onderwijs (Doctoral Dissertation, University of Amsterdam) (2016)
10. Intelligent Verbatim Transcription. https://www.academic-transcription-services.com/intelligent-verbatim-transcription/
11. Hennink, M.: Focus Group Discussions. Oxford University Press (2014)
12. Citations: Guidelines for Adding References to Powerpoint Presentations. http://academia.stackexchange.com/questions/37418/guidelines-for-adding-references-to-powerpoint-presentations

Searching as Strategic Exploration: How Well Do Faculty Know Their Students' Opinions Regarding Information Sources?

Katia G. Karadjova[✉] and Marissa M. Mourer

Humboldt State University (HSU), Arcata, CA, USA
{katia.karadjova,marissa.mourer}@humboldt.edu

Abstract. A research study at a rural, public university revealed gaps between faculty perception and student opinion on the importance and difficulty of use of information sources. This study shares the significant gaps discovered across four common stages related to the preparation of academic course assignments and the information-seeking process. The results of the study are intended to inform information literacy instructional practice and drive dialogue across a campus to support students where they are rather than where we hope them to be.

Keywords: Information literacy · Information-seeking behavior · Undergraduate students · Information sources

1 Introduction

In this research study we aimed to identify existing gaps between undergraduate students' perceptions of the importance and difficulty of use of various information resources for the completion of academic course assignments (including papers, projects, and presentations) and the corresponding perceptions that faculty/instructors hold of students' information-seeking behavior.

The literature, our practice, and discussions with students and departmental faculty suggested the following common stages related to the preparation of academic course assignments [1, 2]: identifying a topic; formulating a research question; finding scholarly publications; and evaluating sources. Students may perceive each of these steps as requiring different approaches with respect to gathering information.

We designed the study to detect any discrepancies between what students found important (along with corresponding difficulty of use) and what faculty think that students consider important (as well as perceived difficulty of use). Our aim was to identify any misconceptions and help increase campus awareness of student and faculty needs. This provided a rich opportunity for dialogue areas across the library and campus, which can support future meaningful collaboration. An elucidation of differences will help to focus both information literacy instruction to students and faculty curricular support more effectively. We addressed an important and recognized gap in the scholarly literature [3] that would help both groups, in practice, to conserve time and effort.

2   Literature Review

Over the last 25 years, librarians have undertaken substantial studies to survey under-graduate students about their information-seeking behavior [1, 2, 4–10]. Occasionally, librarians have been successful in also reaching out to faculty to survey them about their students' information use [11–15]. There is plentiful literature capturing data on infor-mation seeking behavior of undergraduates, across majors, as compared to faculty expectations, types of information resources, and evaluations of information literacy skills in integrating resources. Researchers have undertaken qualitative observational, interview, evaluative, and usability studies to learn about undergraduates' information-seeking behaviors [4, 5, 16–21]. One use-in-context study aimed to understand study behaviors within the environment that students conduct their research [20].

Yet, we did not find literature looking at both **importance of** and **ease of use** of information sources - by both undergraduates and faculty - categorized by specific academic tasks and comparing actual students' opinions and faculty perceptions about their students' experiences.

Information Seeking. Consistent conclusions drawn from faculty surveys demon-strated that there are gaps - sometimes significant - between students' observed or self-reported information-seeking behavior and what faculty reported about their students [12]. Some surveys on faculty sought to understand where departmental faculty expected that their students would learn information literacy skills [21–27]. Others centered on how well students apply information literacy skills to information seeking [28–31]. A study [32] surveyed students in seeking to understand the frequency that students needed to seek information for research assignments, if or when they had last received library instruction, and their self-reported comfort level with library research. Another study [23] included specific information resources that were not part of our survey, such as primary sources, government or NGO sources, or Audio/Visual sources. They also surveyed students about their self-reported opinions about the importance of each resource as well as their proficiency in using each type of resource. Although faculty were surveyed about their students' information resource use and information literacy skills in using resources, they were not asked to report on how their students value the importance or ease of use of these resources.

A mixed-methods study [11] evaluated the self-reported responses from both faculty and undergraduates against completed student theses using a rubric. Students were asked to rate the importance of key components of information resources - including meth-odology, author's credentials, and referral by librarian - rather than the information resources directly.

Google and Wikipedia. Consequently, the influence of Google and Wikipedia featured prominently in studies since these information resources were valued by students as important because of familiarity [3, 5, 33–35]. Results from these studies showed that, overall, students viewed these resources as important to their information searches. Recent studies revealed also that the majority of the undergraduate students start their research with Google and Wikipedia and tend to develop "Google-centric search skills"

[3, 5, 36, 37]. Student responses about Wikipedia on some surveys, though, showed that this source was not viewed always as an important one [16].

Other researchers undertook a cross-cultural study to learn about students' view of the importance of internet-based information resources in addition to Google and Wikipedia [1]. He et al. surveyed across multiple information resources and examined how students viewed the importance of those resources across various academic tasks. They identified the information resources through the use of a focus group with students.

Peers. Some studies noted that peers were helpful or important information resources [5, 17, 35].

Librarians. Librarians have factored low on importance in many studies [11, 12, 20, 38]. A study [39] posited that faculty's lack of library integration into the classroom and assignments could be contributing to this lack of perceived importance. The connection between students' desire for greatest ease during the research process was explored as it related to librarian support, and the question of perceived legitimacy of librarians to the information seeking process was a unique contribution to the literature [40]. An additional strong impetus for our having conducted this study was the seemingly low valuation of librarians and use of the library broadly.

Common themes from both quantitative and qualitative studies on students' research process uncovered trends of frustration, annoyance, anxiety, or disengagement with the search process [5, 11, 34]. We took this into account along with the lack of studies that explore both student opinions and faculty perceptions about student experiences in relation to both the importance of information sources as well as the ease of use of several common information resources. Our goal was to assess the gap and survey how well do faculty know their students' opinions regarding information sources.

3 Methodology

3.1 Research Question

Overall research question: How do faculty perceptions of the relative importance and difficulty of use of various information sources that students may use in the completion of academic course assignments differ from students' actual opinions?

3.2 Quantitative Approach

We designed, developed and administered two separate online surveys with matching questions, one to undergraduate students and the other to faculty. This allows for comparisons between students' opinions and faculty perceptions.

The surveys asked four split questions respective to one of the four outlined tasks: **identifying a topic**; **formulating a research question**; **finding scholarly publications**; **evaluating sources**. We asked respondents to rate ten different types of resources. We selected the four tasks through the literature [1, 2], our practice, and discussions

with students and departmental faculty. The resources included both people (faculty, peers, and librarians) and these information print and electronic resources:

- Internet search engines (e.g., Google);
- community-based encyclopedias (e.g., Wikipedia);
- traditional encyclopedias and dictionaries (e.g., Britannica);
- subject LibGuides;
- Databases (e.g., JSTOR, Science Direct, and Academic Search Premier);
- the library catalog (to identity books and e-books); and,
- Google Scholar.

We rated these resources on importance and difficulty of use on five-point Likert-type scales. In questions asking about importance, the ratings ranged from 1 for 'not important' and 5, 'very important.' In questions asking about difficulty, the respondent answered 1 for 'very difficult' and 5 for 'very easy'. In questions 5 to 6 we asked respondents to rate how difficult each task was by itself and in relation to each other.

The online surveys were hosted by Survey Monkey and administered by the Office of Institutional Research and Planning (IRP) on behalf of the researchers in order to adhere to confidentiality and security protocols for protecting personal data.

Sampling: We conducted a random sample of 1,500 undergraduate students, excluding freshmen and a random sample of 250 departmental faculty members across the university. We also collected corresponding demographic information for cross-tabulation with the data. The response rate for students was 8.24% (n = 124), and 23.2% for faculty (n = 58).

3.3   Limitations

The Office of Institutional Research and Planning (IRP) administered the surveys on our behalf. This helped with the data collection but at the same time presented the challenge of scheduling the surveys during the best possible time frame. Hence, over-surveying at the institutional level, including in relation to the university strategic planning, during this particular semester resulted in low student response rates. In retrospect, we should have considered offering some incentive to students to contribute to a higher response rate. The low student response rate challenged the generalizability of the results. Due to the low student response rate, we were not able to cross-tabulate data by discipline or any of the other demographic categories.

4   Results

Overall, the results showed significant gaps between students' opinions and faculty perception about their students' opinions. Some charts, below, give a visual representation of the results by question. Only question one, which was related to the *identifying a topic* task, did not show substantial differences.

We asked students to think of instances when they had to complete various academic course assignments (e.g., papers, projects, presentations) and rate the importance of

sources listed under each question. In other words, students rated how much each source mattered to the accomplishment of each separate task. We asked faculty to think of instances when their undergraduate students had to complete various academic course assignments (e.g., papers, projects, and presentations,) and answer what, they themselves thought the importance was of each of the possible sources to THEIR STUDENTS. Hence, faculty rated how much they think each source mattered to their students for the accomplishment of each separate task. We prompted both groups to answer questions 1 to 4 by selecting the corresponding boxes from the drop-down menus on the two scales, Importance and Difficulty of Use.

4.1   Question 1

Faculty: When <u>identifying a topic</u>, what is the importance and difficulty to use to your students of the following?

Students: When <u>identifying a topic</u>, what is the importance and difficulty to use of the following?

The results for this question did not show significant differences. Student and faculty responses were quite aligned for the most part. Students and their faculty found that *Internet search engines* such as Google were important and easy to use for the accomplishment of the task. They rated *Community-based encyclopedias* such as Wikipedia as neutral on importance but, at the same time, easy to use. Both groups found *Databases* to be important but not so easy to use. The other two sources, which were regarded as important to the accomplishment of this task, were the *Library catalog* and *Faculty*. An interesting revelation was that both groups acknowledged *Reference/Subject librarians* as important but difficult to use.

4.2   Question 2

In the second question in the inquiry, we surveyed the same resources in relation to the task of <u>formulating a research question</u>.

As seen on Chart 1, above, there were significant differences between the groups in relation to most of the resources. While students considered *Internet search engines* such as Google as neutral in importance and difficulty of use, faculty believed that their students regarded this resource as important and easy to use for the accomplishment of this task. Also, students acknowledged *Community-based encyclopedias* such as Wikipedia as not so important and somewhat difficult to use in relation to formulating a research question while faculty believed their students to consider the resource important and easy to use. While faculty perceived that students would be neutral on *Traditional encyclopedias and dictionaries (e.g., Britannica)*, students viewed them as very difficult to use.

Faculty regarded *Databases* as important and neutral on difficulty of use while students viewed them as neutral on importance and difficult to use. Students found *Google Scholar* as somewhat important but difficult to use, while faculty believed their students found it important and almost easy to use.
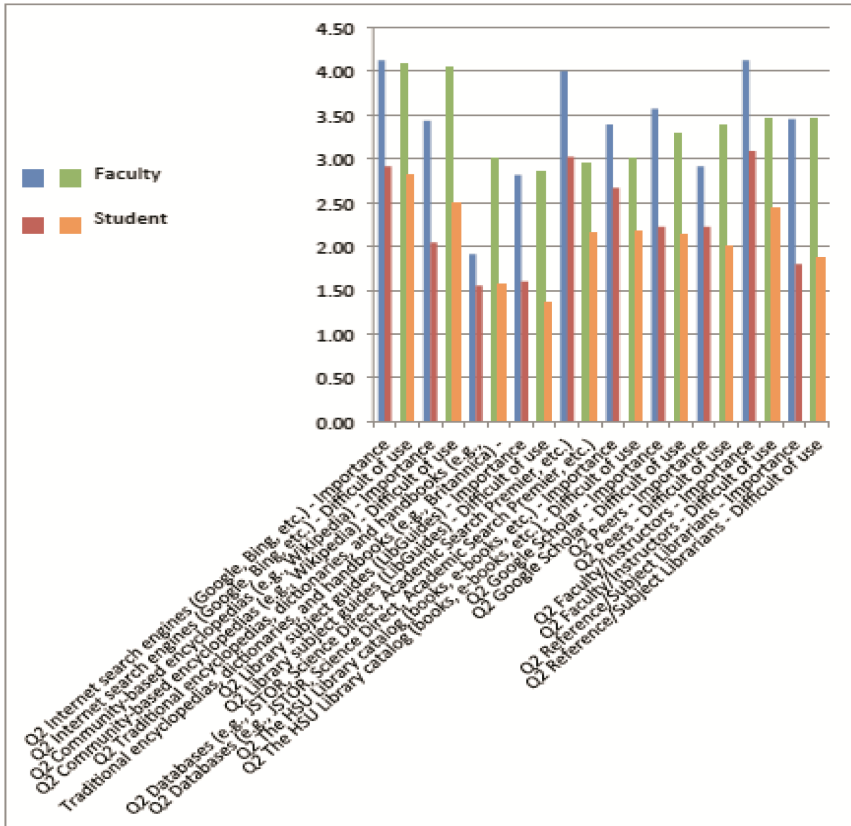
Chart 1. Task: Formulating a Research Question

Students rated *Reference/Subject librarians* and *Subject guides (LibGuides)* similar to *Google Scholar*: as somewhat important but at the same time difficult to use, while faculty believed these resources to be important and easy to use (*Reference/Subject librarians)* and neutral on importance and difficulty of use *(LibGuides)*.

In regard to *Peers* as a source, students valued them as not so important as well as difficult to use, while faculty perceived them to be neutral on importance and difficulty. *Faculty* believed that they were important and easy to use as a resource to their students, while students acknowledged them as neutral on importance and somewhat difficult to use in relation to the task.

4.3   Question 3

The third question in the inquiry surveyed the same resources in relation to the task of finding scholarly publications. As seen on Chart 2, below, there were again significant differences between the two groups in relation to most of the resources.
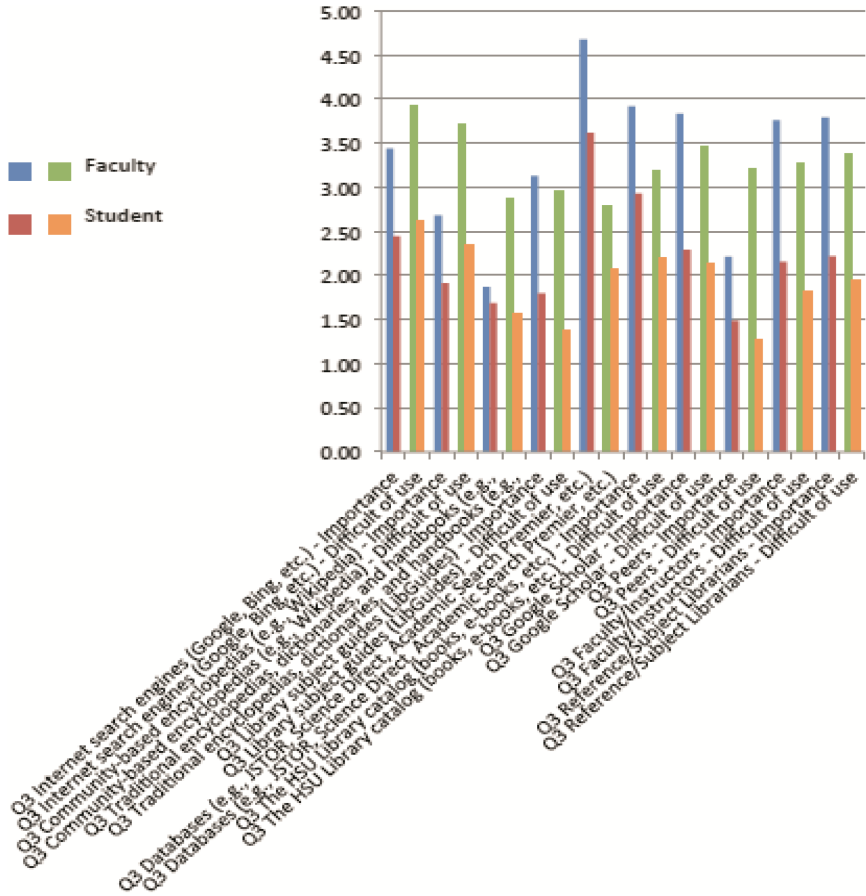
Chart 2. Task: Finding scholarly publications

Students considered *Internet search engines* such as Google somewhat important and not so easy to use while faculty believed their students to regard this source as kind of important as well as easy to use. While both groups rated *Community-based encyclopedias* such as Wikipedia as somewhat important, students viewed it as difficult to use, whereas the faculty regarded it as easy to use.

Both groups scored *Databases* very high on importance but they were rated as difficult to use, especially by students. Faculty expressed great belief in their students' viewing of databases as very important and students confirmed this by acknowledging this source as important to the completion of finding scholarly publications. Again, students rated *Google Scholar* as somewhat important but at the same time difficult to use while faculty believed their students to find it important and almost easy to use. It was interesting that students evaluated *Google Scholar* and the *Library catalog* as having the same difficulty to use and rated the *Library catalog* as more important than *Google Scholar*.

Faculty believed themselves to be an important and somewhat easy to use resource and rated *Reference/Subject librarians* the same way. At the same time, students also regarded departmental *Faculty* and *Reference/Subject librarians* very similar to each other but placed both sources as just somewhat important and difficult to use. There was a huge gap between students and faculty in the viewing of *Peers*. While faculty believed that their students found *peers* easy to use, students viewed them as a "very difficult to use" source.

4.4   Question 4

The fourth question in the inquiry surveyed the same resources in relation to the task of evaluating sources. As seen on Chart 3, below, the results were very similar to these of the preceding question.
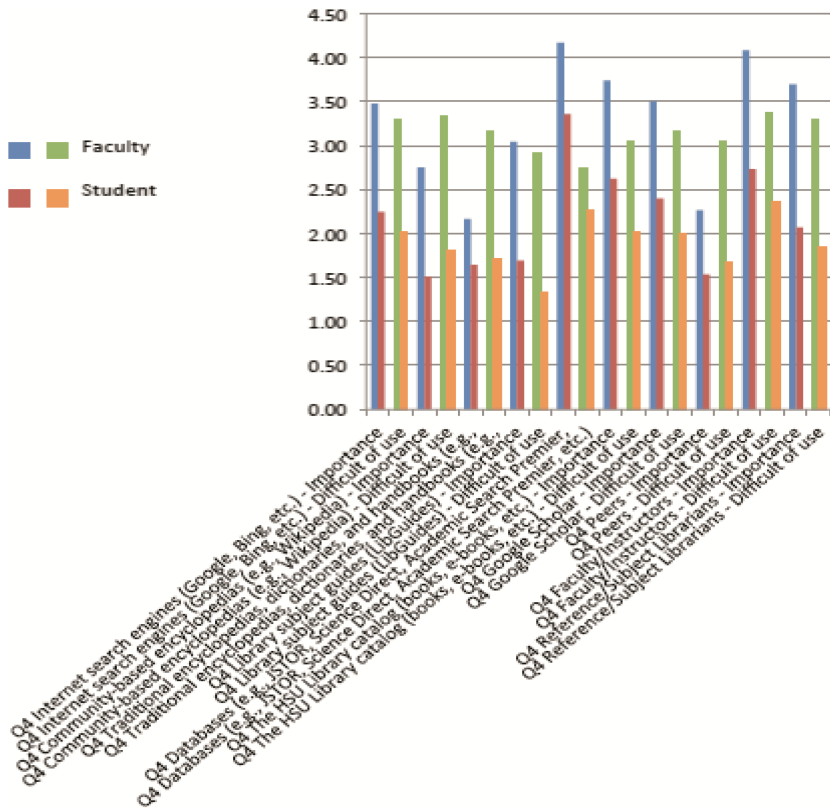
Chart 3. Task: Evaluating sources

4.5   Question 5

We asked students to rate how DIFFICULT each task seemed to them. We asked faculty to rate according TO THEM how DIFFICULT each task may have seemed to THEIR STUDENTS. Both groups were prompted to use the same difficulty of use scale: (1) Very difficult; (2) Difficult; (3) Neutral; (4) Easy' or, (5) Very easy.

Overall, students regarded each of the four tasks as easier than faculty believed them to be. At the same time, students did not find any of the tasks easy as the results showed on Chart 4, below. The faculty perception could have been biased if the students were underperforming.
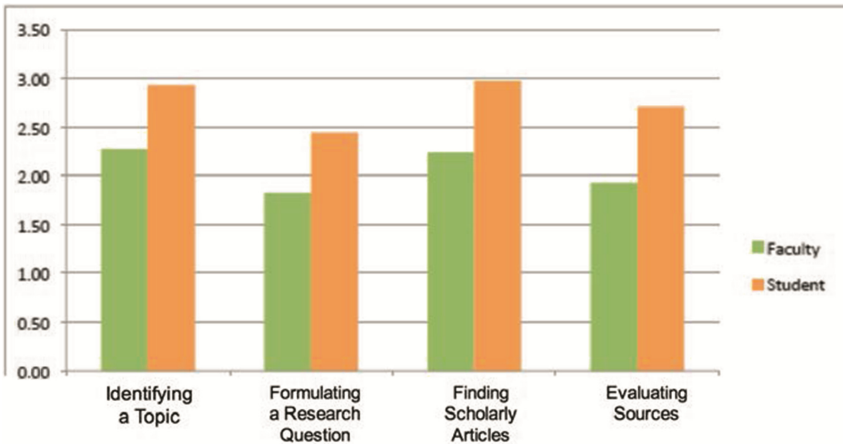
Chart 4. Difficulty of each task

4.6   Question 6

We asked students to rank the four tasks in relation to difficulty, with 1 indicating the most difficult. Correspondingly, we asked faculty to rank the tasks according TO THEM in relation to difficulty to THEIR STUDENTS, again with 1 indicating the most difficult).

Students ranked the tasks as follows: (1) Formulating a Research Question; (2) Identifying a topic; (3) Finding scholarly publications; and, (4) Evaluating sources. Faculty ranked them quite differently after the most difficult one, which was the same for both groups: (1) Formulating a Research Question; (2) Evaluating sources; (3) Finding scholarly publications; and. (4) Identifying a topic.

5   Conclusions/Discussion

Our study showed the existence of a gap between students' actual opinions and faculty perception about their students' opinions in relation to the importance and difficulty of use of different information resources as applied to specific academic tasks. Also, the study revealed a significant difference in regarding the difficulty of each task. A follow

up study would be very useful to elucidate the reasons for this disparity and help with bridging the gap.

Librarians and Subject Guides (LibGuides) were not viewed as very important, which aligned with the existing scholarly publications. The students, also, rated both resources as difficult to use. Low awareness among students of the existence of the LibGuides could be one of the reasons for this rating. Furthermore, as of now, the library provides a single college librarian serving as subject/liaison librarian to all departments and programs in a college, i.e., three colleges – three subject/liaison librarians. This means each of these librarians has to serve more than a few thousand students in more than a dozen different disciplines. This could be a reason why subject librarians were regarded as difficult source to use.

Although peers were noted in some studies as helpful or important information resources, our student responses did not support this conclusion. Yet, faculty responded that they presumed students would value the importance of their peers.

We have excluded first-year students from our study because they might not be familiar yet with the research stages and academic tasks at college level. While we did that, investigating first-year students' information seeking experiences could be foundational to understanding student experience as they navigate their way through later years and upper division classes. For example, as noted above, our survey findings showed that students did not rate peers as an important information resource whereas peers were rated just below librarians as a possible resource for first-year students [12].

Assessing student behaviors and skills across academic departments is another approach. As an example, a study [41] categorized academic disciplines into hard-soft, pure-applied, and life-nonlife systems categories. If we had had greater numbers of student responses, we would have also liked to compare across disciplines.

Nevertheless, the study elucidated existing gaps, which provides rich opportunity for dialogue areas across the library and campus and will support future meaningful collaboration. The results from the study can be used by departmental faculty to inform redesigning of assignments and the information resources required for completing them. Library units may want to take under consideration the divergence of faculty perceptions and student opinions when designing or redesigning library services. The elucidation of differences will help to focus information literacy instruction to students and faculty curricular support more effectively and would help both groups, in practice, to conserve time and effort.

References

1. He, D., Wu, D., Yue, Z., Fu, A., Thien Vo, K.: Undergraduate students' interaction with online information resources in their academic tasks: a comparative study. Aslib Proc. **64**(6), 615–640 (2012)

2. Saunders, L.: Faculty perspectives on information literacy as a student learning outcome. J. Acad. Librarianship **38**(4), 226–236 (2012)

3. Aguirre, M., Fleming-May, R.: "You Just Type in What You are Looking for": undergraduates' use of library resources vs wikipedia. J. Acad. Librarianship **38**(6), 391–399 (2012)

4. Asher, A.D., Duke, L.M.: Searching for answers: student research behavior at Illinois Wesleyan University. In: College Libraries and Student Culture: What We Now Know, pp. 71–86. American Library Association, Chicago (2012)

5. Head, A.J., Eisenberg, M.B.: Finding Context: What Today's College Students Say about Conducting Research in the Digital Age. Project Information Literacy Progress Report, Project Information Literacy (2009)

6. Kuhlthau, C.C.: Inside the search process: information seeking from the user's perspective. J. Am. Soc. Inf. Sci. **42**(5), 361–371 (1991)

7. Ajiboye, J.O., Tella, A.: University undergraduate students' information seeking behaviour: implications for quality in higher education in Africa. TOJET: Turkish Online J. Educ. Technol. **6**(1) (2007)

8. Timmers, C.F., Glas, C.A.W.: Developing scales for information-seeking behaviour. J. Documentation **66**(1), 46–69 (2010)

9. Martin, J.: Investigation of factors affecting information literacy student learning outcomes fails to undercover significant findings. Evid. Based Libr. Inf. Pract. **6**(2), 59–60 (2011)

10. Martin, J.: The information seeking behavior of undergraduate education majors: does library instruction play a role? Evid. Based Libr. Inf. Pract. **3**(4), 4 (2008)

11. Ganley, B.J., Gilbert, A., Rosario, D.: Faculty and student perceptions and behaviours related to information literacy: a pilot study using triangulation. J. Inf. Literacy **7**(2), 80–96 (2013)

12. Raven, M.: Bridging the gap: understanding the differing research expectations of First-Year Students and Professor. Evid. Based Libr. Inf. Pract. **7**(3), 4–31 (2012)

13. Cope, J., Sanabria, J.E.: Do we speak the same language? A study of faculty perceptions of information literacy. Portal Libr. Acad. **14**(4), 475–501 (2014)

14. Gullikson, S.: Faculty perceptions of ACRL's information literacy competency standards for higher education. J. Acad. Librarianship **32**(6), 583–592 (2006)

15. Tyron, J., Frigo, E.E., O'Kelly, M.K.: Using teaching faculty focus groups to assess information literacy core competencies at university level. J. Inf. Literacy **4**(2), 62–77 (2010)

16. Currie, L., Devlin, F., Emde, J., Graves, K.: Undergraduate search strategies and evaluation criteria: searching for credible sources. New Libr. World **111**(3/4), 113–124 (2010)

17. Diehm, R.A., Lupton, M.: Approaches to learning information literacy: a phenomenographic study. J. Acad. Librarianship **38**(4), 217–225 (2012)

18. MacMillan, M.: Watching learning happen: results of a longitudinal study of journalism students. J. Acad. Librarianship **35**(2), 132–142 (2009)

19. Procter, R., Goldenberg, A., Davenport, E., McKinlay, A.: Genres in support of collaborative information retrieval in the virtual library. Interact. Comput. **10**(2), 157–175 (1998)

20. Warwick, C., Rimmer, J., Blandford, A., Gow, J., Buchanan, G.: Cognitive economy and satisfying in information seeking: a longitudinal study of undergraduate information behavior. J. Am. Soc. Inform. Sci. Technol. **60**(12), 2402–2415 (2009)

21. Whitlock, B., Ebrahimi, N.: Beyond the library: using multiple, mixed measures simultaneously in a college-wide assessment of information literacy. Coll. Res. Libr. **77**(2), 236–262 (2016)

22. Dubicki, E.: Faculty perceptions of students' information literacy skills competencies. J. Inf. Literacy **7**(2), 97–125 (2013)

23. Jackson, B., MacMillan, M., Sinotte, M.: Great Expectations: Results from a Faculty Survey of Students' Information Literacy Proficiency. Institutional Repository, Mount Royal University (2014)
24. Leckie, G.J.: Desperately seeking citations: uncovering faculty assumptions about the undergraduate research process. J. Acad. Librarianship **22**(3), 201–208 (1996)
25. Leckie, G.J., Fullerton, A.: Information literacy in science and engineering undergraduate education: Faculty Attitudes and Pedagogical Practices. Coll. Res. Libr. **60**(1), 9–29 (1999)
26. Miller, I.R.: Turning the tables: a faculty-centered approach to integrating information literacy. Ref. Serv. Rev. **38**(4), 647–662 (2010)
27. Zanin-Yost, A.: Designing information literacy: teaching. Collaborating Growing New Libr. World **113**(9/10), 448–461 (2012)
28. Bury, S.: faculty attitudes, perceptions and experiences of information literacy: a study across multiple disciplines at York University, Canada. J. Inf. Literacy **5**(1), 45–64 (2011)
29. Hrycaj, P.L., Russo, M.F.: A survey of LSU faculty attitudes toward library research instruction. Louisiana Libr. **69**(4), 15–25 (2007)
30. Hrycaj, P., Russo, M.: Reflections on surveys of faculty attitudes toward collaboration with librarians. J. Acad. Librarianship **33**(6), 692–696 (2007)
31. Singh, A.B.: A report on faculty perceptions of students' information literacy competencies in journalism and mass communication programs: the ACEJMC survey. Coll. Res. Libr. **66**(4), 294–311 (2005)
32. Kunkel, L.R., Weaver, S.M., Cook, K.N.: What do they know?: An assessment of undergraduate library skills. J. Acad. Librarianship **22**(6), 430–434 (1996)
33. Colon-Aguirre, M., Freberg, K., Allard, S.: Perceptions and uses of google scholar among undergraduate students. In: Paper presented at the "Science Communication and Information Research" 33rd Annual Research Symposium College of Communication and Information, The University of Tennessee, Knoxville, TN (2011)
34. Lawrence, K.: Today's college students: skimmers, scanners and efficiency-seekers. Inf. Serv. Use **35**(1/2), 89–93 (2015)
35. Suarez, D.: Making sense of Liaison Consultations: using reflection to understand information-seeking behavior. New Libr. World **114**(11/12), 527–541 (2013)
36. Holman, L.: Millennial students' mental models of search: implications for academic librarians and database developers. J. Acad. Librarianship **37**(1), 19–27 (2011)
37. Rempel, J., Cossarini, D.: Communicating the relevance of the library in the age of google: improving undergraduate research skills and information literacy through new models of library instruction. Nordic J. Inf. Literacy Higher Educ. **5**(1), 49–53 (2013)
38. Miller, S., Murillo, N.: Why don't students ask librarians for help?: Undergraduate help-seeking behavior in three academic libraries. In: College Libraries and Student Culture: What We Now Know, pp. 49–70. American Library Association, Chicago (2012)
39. DaCosta, J.W.: Is there an information literacy skills gap to be bridged? An examination of faculty perceptions and activities relating to information literacy in the United States and England. Coll. Res. Libr. **71**(3), 203–222 (2010)
40. Lundstrom, K., Shrode, F.: Undergraduates and topic selection: a librarian's role. J. Libr. Innovation **4**(2), 23–41 (2013)
41. Whitmire, E.: Disciplinary differences and undergraduates' information-seeking behavior. J. Am. Soc. Inform. Sci. Technol. **53**(8), 631–638 (2002)

Novice and Expert Information Behavior: An Eye Tracking Study from Qatar

A.M. Salaz, Teresa MacGregor[(✉)], and Priya Thomas

Carnegie Mellon University, Doha, Qatar
{asalaz,teresam,priyadat}@qatar.cmu.edu

Abstract. This paper presents findings of an exploratory pilot study investigating the information evaluation behavior of 30 researchers, including both novices and experts. Specifically, the participants' approaches to evaluating the quality, credibility, and accuracy of scholarly materials were observed using Tobii eye tracking device hardware and triangulated with the participants' qualitative written descriptions of how they evaluated the material. The initial findings include hypotheses about differences between novices and experts, and the utility of different gaze measurements for assessing information evaluation processes.

Keywords: Information behavior · Eye tracking · Expert · Novice · Evaluation

1 Introduction

The study of user information behavior is essential for building information systems and services, such as those provided by academic libraries to meet the needs of researchers, scholars, and students. Information behavior encompasses many different types of activities from information seeking to access and evaluation, and even to production and publication. This study is concerned primarily with information evaluation and, in particular, with how evaluative judgments of scholarly information are made by expert researchers as compared to novice researchers.

An understanding of these differences has implications for how academic librarians and educators in a variety of contexts teach evaluative information skills to novices. Yet, the differences between novices and experts in terms of information behavior more broadly are not currently well understood, as illustrated in a recent Ithaka S+R report on information literacy and research practice which argues that librarians "may need to learn more about how real researchers do research… [p]eople who do outstanding research sometimes fumble through databases and use Google in a way that makes us cringe… [i]f people do these things and then write brilliant books that are beautifully researched, they provide ipso facto models of good research and, presumably, ***define information literacy***" [1, pp. 3–4] (emphasis added).

When teaching students how to evaluate information, librarians spend a great deal of time and effort guiding learners to focus on the aspects of sources that they assume matter most. For example, librarians have developed detailed rubrics, such as the CRAP test [2], that highlight features such as currency, reliability, and authority as good

evaluative measures of a source. However, such approaches have also been criticized as being overly simplistic or, at times, even misleading [3].

The pilot phase of the study reported here is primarily concerned with forming hypotheses about what differences may exist between novices and experts; hypotheses that can be tested more rigorously in subsequent phases of research. The study will also identify which of the more than 120 existing measures of eye movement [4] might be the best indicators for understanding evaluative cognitive processes in participants. These results lay the groundwork for a more systematic investigation into how novice and expert researchers are similar, as well as how they are different, and to help identify what matters most when evaluating sources.

This research has been conducted in the culturally and linguistically diverse Arab Gulf region. The Arab Gulf states, including Qatar, are home to millions of expatriates and local residents drawn together as a consequence of booming economic development fueled by oil revenue. As such, this region presents an extraordinary opportunity for researchers who are interested in diverse samples. Also, as higher education globalizes, there is a special urgency for studying common problems and issues outside of the typical research settings of the Western world, particularly where findings and solutions may be applicable or adopted within institutions that are becoming increasingly global and diverse.

Finally, this study employs a methodology which is relatively uncommon within studies of information behavior, combining quantitative eye movement data with qualitative responses from participants to both observe and interpret researchers' source evaluation processes and patterns. Using eye tracking data as a proxy for attention to certain source elements holds special potential in terms of being able to better access the latent thoughts and decision-making processes of researchers as they evaluate information.

2   Literature Review

The information behaviors of various types of users have been studied extensively over a period of decades using a wide range of methodologies [5], and this work has given rise to a number of important theoretical frameworks for understanding and predicting behaviors [6]. This body of work continues to evolve in order to identify and address new behavioral patterns exhibited in the context of new formats, costs, and accessibility of information in our global, digital era. However, the information practices and habits of expert researchers – those who conduct independent research with a level of success which merits publication and grant-funding – has not been widely explored. Also, focus has centered on retrieval and use, but rarely has the question been asked as to why researchers select particular sources. Information quality is a relative, not an absolute, concept. Information is regarded as high quality if it is fit for purpose, which can be judged only by the consumer of the information [7]. Therefore, the criteria used to make this judgement are of major importance to the study of information behavior.

Information Evaluation Behaviors of Novice Researchers. Metzger et al. observed that students relied heavily on internet and online resources for a variety of purposes,

despite the fact that they do not find these sources particularly credible in relation to traditional information sources [8]. Often, source evaluation was done by simple methods such as checking the date stamp at the end of a web page. Also, students considered authorship to be the most important feature of a high-quality website, but gave no consideration to the qualifications of the authors [9]. Another finding of note is that students' current knowledge of a topic mattered considerably in the process of making evaluative judgments on selected sources [10].

Information Evaluation Behaviors of Expert Researchers. In the case of professionals or experts, the vast majority of studies have focused on understanding information *seeking*, rather than information *evaluation*. Nancy Foster and colleagues briefly touched on the selection criteria used by faculty members, indicating that author names and acknowledgments in scholarly articles play a very important role in prioritizing them for reading [11]. Another set of studies focused on correlating expert judgments of journal quality with calculated impact factors [12, 13]. A study by Pinelli et al. looked at why aerospace engineers used certain sources; relevance was quoted as the most compelling reason, followed by accessibility, then technical quality or reliability [14]. O'Reilly, in his study on the variation of use of information by decision makers, observed that quality is often not an objective dimension [15]. This statement concurs with an earlier observation by Pfiffer and Salancik that perceptions of quality and reliability vary according to experience, goals, or personal preference [16].

Eye Tracking in LIS. Eye tracking takes the study of information evaluation to a new level by allowing researchers to analyze users' natural fixations when viewing a source. While this technology has been extensively used in other disciplines, such as reading comprehension, market research, and human factors, eye tracking is still relatively new to library and information science (LIS). Within LIS, researchers have used eye tracking methodology in usability studies of website and catalog interfaces [17, 18], users' web searching behavior [19], search engine results page analysis [20], and in studies linking eye movement patterns to information task paths [20].

The available literature shows great promise for this field of experimental study. Kemman stated that eye tracking provides a more thorough insight into user interactions with an interface [21]. Not only is user click data collected, but also gaze and focus data. Eye tracking data can point to the source of usability issues identified by traditional usability metrics [22]. The technology has also been successfully deployed to analyze user interaction with faceted search systems [23].

Eye tracking as a methodology shows potential for many other applications within LIS, but thus far has not been explored to its fullest potential. For instance, this method could be used to better understand browsing behavior in print collections, as well as to observe how researchers of varying ability approach the evaluation of information quality. The present study focuses on the latter application of eye tracking methodology and, therefore, represents an original methodological contribution to the field.

3   Methodology

3.1   Data Gathering

In the human-computer interaction lab at Carnegie Mellon University's branch campus in Doha, Qatar, each participant performed an evaluative task involving ranking the quality, credibility, and accuracy of two scholarly articles while their gaze and eye movements were tracked. Eye tracking was conducted using Tobii x60 remote tracking hardware that captures eye movement data at a rate of 60 times per second. Participants also wrote a brief qualitative reflection on the criteria used to rate each article. Finally, participants responded to demographic questions and questions about their professional experience and background. The answers to these questions identified the research experience of each individual participant, and provided evidence for diversity among the participant group.

The articles evaluated by each participant were selected from among Altmetric's Top 100 articles of 2015 [24]. Altmetric aggregates citation data of scholarly material referenced in popular media such as news, blogs, and social media sites like Facebook and Twitter. This selection technique identified scholarly articles that would likely be encountered by a wide cross-section of the public through their everyday interactions with common media outlets.

The articles were presented to participants in random order to minimize the effects of fatigue and ordering bias on the responses.

3.2   Survey Instrument

A literature search determined that no suitable validated instrument for measuring perceptions of the quality of academic sources was available. Therefore, the authors developed and piloted an instrument intended to gauge participants' perceptions of the quality, accuracy, and credibility of the articles used in the study. In order to develop this instrument, the authors crafted four Likert-type survey response items inquiring about the quality and merit of the articles, along with a single free-response question intended to gather qualitative data about the participants' ratings, then reviewed the instrument with five subject-domain experts in information systems and LIS. Based on professional feedback, the question items and answer choices were refined.

After refining the language and response options, the inter-item reliability of the scale was measured to ensure that all items measured the same factor of perceived article quality. Five different non-study volunteers used the instrument to rate a sample article. The inter-item reliability for the four Likert-type response items was measured using Cronbach's Alpha in SPSS, which indicated that one of the four Likert-type items did not correspond well with the other three in participant responses. In qualitative feedback, participants indicated that the question was vague. Therefore, the fourth question item was deemed not to be a reliable indicator of the participants' perceptions of quality of the articles and, therefore, was dropped in order to improve the overall scale.

The final study instrument contains the three remaining Likert-type survey response questions and one qualitative free-response question (see Appendix).

3.3 Measures of Research Expertise

Research expertise for this pilot was operationalized according to participants' experiences publishing articles, delivering conference papers, and receiving grant funding. In other words, this was measured on evidence of external validation of their research expertise.

For the purposes of data analysis, participants were categorized as novice researchers if they had no experience with publishing, presenting at conferences, or receiving research grants. Participants were categorized as expert researchers if they had at least four publications/presentations of any type, or at least three publications/presentations of any type and at least one funding award. Those participants who had some level of publication or conference presentation experience, but less than the expert threshold, were categorized as competent researchers. This terminology is borrowed from the Dreyfus model of adult skill acquisition [25].

3.4 Data Analysis

Data was first reviewed for quality and integrity, and some quantitative eye movement data was excluded on the basis of inaccuracies or imprecisions in calibration tests [26]. Data quality was evaluated using visual inspection of scanpaths (the order or sequence in which elements of the article are viewed) for all 30 participants, and using statistical analysis for 12 of the participants in order to provide indicative values of accuracy and precision. Quantitative eye movement data were analyzed using Excel and SPSS, and the data included in this analysis was accurate to a mean of .29° horizontally and .91° vertically across participants using fixation coordinates calculated by the Tobii I-VT fixation filter. Individual participants ranged in accuracy horizontally from .04 to .60°, and vertically from .29 to 1.55°. Participants included in this analysis had a typical root mean square precision measurement of .14° horizontally and .43° vertically, calculated on raw gaze sample data where each sample was averaged between the left and the right eye. Individual participants ranged in precision from .07 to .24° horizontally, and .12 to 1.2° vertically. These levels of accuracy and precision are insufficient for interpreting finer eye movement measurements, but are more than adequate for identifying areas of interest on a document [4]. Some participants viewing the upper third of the display exhibited larger, although reliable and predictable, accuracy errors of up to 1.55 vertical degrees. Data in these cases was analyzed by calculating an appropriate offset to determine what participants actually had in focal view 1.55° higher than what was recorded as being in focal view. Areas of interest were determined ahead of data gathering by deconstructing each document into standard academic article building blocks, such as journal title, article title, authors, affiliations, abstracts, references, and other major sections. A comparison of participant scanpaths between these areas was conducted, as well as analysis of the number and length of fixations in these areas.

Qualitative response data was analyzed thematically using NVivo. Questionnaire data, including article ratings and demographic responses, was analyzed with SPSS.

4   Findings

The participant group for the pilot comprises 19 females and 11 males, ranging in age from 18 to 54. Participants represent the diverse nationalities present in the population of Qatar, including India (15), Bangladesh (2), Pakistan (2), Philippines (2), Singapore (1), Palestine (1), Jordan (1), United Arab Emirates (1), USA (1), UK (1), Australia (1), and Nigeria (1). Of this group, 18 participants were categorized based on their research experience as *novice* researchers, 7 as *competent* researchers, and 5 as *expert* researchers.

Novice researchers typically required more time in total to evaluate the materials than did expert researchers. Novice researchers also explained their ratings qualitatively by the degree to which the articles' conclusions were consistent with their prior knowledge. Among novices, agreement with prior knowledge resulted in higher quality ratings, while conflict with prior knowledge resulted in lower quality ratings. The following quotations in response to the prompt, "Please explain which features of the material caught your attention and affected your ratings" exemplify the pattern of comparing findings with prior knowledge among novices:

- "From my other readings, I found the findings in this article true." (P2, novice)
- "I would say that from my own experience and observation, it is quite true." (P4, novice)
- "The study assured what I have believed before…" (P27, novice)
- "…an article supporting my own belief and experience was something that I need not think twice to agree" (P30, novice)

Both novices and competent researchers commented on the interest level and likability of the subject matter as affecting their ratings. The following quotations exemplify the pattern of evaluating materials based on interest and likability among both novices and competent researchers:

- "The article about religion and altruism is a very important subject in the current world." (P8, novice)
- "I gave it a high rating, because I'm interested in that information." (P12, competent)

Among expert and competent researchers, prior knowledge was never explicitly mentioned in qualitative explanations for their ratings. Nor did expert researchers mention likability of the subject matter. Instead, expert researchers focused exclusively on detailed evaluations of the study instruments, size, and other methodological factors in their qualitative responses. Competent researchers frequently included similar considerations.

Eye movement and gaze data were consistent with the qualitative response data. Novices spent comparatively more time looking at the conclusions of the articles, and comparatively less time looking at methodology. Expert and competent researchers spent more time looking at the literature review and methodology sections of the articles.

Competent researchers – those whose experience falls between novices and experts – tended to comment on methodological aspects of the papers in the same way that experts did. However, scanpath analysis from the gaze data indicates that these individuals reviewed the conclusions of the articles first, and then the methodology; whereas experts reviewed the methodology first, and then the conclusions.

5   Discussion

The extent to which novice researchers relied on their prior knowledge to evaluate the merits of the articles is clear from the qualitative responses, and is consistent with findings from prior studies. However, for the competent researchers in this pilot, we hypothesize that they relied heavily on prior knowledge to evaluate the articles, but had sufficient training and exposure to scholarly information evaluation techniques to know that this was not an adequate basis for judging the quality of the work. Therefore, these participants sought other evidence to justify their prior-knowledge based evaluations to report in their qualitative responses. This is one possible explanation for the difference in article ratings between competent and expert participants despite their agreement in focusing on the same details of the document in qualitative responses. Further investigation with a more systematic approach could substantiate or disprove this hypothesis.

From this exploratory data, we also hypothesize that meaningful gaze data distinctions exist between novice and expert researchers, potentially including scanpath and total fixation time. This hypothesis also requires validation through additional, systematic investigation. The accuracy and precision of the captured data in this study is not sufficient to analyze differences in very fine eye movement data, such as the extent to which participants re-read individual words in the text, and so these sorts of measures remain open for exploration in improved lab conditions.

6   Conclusion and Recommendations for Future Research

The data from this exploratory pilot study is intended to inform more concrete hypotheses for continued investigation. Based on the findings, we have indications that expert researchers focus on sections of published research articles that require a certain level of scientific literacy to understand, namely the influence of methodological choices on the validity of scientific studies. Therefore, we hypothesize that helping undergraduate students understand epistemologies and research methods will aid in their evaluation of data and sources; a hypothesis that may be tested further through library instruction sessions. We also hypothesize that competent or developing researchers may first learn to mimic expert-level evaluations of data while actually relying on novice-level strategies. This finding merits further, systematic investigation as it could explain why upper-level undergraduates and graduate students could test well for information evaluation skills, while lacking the ability to execute expert level research. Finally, we hypothesize that there may be certain eye tracking and gaze measurements, such as scanpath or fixation time, which could be tied predictably to research abilities in certain circumstances. The possibility of diagnosing research expertise and information literacy with eye measurement data is an area for more rigorous exploration.

Appendix

Piloted survey instrument.

Q1 To what extent do you agree with this statement?
The information presented in this material is **credible**, *by which we mean that the material is believable and authoritative*:

1 Strongly Agree   2 Agree   3 Slightly Agree
4 Slightly Disagree   5 Disagree   6 Strongly Disagree
7 Unsure/Undecided

Q2 To what extent do you agree with this statement?
The information presented in this material is **accurate**, *by which we mean that the material is precise and free of intentional or unintentional errors*:

1 Strongly Agree   2 Agree   3 Slightly Agree
4 Slightly Disagree   5 Disagree   6 Strongly Disagree
7 Unsure/Undecided

Q3 Please rate the material's overall **quality**, *by which we mean the degree to which the material is truthful, accurate, and of sufficient comprehensiveness for the purpose stated by the authors*:

1 Strongly Agree   2 Agree   3 Slightly Agree
4 Slightly Disagree   5 Disagree   6 Strongly Disagree
7 Unsure/Undecided

Q4 Please explain which features of the material caught your attention and affected your ratings: (maximum 100 words)

References

1. Foster, N.F.: Information literacy and research practices. Ithaka S+R 13, 3–4 (2014). http://www.sr.ithaka.org?p=24944
2. Orenic, K., Beestrum, M.: The CRAP test. LOEX Wiki (2008). http://loex2008collaborate.pbworks.com/w/page/18686701/The%20CRAP%20Test
3. Lupton, M.: Critical evaluation of information: generic, situated, transformative, and expressive windows. In: Spiranec, S. et al. (eds.) The Third European Conference on Information Literacy, Tallinn, Estonia, Abstracts p. 8. Talinn University, Tallinn (2015)
4. Holmqvist, K., Nyström, M., Andersson, R., Dewhurst, R., Jarodzka, H., van de Weijer, J.: Eye Tracking: A Comprehensive Guide to Methods and Measures. Oxford University Press, Oxford (2011)
5. Case, D.O.: Looking for Information: A Survey of Research on Information Seeking, Needs, and Behavior. Emerald Group Publishing, Bingley (2012)
6. Fisher, K.E., Erdelez, S., McKechnie, L. (eds.): Theories of Information Behavior. Information Today Inc., New Jersey (2005)
7. Howard, G., Lubbe, S., Klopper, R.: The impact of information quality on information research. Manag. Inform. Res. Des. **18**, 288–305 (2011)
8. Metzger, M.J., Flanagin, A.J., Zwarun, L.: College student web use, perceptions of information credibility, and verification behavior. Comput. Educ. **41**, 271–290 (2003)

9. Grimes, D.J., Boening, C.H.: Worries with the web: a look at student use of web resources. Coll. Res. Libr. **62**, 11–22 (2001)

10. Rieh, S.Y., Hilligoss, B.: College students' credibility judgments in the information-seeking process. In: Metzger, M., Flanagin, A.J. (eds.) Digital Media, Youth, and Credibility, pp. 49–72. MIT Press, Cambridge (2008)

11. Foster, N.F. (ed.): Scholarly Practice, Participatory Design, and the Extensible Catalog. Association of College and Research Libraries, Chicago (2011)

12. Bornmann, L., Marx, W.: Methods for the generation of normalized citation impact scores in bibliometrics: which method best reflects the judgments of experts? J. Informetr. **9**, 408–418 (2015)

13. Haddawy, P., Hassan, S.U., Asghar, A., Amin, S.: A comprehensive examination of the relation of three citation-based journal metrics to expert judgment of journal quality. J. Informetr. **10**, 162–173 (2016)

14. Pinelli, T.E., Kennedy, J.M., Barclay, R.O.: NASA/DoD aerospace knowledge diffusion research project. paper twelve: the diffusion of federally funded aerospace research and development (R and D) and the information seeking behavior of US aerospace engineers and scientists. DTIC Document (1991)

15. O'Reilly, C.A.: Variations in decision makers' use of information sources: the impact of quality and accessibility of information. Acad. Manag. J. **25**(4), 756–771 (1982)

16. Pfeffer, J., Salancik, G.R.: Administrator effectiveness: the effects of advocacy and information on achieving outcomes in an organizational context. Hum. Rel. **30**(7), 641–656 (1977)

17. Lorigo, L., Haridasan, M., Brynjarsdóttir, H., Xia, L., Joachims, T., Gay, G., Granka, L., Pellacini, F., Pan, B.: Eye tracking and online search: lessons learned and challenges ahead. J. Am. Soc. Info. Sci. Tech. **59**, 1041–1052 (2008)

18. Kammerer, Y., Gerjets, P.: Effects of search interface and internet-specific epistemic beliefs on source evaluations during web search for medical information: an eye-tracking study. Behav. Info. Tech. **31**(1), 83–97 (2012)

19. Pöntinen, J., Vakkari, P.: Selecting fiction in library catalogs: a gaze tracking study. In: Aalberg, T., Papatheodorou, C., Dobreva, M., Tsakonas, G., Farrugia, C.J. (eds.) TPDL 2013. LNCS, vol. 8092, pp. 72–83. Springer, Heidelberg (2013). doi:10.1007/978-3-642-40501-3_8

20. Cole, M.J., Gwizdka, J., Liu, C., Bierig, R., Belkin, N.J., Zhang, X.: Task and user effects on reading patterns in information search. Interact. with Comp. **23**, 346–362 (2011)

21. Kemman, M., Kleppe, M., Maarseveen, J.: Eye tracking the use of a collapsible facets panel in a search interface. In: Aalberg, T., Papatheodorou, C., Dobreva, M., Tsakonas, G., Farrugia, C.J. (eds.) TPDL 2013. LNCS, vol. 8092, pp. 405–408. Springer, Heidelberg (2013). doi: 10.1007/978-3-642-40501-3_47

22. Pretorius, M.C., Biljon, J., Kock, E.: Added value of eye tracking in usability studies: expert and non-expert participants. In: Forbrig, P., Paternó, F., Mark Pejtersen, A. (eds.) HCIS 2010. IAICT, vol. 332, pp. 110–121. Springer, Heidelberg (2010). doi:10.1007/978-3-642-15231-3_12

23. Kules, B., Capra, R., Banta, M., Sierra, T.: What do exploratory searchers look at in a faceted search interface? In: Proceedings of the 9th ACM/IEEE-CS Joint Conference on Digital Libraries, pp. 313–322. ACM, New York (2009)

24. The Altmetric Top 100: What academic research caught the public imagination in 2015? Altmetric. http://www.altmetric.com/top100/2015

25. Dreyfus, S.E.: The five-stage model of adult skill acquisition. Bull. Sci. Technol. Soc. **24**, 177–181 (2004)

26. MacGregor, T., Salaz, A.M., Thomas, P.: Eye tracking pilot accuracy and precision data (30 Participants). Figshare. doi:10.6084/m9.figshare.3483146.v1

Discipline Based Studies

Views of Legal Scholars About the Concept of Information Literacy in the Field of Law: Case Study of a Law Faculty in the Republic of Croatia

Dejana Golenko[✉]

Faculty of Law, University of Rijeka, Rijeka, Croatia
`dejana@pravri.hr`

Abstract. This study is one of the results of a wider research, which investigates the views and opinions of legal scholars regarding the concept of IL and information skills and needs of today's students, particularly of information skills in the field of law. This would allow for a deeper understanding of the context of IL in the field of law and offer insights into the required generic skills of IL and contextual information skills from the standpoint of legal scholars. The study used qualitative method of in-depth interviews based on Relational Model by Christine Bruce with academic staff in a case study at the Faculty of Law, University of Rijeka. At the theoretical level, the desire was to stimulate discussion and awareness of the importance of the concept of IL in the field of law and open the way for further research.

Keywords: Information literacy · Legal scholars · Law faculties · Republic of Croatia · In-depth interview

1 Introduction

Research on the concept of information literacy (IL) in the field of law is non-existent in the Republic of Croatia. Only a limited number of academic articles on the IL concept in the field of law have been published [1–3]. Since a large number of higher education institutions in the world conduct IL programs for students at a formal institutional level to develop needed skills and competences necessary for learning and education, including long life learning, research on IL in the field of law in the Republic of Croatia has shown to be an interesting and intriguing task. Lack of research was the main reason to conduct research that would enable a deeper understanding of IL in the field of law in Republic of Croatia.

2 Previous Research

Development of IL in the field of law can be observed in comparison to the development of IL at universities and higher education libraries in the world. A large number of authors emphasizes that law libraries, because of ICT (Information and Communication Technologies) development and changes in the educational environment, there is a need

to adapt their information services and apply IL programs [4–6] as much as possible. IL within the field of law is based on a large number of specific aspects, even unique ones with regards to other scientific fields including finding and evaluating legal sources, rules of citation of legal sources, application of positive legislation, and the specific nature of particular fields of law [7]. Considering the mentioned particularities of the field of law, some authors list the generic and contextual IL skills that should be owned by every law student [5, 8]. Ryskey claims that law students need to know specific legal sources, rules of citation of legal sources, and the use of legal databases [9]. Some authors emphasize that IL programs in the field of law need to be based upon practical models which emphasize cooperation and integrated approach in creating curricula, especially the cooperation of academic and library staff in order to equally develop not only generic, but also contextual skills of law students [5, 10, 11].

3   General Presentation of Current Conditions

Although IL programs at universities include a full array of things, IL programs at law faculties are conducted through an informal cooperation with the teaching staff and several individual practical examples in the field of law. Due to unsystematic education it can be assumed that students of each year of study have different levels of basic information competences, as well as necessary information skills in the field of law [2]. Since there is such a small number of research and insufficient amount of evidence, it can be concluded that there are either not enough programs or that they are not based on real needs of students, teachers and other participants of educational process [1].

4   Research Problem and Research Questions

For a detailed insight of the problem it would be necessary to conduct an extensive research that would provide a deeper understanding of the context of IL in the field of law. This study is one of the results of a broad doctoral research that includes research of attitudes and opinions of legal scholars, attitudes of teaching staff on the IL concept and on information skills and needs of today's students, (especially on developing information skills in the field of law), and on an expert profile who needs to conduct IL programs - who they are intended for and on the possible content of such programs. This would provide a better understanding of the IL context in the field of law and provide insight of the needed generic and contextual IL skills in the field of law from the standpoint of legal scholars. The aim was to explore which legal information skills a law student should learn, which would be useful to him in his work as a future lawyer, as well as what entails the concept of legal skills in relations to the IL skills in the field of law. The broader study aims at identifying appropriate indicators for creating such educational environment for students which would enable continuous and systematic acquisition of IL competences, and finding guidelines to opening space for cooperation between librarians and teaching staff in the field of law. With this in mind we attempt to answer the following research questions:

What is the attitude of the teaching staff towards IL and cooperation of teaching staff and librarians in forming and conducting IL programs, and should this attitude be changed and how? What are the attitudes of teaching staff regarding existing and needed information skills of students, particularly in the field of law? What are the attitudes of teaching staff regarding the expert profile who would conduct IL programs? What are the attitudes of teaching staff regarding the possible content which the IL program should encompass?

5   Methodology

We tried to find answers to those questions by using the qualitative method of in-depth interviews with the teaching staff through a case study conducted at the Faculty of Law at the University of Rijeka. The study applied a deliberate pattern, typical of the population which was to be explored. The sample included 20 respondents from the ranks of teachers who teach legal subjects, to investigate their opinions about the phenomenon of IL based on their experience, and the necessary information skills and competences in the field of law. Interviews were based on underlying phenomenographic interviews, as such access provides a description of a phenomenon and can in a holistic and integrated manner encompass different conceptions of the same phenomenon because of different experiences of people [12]. Phenomenographic interviews as a special form of qualitative interview method were used in the research field of information behavior in order to understand a person's behavior and find the cause of the behavior [13] and were processed through *VLC media player*. Interviews lasted an average of 45 to 90 min, depending on the willingness and interest of participants in the topic and conversation. A pilot study was also conducted (through participation of three respondents) in order to test the Protocol for the interview or to obtain insight on well-placed and guided questions within the interview. After the interviews, transcripts were made which were then forwarded to respondents via e-mail for confirmation before the next stage of research commenced - analysis of the results. Respondents are coded with the following labels: N1, N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N1 and N20.

The form with the categories for a systematic analysis of in-depth interviews with teaching staff included two sets of questions.

To obtain an unbiased opinion of the teaching staff about the IL, the first group of questions included nine sub-categories which explored the notion of IL from the point of view of scholars from different areas of the law on the basis of their personal experience in the use of information. Christine Bruce's relational model [12] was used as a base for the first group of questions in order to set up categories and subcategories and take into account the recommendations proposed by Sandberg for the implementation of phenomenographic interviews [14]. According to this model, there are seven different sizes or "*face*" experiences in dealing with the information, that is, seven different ways of interaction between people and information, so the framework for questions within the interviews was guided by that model [12].

Questions therefore included different dimensions or "*face*" experiences in dealing with the information, including different interactions between legal scholars and information. For example, how they use information technology, how they use information resources (to find and locate information in various sources); what is their information process (what strategies they use in new situations or in solving problems); information control (which media are used to "master" the information, or to get to them the necessary information); knowledge construction (how much of their personal judgment and experience influence the choice of information); knowledge extension (how much their obtained experiences affect the broadening and acquisition of new knowledge); and wisdom (how much do they use the acquired knowledge in the wider context and their environment, including their ethical judgment). These categories enabled a deeper insight into the understanding of the phenomenon of IL from point of view of legal scholars, understanding of the information behavior of legal scholars, and determining the sample [12].

The second group of questions explored the opinions of the teaching staff on information skills and the needs of today's students, especially the development of information skills in the field of law. The goal was to find what legal information skills law students need to learn as future lawyers, as well as what is included in the concept of legal skills in relation to IL skills in the field of law. The last category included the opinion of the teaching staff about the importance of the implementing an IL program, the profile of experts who would carry it out and to whom, as well as possible content of such a program.

The results are grouped with regard to the meaning and different understanding of the same content. A comparison of the respondents' opinions has been conducted and differences in experiencing IL have been found. At the end of the analysis, categories identified as interrelated were connected. Due to the limited scope this paper will show only the basic categories and results.

6   Results

Opinion of the Teaching Staff on the Concept of IL.   Most respondents associate the concept of IL with research skills, the ability to assess, evaluate and use relevant sources of information. [N1, N2, N3, N5, N8, N10, N12, N15, N20] "*IL is the ability and skill of assessing information, the ability and knowledge of relevant sources and ways to get to these sources.*" [N5] Some of the respondents associate IL with computer literacy [N2, N4, N6, N9, N11, N15, N19]. Some of them associate the concept of IL with the acquired knowledge within particular research areas based on experience, but they also consider that information literate persons are those with a developed critical awareness and understand the context of a particular situation [N7, N10, N14, N20].

Interpretation of the Concept of Information Skills by Teaching Staff. Most teachers believe that information skills should be continuously developed because of the constant development of ICT and changes in the educational environment [N1, N5, N6, N7, N8, N13, N14, N15, N18]. "*Competences constantly need to be developed for a person to gain skills, and when you neglect them they get lost.*" [N7] They describe

the importance of acquiring information skills through their personal experiences. Respondents who have attended some form of IL education are aware that such IL programs are conducted at the Faculty [N1, N3, N7, N10, N12, N13, N15].

The Use of Information Technology and Information Resources. Teachers in different phases of their research use different technology and apply their knowledge of various information sources, especially in the field of law, they recognize the structure of legal sources and use them independently [N1-N20].

Information Process. Regarding the information process the opinions of the teaching staff can be divided into two basic categories. In the first group are teachers who have pre-set research strategies in solving problems [N1-N8, N11-N14, N18, N19, N20]. "*It is important to get information faster and easier. Easier – to have an established process, perhaps initially taught, and later trained so the first half an hour of wondering where to start looking disappears*" [N18]. In the second group are teachers who find the necessary information mainly through intuition, or do not have an established pathways or methods of researching the information [N9, N10, N15-N17]. "*I do not have a structured way of researching, I'm intuitive*" [N9].

Information Control. Teachers use and apply variety of media, depending on required information, in particular in their scientific work. For example, to find positive legislation they use the official database of Croatian laws and legal databases of revised texts of Croatian laws that are currently in force. [N1-N20]. *To search for legislation I use the official databases containing legal texts…* [N18].

Knowledge Construction. Teachers critically review any information which becomes the object of their own judgment. Thus, they take into account various factor that influence the relevance of the information. They take into account who they have received information from (people, media) [N1, N4, N5, N6, N9, N19], and consider that in the context of a given field new information must be based on the already proven background knowledge within a discipline or field [N2, N7, N17, N19, N20], and any new information must be assessed on the basis of whether it is purposeful and useful [N15, N18]. "*A source within science is much more important than in real life, because in science we want credibility of information to be verified by a source we obtained it from in order to rely on information*" [N6].

Knowledge Extension. Respondents point out that only open and free individuals can acquire new knowledge without prejudices, respecting the dignity and skills of other individuals, but also that new knowledge is dependent on conditions from the environment and previously acquired knowledge or gained lifetime experiences. [N2, N7, N10, N17, N19, N20]. They point out that it is necessary to develop new knowledge in the use of ICT, but also in knowledge and use of relevant and quality sources of information because in that way every individual develops an established process of researching information that enables them to reach relevant and credible information faster and easier

[N2-N7, N10, N12, N13, N15]. "*I am probably making up for lack of technical knowl-edge with other knowledge, which allows me to go faster, assuming that I know some of the things and I can get to it*" [N10].

Wisdom. Respondents believe that lifelong education and the openness of an individual to new knowledge are essential for developing their own personality, not only through acquisition of knowledge within the scientific field that the individual works in, but also through acceptance and acquisition of knowledge based on experiences in everyday life [N1-N3, N6, N10, N16, N19, N20]. The result is that the acquired knowledge is applied in a broader context and environment "*There must be some type of pre-knowledge for anything and I think that it is up to each individual, not even up to expertise, to know how to adapt and apply that multitude of beautiful information to rational usage patterns, otherwise this database is just a mass of data*" [N2].

Teaching Staff Opinions about the Existing Information Skills of Students, Especially about Developing Information Skills in the Field of Law. Respondents emphasize the importance of learning and learning through problem-solving situations, and apply various simulations of situations in the context of legal clinics. They observed a large number of *Google generation* characteristics [15] and believe that today's students are pretty superficial when conducting research and finding relevant informa-tion [N1-N5, N7, N11, N13, N18]. One group of teachers reported that students often overestimate their information skills in finding relevant sources [N2, N6, N9, N15], while the second group overestimates the skills of students and believes that these skills should have been acquired during their elementary and secondary education [N1, N3, N5, N11]. The majority of respondents conclude that students, although they have a much larger choice and access to various sources of information than 20 years ago, under-use and are unfamiliar with legal databases (particularly international databases and relevant databases of the European Union), and in the process of writing students' academic papers the most common problems are citing legal regulations and the inter-pretation of positive law (application of legal regulations in force) as well as oral and written legal expression [N1, N3, N4-N7, N11, N13, N16, N17].

Necessary IL Skills of Students in the Field of Law. Needed skills that law students should have can be divided into three main groups. The first group includes the impor-tance of developing general information skills regardless of the scientific discipline, the second group comprises the importance of developing professional skills relevant for lawyers, which can be divided into two subgroups – one is legal skills that law students should develop in all years of study and do not apply to information skills but are unique to the field of law and are linked to learning outcomes and obtaining of the necessary competencies and skills as future lawyers and skills in the field of law. The other subgroup includes the general IL skills law students should possess the following generic information skills in all disciplines: computer skills, basic general information skills, development of student papers, independent research and finding of relevant sources on the Internet, using libraries and online catalogs, application of the rules of citation (books and articles), the notion of plagiarism, compression, identification and meaningful reasoning of information, proper and effective use of the research strategy and so on.

As for the specific competencies law students should possess and develop professional skills relevant for lawyers, which can be divided into two groups.

The first group includes legal skills that law students should develop in all years of study in the context of content of each legal subject, irrespective of IL programs, for example, the ability of critical thinking of lawyers, legal argumentation, logical expression of legislation, juridical syllogism, evaluation, comparison and understanding of legal text, written and oral language expression in legislation, writing and drafting legal documents and letters, grammar in legislation, the use of legal terminology and language of law as a legal discipline (spatial unity of words, the time unity of words, the meaning of foreign words), the relevance of the legal norms and legal facts, understanding the legal text, drafting legal act, recognizing fundamental legal concepts, institutes and major types of sources of law and modern legal systems, the use of domestic and foreign legal terminology, the ability to recognize the normative framework for the legal problem, analyzing the relevant legal sources and case law, the application and use of positive law, identifying and implementing specific legal areas (interpretation of continental and Anglo-American legal circle), and so on.

The second group includes IL skills in the field of law that would be included in IL programs, which should be implemented in accordance with the teaching staff and librarians, for example, skills in finding and evaluating legal information and legal databases (legislation and case law databases), the use of specific systems in the field of law, combining, defining and detecting legal concepts, skills of managing legal sources, research, retrieval and evaluation of legal databases and other relevant sources of law, ability to assess scientific information in the field of law, finding positive law legislation in the relevant sources, quoting legal sources (especially in the field of European law), and similar. The respondents emphasize that students should already possess some additional skills they should have acquired during their previous education as a prerequisite for their successful study, independent work and learning, for example, the importance of having communication skills and knowledge of foreign languages.

Attitudes of Teachers Towards the Profile of Professionals Who Would Implement IL Programs and Towards the Content of the IL Program. Teaching staff proposed that IL programs should be implemented and created by librarians, but in agreement with the teaching staff, as well as IT services staff [N1-N20]. They explain this by the fact that each field of law has its own particularities of which teachers have the most knowledge, and librarians, with regard to their competence and knowledge, know best the tools and relevant sources, and therefore together they would create the most appropriate IL program for students. They believe that the most effective way is the installation of an IL program in the curriculum of the institution because the students would be required to attend formal IL programs [N2-N9, N11, N13-N16]. "...*As far as the specific, I think we should institutionalize, through a program, cooperation with librarians, with people who are competent with the data ...*" [N2].

7 Discussion

The analysis of the responses shows that, although the teaching staff does not use the term IL, they put it in the context of the ability to assess, evaluate and use relevant sources of information, the development of critical thinking and critical awareness of an issue, and understanding the context of a particular situation. They stress the importance of acquiring new knowledge and experience as well as information skills, particularly the development of new knowledge in the use of ICT, but also the knowledge and the use of relevant and quality sources of information giving every individual the possibility to develop an established process to research information that enables them to reach relevant and credible information faster and easier. They find that lifelong education and the openness of the individual to new knowledge is crucial for the development of their own personality. Most of the teaching staff that had contact with IL programs strongly encourage and actively participate with librarians at the Law Faculty in their implementation. The significance of quality and efficient education at all levels of university study programs based on learning outcomes and the concept of lifelong education in the legal profession is emphasized.

It can be concluded that the possibility is open for the potential role of libraries to participate in the educational process of the implementation of IL programs for students which will develop the necessary information skills and competences for learning in line with modern educational starting points.

Research results show that the necessary information skills that students should have in the field of law can be divided into three main groups. The first group includes the importance of developing general information skills regardless of the scientific discipline; the second group comprises the importance of developing professional skills relevant for lawyers, which can be divided into: (a) legal skills that law students should develop in all years of study and (b) IL skills in the field of law. With regard to specific aspects within the field of law which require specific IL skills, as well as the fact that the specifics of law as a scientific discipline observed within each legal science, and the creation of an IL program, the respondents felt that close cooperation between librarians and the faculty in the implementation of the IL program at the institutional level is necessary and indispensable, and that librarians should not be left to create and implement IL program on their own [10]. The teaching staff explains the aforementioned with the fact that the most competent persons for the development of basic IL skills, irrespective of legal field, would be librarians. This influences also the selection of the type of IL to be taught to students. In order to develop information skills continuously and systematically, and due to the fact that students develop specific competencies related to the definition of the basic concepts of the so-called specific legal science in their higher years of study, most of the teachers warned that IL programs should be included at the formal institutional level. Thus the content of the courses would be intertwined with IL, which greatly contributes to the quality of teaching and motivating students to adopt appropriate information behavior [16]. As Torras stated, didactic components that are required for both librarians and teaching staff in the planning and implementation of IL need to also be considered [17].

8   Conclusion

The results draw us to the conclusion that the most appropriate type of IL is intra-curricular, or one that involves the installation of competences related to the IL in learning outcomes of courses. This would also develop the generic IL skills of students, unrelated to any particular scientific discipline, with the necessary contextual skills specific to the legal field at the expected learning outcomes. Because the particularity of the legal discipline and the context of each legal discipline or legal field can affect the design of the IL program, one of the key factors is that librarians need to plan their activities in collaboration with the faculty to connect the necessary knowledge, skills, attitude and interaction with students during lectures. The teaching staff and librarians must jointly participate not only in the planning of the content (both in the field of law and content-related information sources) to be represented in the IL programs, but also in the choice of activities and learning techniques that best match the subject field of law. From this research we can see the validity of formalizing the concept of IL in academic libraries in the field of law. The reason for this is precisely the fact that IL is a precondition for lifelong learning, and by connecting generic and contextual IL skills of certain scientific disciplines, students acquire the necessary skills and complete IL that will be needed in everyday life and work. The method used in this research can be used for similar research on various levels since it is applicable to any higher education context. The results will be used to set indicators for creating an educational environment that allows students to continuously and systematically acquire IL competences. Given the lack of research on the topic, the results of the research contribute to both theoretical and practical reasoning regarding IL in the field of law at domestic and international level. On a scientific level the conducted research opens the path to further research and increases the awareness about the importance of the concept of IL in the field of law.

References

1. Golenko, D., Vilar, P., Stričević, I.: Information literacy skills of law students: challenges for academic librarians. In: Todorova, T., Stoikova, D., Bugarska, V. (eds.) Scientific Seminar with International Participation Training Models and Best Practices: Proceedings, pp. 36–54. Izdavateljstvo "Za bukvite – O pismenenja", Varna (2013)
2. Golenko, D., Vilar, P., Stričević, I.: Academic strategic documents as a framework for good information literacy programs: case study of law faculties in the Republic of Croatia. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 415–421. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_55
3. Balog, K.P., Siber, L., Plašćak, B.: Library instruction in two Croatian academic libraries: law faculty and faculty of humanities and social sciences in Osijek. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 558–564. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_75
4. Davies, J., Jackson, C.: Information literacy in the law curriculum: experiences from Cardiff. Law Teacher. **39**(2), 150–160 (2005)
5. Beljaars, B.: Implementing legal information literacy: a challenge for the curriculum. Inter. J. Leg. Infor. **37**(3), 321–332 (2009)

6. Cuffe, N.: Law student's experiences of information and information technology - implications for legal information literacy curriculum development. http://www.aare.edu.au/data/publications/2002/cuf02169.pdf

7. Callister, P.D.: Beyond training: law librarianship's quest for the pedagogy of legal research education. Law Libr. J. **7**(9), 7–46 (2003)

8. McLaurin Smith, N., Presser, P.: Embed with the faculty: legal information skills online. J. Acad. Libr. **31**(3), 249–250 (2005)

9. Ryesky, K.H.: On solid legal ground: bringing information literacy to undergraduate level law courses. J. Effec. Teach. **7**(2), 21–35 (2007)

10. Kim-Prieto, D.: The road not yet taken: how law student information literacy standards address identified issues in legal research education and training. Law Libr. J. **103**(4), 605–630 (2011)

11. Bundy, A. (ed).: Australian and New Zealand Information Literacy Framework: Principles, Standards and Practice, 2nd edn. Australian and New Zealand Institute for Information Literacy, Adelaide (2004)

12. Bruce, C.: The Seven Faces of Information Literacy. Auslib Press, Adelaide (1997)

13. Huntly, H.: Teachers'Work: beginning teach conceptions of competence. Aust. Educ. Researcher **35**(1), 125–145 (2008)

14. Sandbergh, J.: Are phenomenographic results reliable? High. Educ. Res. Dev. **16**(2), 203–212 (1997)

15. Williams, P., Rowlands, I.: Information Behaviour of the Researcher of the Future; Work Package II: The Literature on Young People and Their Information Behaviour. CIBER, London (2007)

16. Špiranec, S., Banek, Z.: Mihaela. Informacijska Pismenost: Teorijski Okvir i Polazišta. Zavod za Informacijske Znanosti, Zagreb (2008)

17. Torras, M.C., Saetre, T.P.: Information Literacy Education: A Process Approach: Professionalising the Pedagogical Role of Academic Libraries. Chandos Publishing, Oxford (2009)

Information Literacy Programs in the Field of Law: Case Study of Two Law Faculties in Croatia

Dejana Golenko[1(✉)], Kornelija Petr Balog[2], and Ljiljana Siber[3]

[1] Faculty of Law, University of Rijeka, Rijeka, Croatia
`dejana@pravri.hr`
[2] Faculty of Humanities and Social Sciences, University of Osijek, Osijek, Croatia
`kpetr@knjiga.ffos.hr`
[3] Faculty of Law, University of Osijek, Osijek, Croatia
`ljsiber@pravos.hr`

Abstract. This paper presents findings of the research whose goal was to investigate and identify the key elements for a successful formal inclusion of information literacy (IL) programs into the curriculum and strategic documents at the institutional level of law faculties in Croatia based on the viewpoint of the senior administration of two Croatian law faculties (in Rijeka and Osijek). We collected the data through the qualitative method of semi-structured interviews. All together, nine interviewes were conducted: in Rijeka we interviewed four vice-deans and in Osijek a dean, three vice-deans and a representative of the decision-making faculty body on strategic documents and institution's curriculum. The findings reveal that, although our respondents do not agree which term is broader and which narrower in meaning ('information literacy' (IL) and 'legal research' (LR)), they all strongly support the inclusion of IL into the institutional curriculum.

Keywords: Curriculum · Information literacy · Law faculties · Strategic documents · Republic of Croatia

1 Introduction

Information literacy (IL) has been defined by the American Library Association (ALA) as the ability to identify, access, evaluate and apply information in an ethical manner [1]. However, IL skills cannot exist in an intellectual vacuum, without the content that allows for such skills to emerge from practice. Although there are opinions that IL should be studied as a field of study in its own right [2, 3], there are those who believe that IL is a discipline-specific and that certain disciplines require specific IL skills for doing research in a specific subject area [4–6]. Another argument for teaching IL within disciplinary contexts is that it facilitates comprehension and gives deeper meaning to the contents [7, 8]. In response, an IL in law movement has arisen, applying the standards for identification, accessing, evaluation, application and ethical analysis to legal information and the research methods and tools unique to the practice of law. Law librarians around the world have sought to devise taxonomy of skills that would provide basic definitions and examples of IL in the study of law or more specifically, law student information literacy (LSIL). Consequently, various

associations of law librarians have proposed research competency and information literacy standards for law students such as the one in the US [9] or Great Britain [10]. American standards *AALL Principles and Standards for Legal Research Competency* [9] were issued in 2012 and are based on the following five principles:

- a successful legal researcher possesses foundational knowledge of the legal system and legal information sources;
- a successful legal researcher gathers information through effective and efficient research strategies;
- a successful legal researcher critically evaluates information;
- a successful legal researcher applies information effectively to resolve a specific issue or need; and,
- a successful legal researcher distinguishes between ethical and unethical uses of information, and understands the legal issues associated with the discovery, use, or application of information.

In the same year their colleagues in Great Britain and Ireland also issued their standards entitled *BIALL Legal information Literacy Statement* [10] in which they focus on the following five principles:

- demonstrate an understanding of the need for the thorough investigation of all relevant factual and legal issues involved in a research task;
- demonstrate the ability to undertake systematic and comprehensive legal research;
- demonstrate the ability to analyse research findings effectively;
- demonstrate the ability to present the results of research in an appropriate and effective manner; and,
- continuing professional development – refreshing the legal research skills required of a modern lawyer.

The importance of this topic for law schools can be seen from the recurrent criticism that current students or newly admitted attorneys lack the research skills necessary for legal profession [5, 11].

The Croatian system of higher education (HE) underwent a thorough reform as a result of the introduction of the Bologna process (first 'Bologna students' were admitted in academic year 2005/2006). Although this process was accompanied by many problems, the Bologna process had also many good outcomes – one of them was that it promoted new methods of learning where students had more independent and responsible roles. However, Croatian university students' technical skills of information searching are still at a low level, and intensive participation in the search process with the engagement of higher order thinking skills is necessary [12].

Academic libraries in Croatia have started implementing IL programs for their users. Most frequent forms of IL delivery are either individual consultations or library workshops with voluntary participation [13, 14]. The next form of IL delivery is the intra-curricular model [14, 15], and the least represented form is a stand-alone IL course [12]. Similarly, law libraries in Croatia usually organize IL workshops and a few invest efforts to embed IL content into existing courses. When they do the latter, they always tailor the IL content to reflect the course content and students' specific needs [16, 17]. However, lately there have

been efforts to make IL education more formalized and get its place in law schools' curricula. This paper presents efforts of law librarians of two law schools in Croatia (in Osijek and in Rijeka) to make the leadership of their institutions aware of the importance of IL education for students of law and future legal workers.

2 Information Literacy Instruction at Law Faculty Libraries in Rijeka and Osijek

Law Faculty Library in Rijeka began its IL activities in the academic year 2006/2007 when the library started cooperation with the instructor of a course *Legal Writing* offered in the 1st year of undergraduate program. Ever since, the library has been organizing a 90-minute workshop and teaching students the basics of IL. Next to that basic IL instruction, the library also prepared discipline-specific IL workshops for students in various courses at all levels of education (from undergraduate to post-graduate level). The library continued to carry out these types of IL activities, but they were of a sporadic and unsystematic nature. The change occurred in the academic year 2012/2013 when the library managed to become a formally recognized partner of the course *European Law (II). European Law (II)* is a research seminar for the 3rd year students and librarians (in cooperation with the course instructor) prepare exercises for students on EU legal sources. In comparison to basic IL skills that are taught within the *Legal Writing* course, the IL skills within the *European Law (II)* are more discipline-specific and specifically tailored for the students of this particular course [18].

Law Faculty Library in Osijek started with its IL instruction in the academic year 2012/2013. Before that academic year, the library offered so-called bibliographic instruction (BI) to its users. Although the distinction between BI and IL is not always clear, some believe that BI refers to instruction in traditional (print) resources [4], whereas others believe that IL extends beyond the instruction in traditional resources and includes the vast array of digital resources that are available [19]. It is important to point out that with the shift from BI to IL, the library also changed its approach – in the past, the library was extremely passive and the BI was offered only upon request (by professors or students). With the decision to start with the IL instruction, the library became more proactive and proposed a pilot-project on IL. Within this pilot-project, IL workshops were embedded into one seminar course per each study year. The project also included the close cooperation with course instructors [20]. The project was well received both by the students and the faculty, and the library continued with its efforts, every year changing the cooperating professors and the topics of IL workshops such as e-democracy and environmental legislation. However, in spite of all its efforts and initiatives, IL instruction remained voluntary and of sporadic nature, not included into the official institutional curriculum.

The described situation regarding IL instruction, which is non-systematic, occasional, and depends very much on the disposition of the course instructors, law students of those Law Faculties have various levels of both generic and contextual IL skills, depending whether they took the course in which the IL workshop was embedded or not.

3   Research

This paper presents the findings of individual semi-structured interviews conducted with the senior management of both Law Faculties with the goal to find out their views and perceptions regarding the importance of IL instruction at their respective institutions for their students' academic success and later career. The aim of the interviews was to investigate the possibility of inclusion of IL programs into the institutional curriculum and strategic documents. The findings from this research will serve as a starting point for libraries to start working on a proposal for a mandatory credit IL course that will be included into the formal curriculum at both Law Faculties.

3.1   Methodology, Instrument, and Sample

The methodology used in this paper is a qualitative case-study approach, which allows a researcher to examine closely the data within the specific context. For this purpose, we conducted nine semi-structured interviews with selected members of senior management of those two Law Faculties. At the Law Faculty in Rijeka we interviewed four vice-deans: for professional study program (Associate Professor) (R1), for university study program (Associate Professor) (R2), for science (Full Professor) (R3), for business relations (Assistant Professor) (R4). At the Law Faculty in Osijek we interviewed five members of senior management: dean (Associate Professor) (O1), vice-dean for teaching and students (Assistant Professor) (O2), vice-dean for science and post-graduate program (Assistant Professor) (O3), vice-dean for operations and development (Assistant Professor) (O4), and the Law Faculty in Osijek Curriculum Reform Board Member and the president of the Library Board (Associate Professor) (O5). All interviews were conducted by librarians, co-authors of this paper, employed at respective faculties.

Rijeka interviewees were slightly older, with the average age of 45. Osijek respondents were younger, with the average age of 37.

All the interviewees were asked for cooperation and given a list of interview the questions in advance. The list also contained the short definition of the concept of IL.

Interviews consisted of eleven tentative questions that focused on the topic of IL. The topics were: distinction between IL and legal research; representation of those two activities in the institution's curriculum; degree of information skills law students should acquire during their course of study; employers' opinions about the competences and skills of graduated law students; usefulness of IL instruction for law students; who should conduct IL instruction (librarians or the faculty); inclusion of IL instruction into the formal curriculum of the Law Faculty.

Interviews were conducted at the beginning of May 2016. Interviews lasted between 15–30 min.

3.2   Results

The interviews started with the question about the differences in meaning between IL and legal research. The interviewees in Rijeka (R2–R4) thought that generic IL skills refer only to skills of locating, evaluating, and applying relevant information sources, and in the case

of legal studies, IL is connected with legal online databases and other relevant legal sources such as consulting the primary and secondary materials. Therefore the legal IL skills are narrower in scope than the legal research skills. Legal research is, according to them, broader in meaning and includes, besides information sources, specific legal knowledge and understanding of legal argument (R1, R4). Interviewees in Osijek (O1–O5), interestingly, thought that IL is a broader term and that both information literacy and computer literacy are prerequisites for the achievement of high quality legal research skills. In addition, it seems that interviewees in Rijeka do not make a firm distinction between information literacy and computer literacy. We can discern from their answers that they are positive that law students should develop generic IL skills (retrieval, evaluation, usage of sources), but, at the same time they point out that computer literacy skills and familiarization with word processing and other computer programs are prerequisites for successful study. Osijek interviewees seem to be aware of the difference between those two terms and make it a point to say that many people, mistakenly, use those two terms in a synonymous meaning[1].

Rijeka respondents believe that the legal research, being broader in meaning and more important for legal profession than IL, is sufficiently represented in the curriculum of the Law Faculty in Rijeka. On the other hand, the ICT and the changes in our (educational) environment make it necessary to continuously develop the IL skills, which, they confess, are underrepresented in the curriculum (R1–R4). Osijek respondents believe that neither legal research skills nor IL are sufficiently represented in their curriculum, but point out that the curriculum of Osijek Law Faculty is currently under revision, which gives them the perfect opportunity to change the level of inclusion of those two skills (O1–O5).

All our respondents point out that law students should acquire information literacy and communication skills during their course of study. Those skills will enable them to achieve academic success, but they will also need those skills when they graduate and start working in the legal profession. Respondents in Rijeka (R1–R4) add that students' current information literacy skills are at a low level – they are superficial in their research, and demonstrate the lack of knowledge and lack of familiarization with legal online databases (especially foreign) (R1–R4). Their colleagues in Osijek agree (O1–O3) elaborating that students in general are unable to distinguish between primary and secondary sources, and too passive to do the searches on their own. Instead, they expect the librarian to do all the work for them, failing to recognize that in that way they are missing the opportunity to learn and acquire a skill they will find useful in their later life and career. In addition, Rijeka respondents (R1–R4) believe that law students should develop both generic and contextual (legal) IL skills. Similarly, an Osijek respondent (O3) stresses out the importance of good IL skills in the area of European law, which is particularly complex and abundant with various versions of regulations and decisions.

The majority of our respondents in Rijeka and Osijek convey that they do not have information about employers' opinions about graduated law students' IL competencies and skills (R1–R3; O1–O3, O5). An interviewee from Rijeka (R1) points out that employers concentrate primarily on computer literacy and believe that young new

---

[1] It should be pointed out that in Croatian language the terms IL (informacijska pismenost) and computer literacy (informatička pismenost) are extremely easy to confuse. Consequently, many people are not aware that those two terms are not synonims.

attorneys have good computer literacy skills. An interviewee from Osijek (O4) confirms this notion. Besides being a vice-dean, this respondent is also a principal investigator of a big national project on the quality of academic law programs in the Republic of Croatia entitled *Iurisprudentia.* A large research study on a sample of 305 employers of graduated law students in Croatia was conducted within this project. According to this interviewee, employers are satisfied with the level of young attorneys' computer literacy, but not with their IL level. Also, this respondent adds that even though the employers used the term 'computer literacy' (informatička pismenost), judging from the content of their comments, it is clear that they were actually talking about IL (informacijska pismenost). One respondent from Rijeka (R1) thinks that Croatian employers value students' legal knowledge and skills such as abilities to distinguish between relevant and irrelevant facts or the ability to apply legal norms. In addition, one respondent from Osijek (O1) thinks that employers in Croatia have unrealistic expectations from graduated law students and are never satisfied with the level of competences of newly employed young attorneys.

All our respondents agree that IL instruction with the focus on the development of legal IL skills is extremely valuable and should be included into the formal curriculum of their law school. One respondent from Osijek (O4) points out that this would result in raising the level of quality of students' seminar and final (graduation) papers and that students' would also be able to apply for the Dean's or Chancellor's award for the best paper. Some respondents from Osijek (O1–O2) expressed their concerns about the appropriate way to include IL instruction into the "extremely course-overloaded" curriculum. They speculated that the best way to do that would be to analyse the curriculum and identify courses that already have some of the elements of IL (such as Theory of State and Law, Statistics, and Legal Informatics) and then extend them. Another solution would be to have a stand-alone mandatory and credited IL course, but without a grade (as is the case with the Physical Education – it is a mandatory and credited course, but students do not have to take any exams).

All respondents are aware of their faculty library's current efforts to deliver IL instruction at their institution. In Rijeka they stress that IL instruction is being offered embedded in other courses and presupposes the existence of cooperation between librarians and the faculty (R1–R3). In Osijek, IL instruction is being delivered in several ways: by librarians in the library, embedded in other courses, and also by some of the faculty members during their courses (O1–O4). Unfortunately, the IL instruction in Osijek is not formalized in any way (O4–O5).

Some of our respondents stress that IL topics should be included at all stages of student academic education, but with increasing complexity (R2, O4). All respondents expressed their firm belief that the concept of legal IL skills is important for law students and as such should be included into the formal institutional curriculum. Although, at this moment, they are not unanimous about the way IL instruction should be delivered: Osijek respondents seemed to like the idea of a mandatory credit non-graded course. Rijeka respondents speculated about several possible options: IL should be embedded into research seminars (R1–R2), into some other courses, or become a mandatory stand-alone course offered to senior students (R1–R2, R4). In addition, some respondents thought about possible names for a stand-alone IL course such as 'Legal Information

Literacy' or 'Information Retrieval of Legal Sources' (R2, R4). The majority of our respondents think that the IL instruction should be delivered in cooperation between a faculty member and a librarian (R1–R4, O1–O3), but there are also those who think that this type of course should be delivered only by librarians. Two Osijek respondents (O4–O5), allow the possibility that the IL course might be delivered only by a librarian, providing the librarian meets the requirements for obtaining the faculty status[2].

4   Discussion and Conclusions

This paper presents the findings of interviews conducted with the senior management of two law faculties in Croatia: Law Faculty in Rijeka and Law Faculty in Osijek. Interviews were conducted with the goal to find about the attitudes and opinions of the law faculty administration regarding the importance of IL for law students, the possibility of inclusion of IL instruction into the law school curriculum, and the ways of future IL instruction delivery.

The results show that our respondents, in general, share similar attitudes and views about IL instruction, its importance for the academic success of law students, but also for their success later in their career and life. At this point it should be stressed that the academic libraries of those two law faculties are extremely active in promoting IL instruction – they have had experience in organizing IL workshops embedded in other courses at their institutions and tailored those workshops to meet the needs of the specific course topic. At the moment, it seems that the IL instruction in Rijeka is in a slightly more advanced phase than the IL instruction in Osijek because Rijeka has at least one course (research seminar European Law (II) which is a part of a formal curriculum. At the same time, Osijek has none. Furthermore, librarians of both law faculties have published extensively about their IL initiatives and efforts [16–18, 20]. These interviews revealed that the members of the senior management of those two law faculties are well aware of the librarians' efforts and activities, and that they are also extremely supportive about their (formal) inclusion into the teaching processes at the institution.

Although there are some disagreements about which term is broader and which narrower in its meaning this is a result of a different point of view. Rijeka respondents believe that 'legal research' is a broader term than 'legal IL', because they focus on the field of law. Osijek respondents believe the opposite. That the IL is broader term than legal research, but they are thinking about the IL in general, and not the specific set of skills entitled legal IL.

It seems that Rijeka interviewees put stronger emphasis on the legal research than Osijek respondents do, but nevertheless it is evident from the replies of both groups that they both think that the law students need a set of discipline-specific skills that are already known as legal information literacy skills [5]. At the same time, all respondents have identified the poor information literacy skills of their students. In spite of all the library

---

[2] Both the librarian from Rijeka and the librarian from Osijek meet the requirements for the some faculty positions – the Osijek librarian for the position of a lecturer, and the Rijeka librarian, who has recently defended her PhD on information literacy, even for the position of an assistant professor.

efforts, since the library IL instruction is offered only to volunteers, and/or to those who take a particular course in which the IL workshop is embedded (and there are not many such courses), the students are at various stages of IL skills expertise. The majority of students, however, graduate from the library school without being exposed to any systematic IL instruction. It is true that the members of the faculty at library schools teach legal research skills within their courses, but those skills are insufficient and should be complemented with both generic and contextual IL skills. Law schools in the US and Great Britain have been widely criticized for failing to equip their students with the necessary legal research skills [5, 11]. Although the majority of our respondents did not think that this applies on their institutions, one of the respondents (O4) who researched the employers' opinions of graduated law students in Croatia revealed that many employers complained about the low level of IL skills of newly employed attorneys.

Judging from these interviews, the senior management of these two law faculties in Croatia is positively inclined toward the inclusion of IL into the official institutional curriculum. Therefore both librarians will work together to prepare two course proposals: one introductory course that would focus on generic IL skills, aimed at the junior students, and another advanced course that would be contextual and would teach about the more complex, discipline-specific set of IL skills, for senior students.

The Osijek Law Faculty is currently in the process of modification of its curriculum, and it seems that the option of a non-graded, mandatory credit IL class is an option the institution would be prepared to support. The interviewees from Rijeka did not discuss this particular aspect and the Rijeka librarian has to look into the possible options for those courses.

At both institutions, the best solution at the moment would be to have a member of the faculty and a librarian teach such a course together.

In future, we hope to be able to prepare a joint IL program for all law schools in Croatia, but now we have to concentrate on inclusion of IL programs into the law school curricula on this individual level.

References

1. American Library Association (ALA): Information literacy competency standards for higher education (2000). http://www.ala.org/acrl/standards/informationliteracycompetency
2. Johnston, B., Webber, S.: As we may think: information literacy as a discipline for the information age. Res. Strat. **20**, 108–121 (2006)
3. Shapiro, J.J., Hughes, S.K.: Information technology as a liberal art: enlightenment proposals for a new curriculum. Educom Rev. **31**(2), 31–35 (1996). https://net.educause.edu/apps/er/review/reviewArticles/31231.html
4. Grafstein, A.: A discipline-based approach to information literacy. J. Acad. Librariansh. **28**(4), 197–204 (2002)
5. Kim-Prieto, D., Kahvecioğlu, M.K.: Three faces of information literacy in legal studies: research instruction and law student information literacy standards in the American common law, British common law, and Turkish civilian legal traditions. Int. J. Leg. Inf. **42**(2), 293–302 (2014)

6. Špiranec, S., Banek Zorica, M.: Informacijska pismenost: teorijski okvir i polazišta. Zavod za ınformacijske studije odsjeka za ınformacijske znanosti Filozofskog fakulteta Sveučilišta, Zagreb (2008)

7. Eisenberg, M.B., McGuire, C., Spitzer, K.L.: Information Literacy: Essential Skills for the Information Age. Libraries Unlimited, Westport (2004)

8. Wang, L.: An information literacy integration model and its application in higher education. Ref. Serv. Rev. **39**(4), 703–720 (2011)

9. American Association of Law Libraries (AALL): AALL legal research competencies and standards for law student information literacy (2012). http://www.aallnet.org/Archived/ Leadership-Governance/policies/PublicPolicies/policy-lawstu.html

10. British and Irish Association of Law Libraries (BIALL): BIALL legal information literacy statement (2012). http://www.biall.org.uk/data/files/ BIALL_Legal_Information_Literacy_Statement_July_2012.pdf

11. Hackerson, D.K.: Access to justice starts in the library: the importance of competent research skills and free/low-cost research resource. Maine Law Rev. **62**(2), 473–486 (2010)

12. Rubinić, D., Stričević, I., Juric, M.: Information literacy course – the perception of students and professors: University of Zadar case. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 528–534. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_71

13. Švenda-Radeljak, K.: Obrazovanje za informacijsku pismenost korisnika knjižnice Studijskog centra socijalnog rada. In: Hebrang Grgić, I., Špac, V. (eds.) 13. dani specijalnih i visokoškolskih knjižnica Knjižnice: kamo i kako dalje? pp. 268–277. Hrvatsko knjižničarsko društvo, Zagreb (2014)

14. Petr Balog, K., Zetović, J., Plašćak, B.: Knjižnice u službi informacijskog opismenjavanja: stanje u visokoškolskim knjižnicama osječkog Sveučilišta. In: Hebrang Grgić, I., Špac, V. (eds.) 13. dani specijalnih i visokoškolskih knjižnica Knjižnice: kamo i kako dalje? pp. 215–230. Hrvatsko knjižničarsko društvo, Zagreb (2014)

15. Markulin, H., Škorić, L., Petrak, J.: Informacijska pismenost u visokoškolskom kurikulumu: sustavni pristup Medicinskog fakulteta Sveučilišta u Zagrebu. Čitalište **24**, 9–15 (2014)

16. Golenko, D., Vilar, P., Stričević, I.: Academic strategic documents as a framework for good ınformation literacy programs: case study of law faculties in the Republic of Croatia. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 415–421. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_55

17. Balog, K.P., Siber, L.: Students of law and e-Democracy. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 663–672. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_69

18. Golenko, D., Vilar, P., Stričević, I.: Information literacy skills of law students: challenges for academic librarians. In: Todorova, T., Stoikova, D., Bugarska, V. (eds.) Proceedings of the Scientific Seminar with International Participation Training Models and Best Practices, pp. 36–54. Izdavateljstvo „Za bukvite – O pismenenja", Varna (2013)

19. Lowry, A.K.: Beyond BI: information literacy in the electronic age. Res. Strat. **8**(1), 22–27 (1990)

20. Balog, K.P., Siber, L., Plašćak, B.: Library ınstruction in two Croatian academic libraries. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 558–564. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_75

Scaffolding Information Literacy in the Nursing Curriculum

Eric Jennings[1](✉), Hans Kishel[1], Bryan S. Vogh[2], Angie Stombaugh[1], Rita Sperstad[1], and Arin VanWormer[1]

[1] University of Wisconsin-Eau Claire, Eau Claire, USA
{jenninge,kishelhf,stombaam,sperstra,vanworag}@uwec.edu
[2] University of Wisconsin-Stout, Menomonie, USA
voghb@uwstout.edu

Abstract. Teaching students how to effectively retrieve, evaluate, and use information is a difficult task for all librarians. Expecting students to understand how to apply these skills – inside and outside of academia – in an hour-long instruction session is setting oneself up for failure. This paper describes the process of librarians and nursing faculty using the Lesson Study methodology to address adding information literacy and evidence-based practice (EBP) skills and content within a series of scaffolded classes in the nursing curriculum. Quantitative data showed growth in student learning from sophomore to senior years but retention of knowledge was inconclusive. Qualitative data indicated that students valued the scaffolded curriculum, librarians and nursing faculty working together, and understood the usefulness of EBP and information literacy. The multiple assessment methods used in this study allowed the team to assess student learning and the usefulness of Lesson Study as an instructional development tool.

Keywords: Information literacy · Lesson study · Collaboration · Curriculum development · Evidence-based practice

1 Introduction

At the University of Wisconsin-Eau Claire (UW-Eau Claire), nursing faculty knew that they needed to be more intentional about incorporating evidence-based practice content within their curriculum. Various accrediting agencies and professional and national organizations require undergraduate nursing students to demonstrate application of evidence-based practice (EBP) concepts towards improvement of patient outcomes [1]. In addition, at the time that these issues were being addressed within the nursing curriculum, the university's Center for Excellence in Teaching and Learning (CETL) began encouraging the use of the Lesson Study methodology of teaching to faculty on campus. Librarians had already taken part in a Lesson Study with the English department on campus that specifically addressed incorporating information literacy skills into its first-year curriculum and the director of CETL approached the nursing and library faculty because he saw an overlap between EBP and information literacy. Thus, three nursing and three library faculty began a longitudinal study whose overall goal was for "students

to be able to retrieve various levels of scholarly information and apply or evaluate its usefulness to clinical practice."

2   Background

Library instruction literature often focuses on individual classes. There is not much research on using Lesson Study as a way to create library instruction sessions. Primarily, Lesson Study research focuses on K-12 education because it was originally developed for use in that setting. However, in recent years it has made its way into higher education [2] with many of these Lesson Studies taking place within the University of Wisconsin System.

A Lesson Study gathers a group of instructors together to "plan, observe, and analyze actual classroom lessons, drawing out implications both for the design of specific lessons and for teaching and learning more broadly" [3, p. 273]. According to Stombaugh,

> "Lesson Study is a 5 step cycle. First, the group reads relevant literature about the topic that will be taught and discusses the class' objective(s) as desired by the group. Based on the readings and class objective(s), the group identifies one or more goals for the Lesson Study. Second, the group plans the session. Third, one member from the group teaches the session and other members take notes while observing the students. This is to evaluate the effectiveness of the planned session based on student engagement and understanding. Additional data on the effectiveness of the session can be gathered through a variety of assessment methods such as focus groups and surveys. Fourth, the group reviews all evaluative material and discusses the findings. Fifth, based on the findings, the group revises (if needed) the original session and implements the Lesson Study cycle again [1, p. 174]."

Typically a Lesson Study is carried out for one specific lesson. However, when team members at UW-Eau Claire started discussing what they wanted to accomplish in a Lesson Study for nursing, it quickly became apparent to the librarians that improving information literacy skills and integrating EBP into the nursing curriculum could not be accomplished in one Lesson Study instruction session. Instead, the team decided to implement the Lesson Study methodology progressively across the nursing curriculum.

The team identified four classes where unique Lesson Study sessions would be planned and implemented. Two classes were at the sophomore level, one of which is a pre-requisite to the Lesson Studies themselves, one was at the junior, and the fourth was a senior level course. Each of these classes have specific goals that work toward the greater overall goal for this scaffolded approach to incorporating EBP and information literacy in the nursing curriculum. These are summarized in the Table 1.

Lesson plans typically have goals or objectives that are learner-focused and Lesson Study is no different in that regard. But what makes Lesson Study unique is that when it is implemented it continues to be learner-focused rather than focused on the instructor. More specifically, when teaching each Lesson Study session, team members and other observers are scattered throughout the room, recording student engagement and participation in the session. The observers look for behaviors such as student engagement during the session and with the instructor. For example, were the students following along during the demonstration period of the session or were they doing something else on their computers? Are students actively participating in their groups? Do students have

enough time to complete the in-class assignment? This focus on the learner is further explored during the discussion of findings and revision stages of Lesson Study.

Table 1. Goals for Lesson Studies

Sophomore pre-requisite class goal	Sophomore Lesson Study class goal	Junior Lesson Study class goal	Senior Lesson Study class goal	Overall goal
The student will demonstrate an understanding of nursing information structure and literature	The student will demonstrate effective search strategies to retrieve one scholarly piece of evidence from CINAHL to support their clinical PICO (Patient, Intervention, Control/Comparison, Outcome) question	The student will be able to demonstrate advanced search strategies to select high quality pieces of evidence to support their clinical PICO question	The student will be able to demonstrate using "best practice" evidence to evaluate nursing practice within the clinical setting	Students will be able to retrieve various levels of scholarly information and apply or evaluate its usefulness to clinical practice

Because the team at UW-Eau Claire taught the Lesson Study sessions twice, it allowed for each instruction session to be fine-tuned to meet learner needs. Prior to this project, library instruction sessions in nursing were primarily lecture-based and did not involve close collaboration between librarians and faculty in other departments. There was little to no assessment or observation of the instruction session and if there was revision of a lesson plan it was done solely from the perspective of the teaching librarian, not incorporating feedback or observations of how the instruction session went for students.

3   Methodology

3.1   Process/Development

As described above, Lesson Study was progressively integrated into the curriculum at UW-Eau Claire over a three year period. Each Lesson Study instruction session was developed collaboratively by the team of three nursing and three library faculty. Subsequently, each instruction session was taught by one of the three librarians in an active learning style with the rest of the team participating as observers.

Because Lesson Study is an iterative process two different cohorts of students participated in this intervention and were compared to two control groups. The control groups did not receive any Lesson Study instruction and any instructional content related to EBP and information literacy was minimal, done in a lecture format and not

intentional. The timing of each intervention or assessment method for both groups is described in the Table 2.

Table 2. Timing of interventions for assessment

Group type	Sophomore			Junior		Senior	
	Pre-test	Lesson Study taught	Embedded test questions	Lesson Study taught	Embedded test questions	Lesson Study taught	Post-test
Control #1 (n = 39)	–	–	–	–	–	–	Oct. 2011
Control #2 (n = 51)	–	–	–	–	–	–	Mar. 2012
Intervention #1 (n = 53)	Sept. 2011	Oct. 2011	Nov. 2011	Feb. 2012	Mar. 2012	Sept. 2013	Oct. 2013
Intervention #2 (n = 56)	Feb. 2012	Mar. 2012	Apr. 2012	Oct. 2013	Nov. 2013	Feb. 2014	Mar. 2014

3.2 Sample Size

At UW-Eau Claire students are admitted to the nursing program during the fall and spring semesters. For this study, the intervention group consisted of two cohorts totaling 109 students. For comparison, the control group, which had no Lesson Study instruction, consisted of two cohorts of students totaling 90 students.

3.3 Assessment Methods

We followed a number of assessment and data collection methods for the purposes of this curricular integration of Lesson Study:

1. We gave a baseline pre-test to the sophomore intervention cohorts prior to beginning the four different Lesson Study sessions. The pre-test included a total of seven questions in multiple choice, fill in the blank, or short answer formats.
2. We gave a post-test to the senior intervention cohorts after the four Lesson Study sessions. We also gave it to the control cohorts who did not have any Lesson Study instruction. The post-test included a total of five questions in multiple choice, fill in the blank, or short answer formats.
3. We recorded observations of the intervention cohorts during each Lesson Study.
4. We gathered and analyzed in class worksheets from the intervention cohorts to see if students were able to successfully complete the assigned tasks.
5. We conducted embedded assessments four to eight weeks following each Lesson Study intervention. These assessments included two to four questions in multiple choice or short answer formats.
6. We conducted student focus groups following each Lesson Study intervention. We asked each focus group four to six open-ended questions.

The control cohorts did not receive any Lesson Study instruction but the data collected used the same post-test and took place at the same time of the semester as the intervention group. In order to evaluate each Lesson Study session, the team created assessment

questions tied to the objectives within each unique Lesson Study. The instruments used for this Lesson Study had not been used in previous research and were not been subjected to formal validity testing. However, several content experts ensured the instrument's face validity through review. Focus groups led by research team members followed each intervention session and lasted approximately one hour. These were set up to obtain further feedback regarding the implementation of the lesson and student learning, not the performance of the librarian. Each focus group had between ten to fifteen students in attendance and several questions guided these discussions [1]. These assessment methods allowed the team to compare students in the intervention as they entered, progressed through, and exited the program as well as against the control groups.

3.4 Analysis

In order to increase statistical power to detect differences between students who received the Lesson Study intervention versus those that did not, intervention and control cohorts were combined into two groups – making for one intervention group and one control group. In addition, because data from students in the intervention were anonymized, we did not perform paired analyses. Finally, we analyzed qualitative data to identify themes relative to the quantitative data.

4   Results

Our key quantitative findings are outlined in Fig. 1 through Fig. 3, detailing the proportion of correct responses varied widely by question and level (sophomore, junior, or senior). Figures 1 and 2 show results that were significantly different between the intervention and control group. Specifically, in Fig. 1, 71.0% of the intervention group answered the post-test question correctly whereas 41.5% of the control group answered the post-test question correctly ($X^2 = 16.72$, p < 0.001). In Fig. 2 42.5% of the intervention group answered the post-test question correctly whereas 26.0% answered the post-test question correctly ($X^2 = 5.58$, p = 0.018).

In addition to comparing the intervention and control groups it is also important to look at student growth and understanding of concepts students from sophomore to senior year within the intervention group. Figure 3 indicates that 8.0% of the students answered the question correctly on the pre-test and 25.5% of students answered correctly at post-test ($X^2 = 11.53$, p = 0.001). When looking at Fig. 1, 23.0% of students that had the Lesson Study intervention answered the question correctly at pre-test and 71.0% of students answered it correctly at post-test ($X^2 = 50.58$, p < 0.001).

Three main themes emerged from the focus groups' qualitative responses to the lessons.

1. Collaborative relationships: Students identified the value of librarians and nursing faculty working closely together in enhancing their learning.
2. Process continuity: Students appreciated the purpose of scaffolding the lessons. They also valued the replication of structure in each course lesson and in-class worksheets.
3. Concepts valued: Students articulated the value of EBP and information literacy.
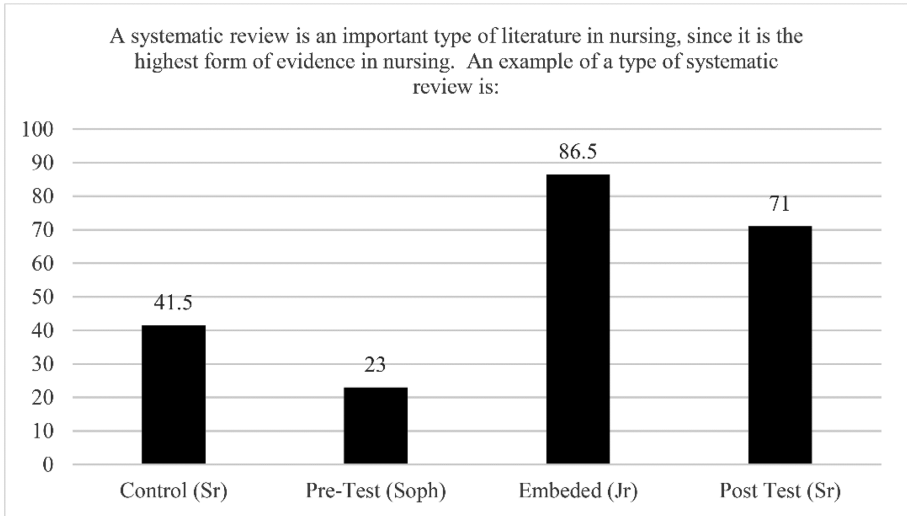
A systematic review is an important type of literature in nursing, since it is the highest form of evidence in nursing. An example of a type of systematic review is:

Fig. 1. Percentage of students selecting the correct answer from multiple choices.

Select the BEST article citation from a peer-reviewed journal (below) and match it to the most appropriate student assignment you need information for a research paper
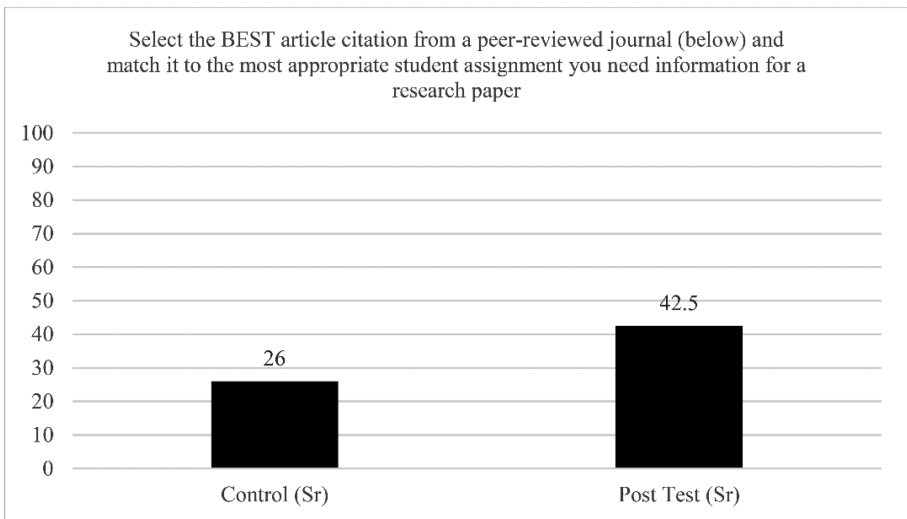
Fig. 2. Percentage of students selecting the correct answer from multiple choices.

Class observations and collection of worksheets often led the Lesson Study team to tweak the agreed-upon lesson outline and/or worksheet so that student learning was more focused on the process and less on the results. For example, in the junior year Lesson Study, the worksheet that students completed as a group in class was redesigned so that students could focus more on the process of selecting high quality content and less on the process of completing the worksheet. To do this the group labeled sections of the worksheet, reduced the number of short answer questions, and moved the short answer

A nurse wants to apply evidenced-based practice to his floor. He is trying to shape practice to see how long an intravenous (IV) site can be used before it should be changed. He has found several types of studies related to the subject, but he is unsure what the best evidence to use is. In the hierarchy of evidence, what should be selected?
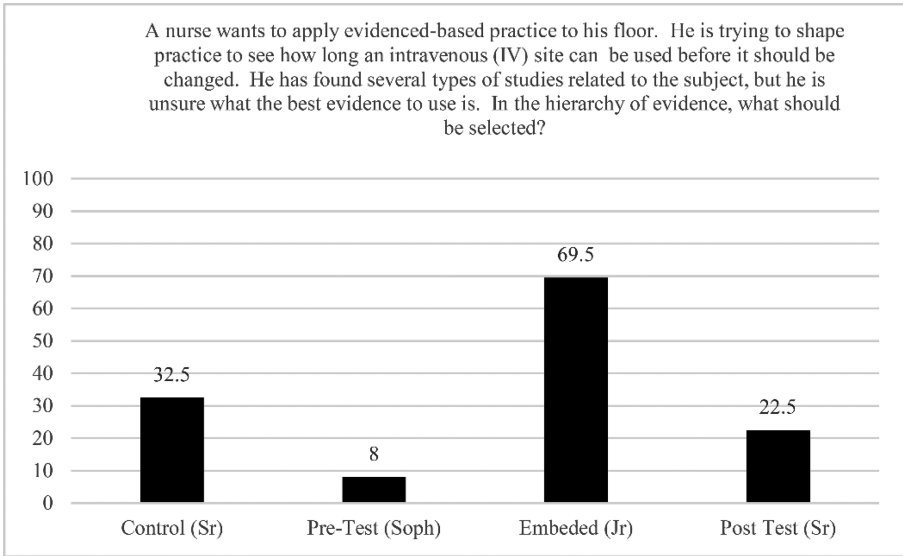
Fig. 3. Percentage of students selecting the correct answer from multiple choices in the hierarchy of evidence.

questions to the end of the worksheet. It is important to note, however, that tweaks to lesson plans were logistical and minor in scope, not content related, and did not divert from the class goal or overall goal of the Lesson Study.

5   Discussion

The results of our study suggest the use of the scaffolded Lesson Study method is an effective teaching information literacy and EBP skills for undergraduate nursing students. However, since the measurement instruments are not validated we must be careful in drawing conclusions based upon results. The skills included in the learning objectives of this project were not only knowledge, understanding, appraisal and evaluation skills, but included the higher ability of applying evidence to nursing practice. There is some question about how much the scaffolded Lesson Study helped sustain students' understanding of some concepts. An example of this can be found in Fig. 3 that explores the EBP concept of hierarchy of evidence. Although there was a quantitative decline in correct responses from junior (69.5%) to senior year (25.5%), senior students demonstrated the retention to apply hierarchy of evidence through classroom application and discussion. Student knowledge and understanding of the hierarchy of evidence is also explored with the question in Fig. 1. When comparing the control to the intervention cohort, students in the intervention group were nearly twice as likely to identify the highest form of evidence, as compared to their peers in the control group. This result directly supported the Lesson Study's purpose. These results were also consistent with students' in class abilities, as evidenced by faculty observation of

students demonstrating the selection of appropriate scholarly articles for their assignments and through their completed worksheets.

The qualitative data collected from the focus groups allowed our team to better assess achievement of the identified goals. For example, on embedded course assessment, students were able to identify the purpose of scholarly literature, but they had difficulty in verbally articulating this skill during focus group evaluation. Thus, the qualitative data enhanced the quantitative data to help identify a gap in the students' knowledge and understanding of information literacy and EBP skills. Furthermore, during the final focus group with senior students, when students were asked to articulate what they learned as a result of this series of Lesson Study sessions, various students expressed specific outcomes created for this learning project. One student remarked that it made him "think more critically." During those same focus groups many students described the significance of how the Lesson Study intervention prepared them for using EBP skills in clinical practice, which was in the forefront of their minds as they approached graduation and had a strong sense of their future job search.

6   Conclusion

From the librarians' perspective, there are three main benefits to having conducted this series of Lesson Studies. First, librarians know more of what students learn in each of the nursing classes and are better equipped to help them because of this knowledge. Second, Lesson Study afforded librarians an opportunity to help students learn that there are multiple databases that can be used to address different information needs and that the search skills they learn in one database are transferrable to other databases. Third, this collaboration allowed librarians to formally map lessons and a curriculum to the Association of College and Research Libraries' Information Literacy Competency Standards for Higher Education [4].

From the nurses perspective one of the benefits was that they had more time in class that they could spend teaching core nursing concepts because they did not have to spend as much time in class or in their offices explaining searching and evaluating sources of information. Faculty in the nursing program who were not part of the Lesson Study intervention even commented that they could tell a difference in the students' ability to find high quality information. Furthermore, it helped make the curriculum within the nursing department much less silo-ed and more collaborative. Instead of concepts being reiterated each semester or assuming that one of their colleagues would cover it in another class, the nursing faculty were able to build off of what they knew their colleagues were teaching to make each class much more intentional in its objectives and less duplicative.

In sum, Lesson Study helped librarians and faculty at UW-Eau Claire integrate information literacy and EBP skills effectively within the nursing curriculum.

References

1. Stombaugh, A., Sperstad, R., VanWomer, A., Jennings, E., Kishel, H., Vogh, B.: Using lesson study to integrate information literacy throughout the curriculum. Nurs. Educ. **38**, 173–177 (2013)
2. Cerbin, B.: Lesson Study: Using Classroom Inquiry to Improve Teaching and Learning in Higher Education. Stylus, Sterling (2011)
3. Lewis, C., Perry, R., Hurd, J., O'Connell, M.: Lesson Study comes of age in North America. Phi Delta Kappan **88**(4), 273–281 (2006)
4. Association of College & Research Libraries: Information Literacy Competency Standards for Higher Education. Association of College & Research Libraries, Chicago (2000)

Assessing Content and Cognitive Levels of Information Literacy in a Group of Life Sciences University Students

Danica Dolničar[1(✉)], Bojana Boh Podgornik[1], Irena Sajovic[1],
Andrej Šorgo[2], and Tomaž Bartol[3]

[1] Faculty of Natural Sciences and Engineering, University of Ljubljana, Ljubljana, Slovenia
{danica.dolnicar,bojana.boh,irena.sajovic}@ntf.uni-lj.si
[2] Faculty of Natural Sciences and Mathematics/Faculty of Electrical Engineering
and Computer Sciences, University of Maribor, Maribor, Slovenia
andrej.sorgo@um.si
[3] Biotechnical Faculty, University of Ljubljana, Ljubljana, Slovenia
tomaz.bartol@bf.uni-lj.si

Abstract. The present study investigates the initial level of information literacy (IL) of 308 life sciences students from three Slovenian faculties compared to the level achieved by the students after completing a compulsory credit-bearing IL course. A validated information literacy test (ILT) served as an assessment instrument, and the results were statistically analysed by IL topic, cognitive category and year of study. The students achieved significant progress in all main IL topics and all cognitive categories. The greatest improvement was in the subscale of database searching, where the initial IL level was the lowest. Another IL deficiency that was detected and improved relates to legal and ethical issues. With regard to cognitive categories, the students achieved the most evident progress in the category of applying knowledge, where they were initially the least successful. An analysis of the students' IL achievements by year of study led to the recommendation to include an IL-related study course in the curriculum of life sciences programmes in the second year of study.

Keywords: Information literacy · Higher education · Standards · Cognitive levels · Evaluation

1 Introduction

Students' level of information literacy (IL) is an important indicator of the quality of higher education. The generation of digital natives is assumed to possess inborn natural knowledge and skills to handle information and communication technologies (ICT) and tools easily. However, ICT experiences, expressed as the sum of the use of different applications, do not necessarily contribute to IL, as a recent study by Šorgo et al. [1] concluded. Digital natives are not necessarily information literate, and IL should be promoted with hands-on and minds-on courses based on IL standards. Furthermore, a body of research indicates that university educators cannot blindly rely on the IL competences of students achieved during secondary education [2].

Higher education institutions in different countries use various standards for describing, structuring and assessing key IL competencies, in order to efficiently design and implement IL in academic courses. The present study was based on the ACRL (Association of College & Research Libraries) standards of higher education [3], which have been officially translated and adopted in Slovenia, largely due to their broad international recognition. Recently, the ACRL standards have been complemented by a new initiative, the ACRL Framework [4], in which the set of competencies and skills has been replaced by a threshold concept that is more open to interpretation than the standards. Attempts have been made to reconcile the two systems, both on content and cognitive levels [5]. In addition, the concept of Critical Information Literacy (CIL) has emerged, with the proposal that librarians and other IL educators should become specialists in coaching intellectual growth and critical development, and should engage in solving significant problems. Information should therefore serve as the raw material for students to solve problems and create their own understandings and identities. This shifts the learning process from content towards processes of intellectual growth and understanding [6, 7].

In practical applications, IL instruction can be included in the curriculum in several ways, such as embedded throughout subject courses, as a one-shot add-on to subject courses, or as a stand-alone credit-bearing IL course. The latter approach is presented and discussed in this article.

Multiple assessment methods are in use to ascertain students' IL levels, such as tests, open-ended tasks, paper assignments and oral exams. In this study, a multiple-choice information literacy test (ILT), developed and validated by the authors [8], was applied.

The IL of students can also be analysed and discussed from the viewpoint of cognitive levels using Bloom's taxonomy [9], which identifies six cognitive categories of increasing difficulty: (1) remembering, (2) understanding, (3) applying, (4) analyzing, (5) evaluating and (6) creating. These cognitive categories can be connected to the ACRL standards [10]. Keene et al. suggest [11] that the achieved cognitive levels in IL are connected to IL teaching methods, and that the higher cognitive categories demand the application of more active teaching methods. According to a study by Šumiga [12], the IL of science students (after completing higher education) plays an important role in the industrial environment for solving practical problems in innovation and development. In order to be successful, young engineers need such competencies and skills at higher cognitive levels, such as application, analysis, synthesis and evaluation.

A study of IL topics by Boustany [13] reported that university students found it easier to define search topics than to narrow and refine searches. While the second task became easier by study year, the first did not.

Based on the above knowledge and understanding, the aim of our study was (1) to assess in which content areas of IL and on which cognitive levels university students from life sciences programmes exhibit the most obvious shortcomings, and (2) to evaluate the contribution of a compulsory credit-bearing information literacy study course (ILSC) regarding IL content and cognitive levels. (3) We also attempted to evaluate the influence of the length of study/study year on the IL of students, and on their ability to improve their understanding and application of knowledge in the domain of IL.

2   Materials and Methods

2.1   Information Literacy Test

The validated and freely available ILT [8] consists of 40 multiple-choice items (questions). Each item offers four answers (only one of which is correct). The test content reflects the ACRL standards [3], with each item predominantly matching one of the five standards.

The ILT items were further categorised into three groups according to Bloom's taxonomy: B1-remembering, B2-understanding and B3-applying, as well as higher cognitive levels. Due to the test type, the highest three Bloom's cognitive levels (analyzing, evaluating and creating) could not be assessed individually.

2.2   Information Literacy Study Course

The content of the compulsory credit-bearing information literacy study course was designed according to the ACRL standards. The course involved a total of 45 contact hours, consisting of both lectures and practical work, which was organised and supervised by the authors of this study. Traditional teaching methods were enriched by examples of active learning and problem solving, closely linked to the field of study.

2.3   Test Group and Testing

The test group of 308 participants was comprised of students from biotechnical sciences (182 students, 59.1% of the total), health sciences (68, 22.1%) and biology education programmes (58, 18.8%). Students from three faculties and five study programmes were balanced according to year of study: 1st year (102 students, 33.1%), 2nd year (108, 35.1%), 4th year (98, 31.8%). Due to the curricula structure, no 3rd year students participated.

All of the students took the ILSC as part of their regular curriculum. The students' initial IL levels were assessed using the ILT at the beginning of the ILSC (pre-test), and again after the course had been completed (post-test). The testing was implemented either via the online survey system 1 ka (1 ka.si) or in printed form, in classrooms supervised by the course teacher. Testing was undertaken in 2014 and 2015, in order to assess two generations of students.

2.4   Data Analysis

The ILT results were statistically analysed by (a) test total, (b) content subscales - five subscales according to the ACRL standards, (c) cognitive subscales - three subscales according to Bloom's taxonomy, and (d) study year - three subscales. The following analyses were carried out:

- Basic statistics (mean, standard deviation) for pre-test and post-test;
- Paired-samples t-test for pre-test vs. post-test comparison;
- Effect size was calculated as Cohen's d.

The SPSS statistical package (version 22) was used.

3   Results and Discussion

3.1   Total IL Score

ILT score frequency distributions in the pre- and post-test (Fig. 1) show a shift to the right towards higher scores in the post-test, indicating an improvement in IL.
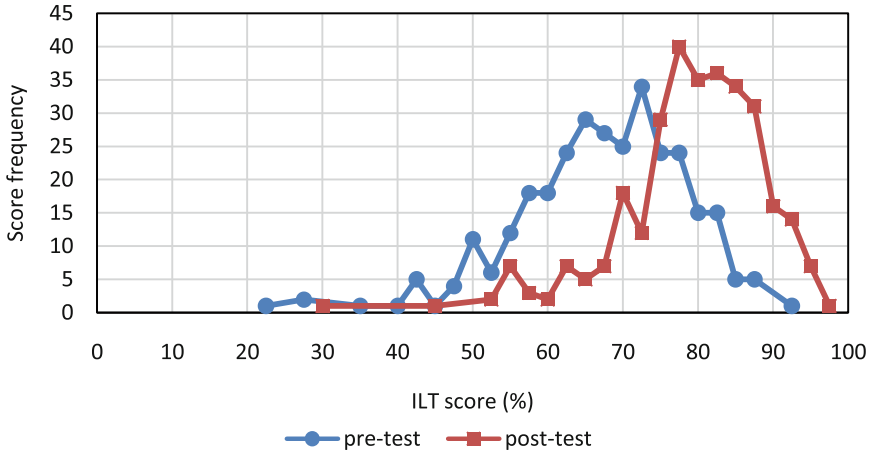
Fig. 1.   Pre-test and post-test ILT score frequency distribution

An analysis of the pre- and post-test total ILT scores (Table 1) indicates a satisfactory overall initial level of the students' IL (67.26%), and an increase in their IL after completing the ILSC (79.12%). The mean difference (11.86%) is proved to be significant ($p < 0.001$), with a large effect size ($d = 1.15$).

Table 1.   Pre-test vs. post-test difference for ILT total (paired-samples t-test)

Pre-test		Post-test		t	p<	d	Mean diff.	Confidence int.	
Mean	St. dev.	Mean	St. dev.					Lower	Upper
67.26	10.99	79.12	9.55	21.352	0.001	1.15	11.86	10.77	12.95

Comparisons of pre-test IL levels by year of study (Fig. 2) reveal the highest initial IL level for the fourth year students (74%), and an approximately 10% lower IL level in the first two years. It can be assumed that older students have acquired some IL knowledge and skills during the course of their studies. Interestingly, the second year students demonstrated the greatest improvement in IL in the post-test, almost reaching the level of the fourth year students at 83%, while the first year students still lagged behind by about 10% in the post-test. This suggests that the inclusion of an IL-related study course might be most meaningful and effective in the second year of study, when students have

essentially adapted to the academic environment, completed the fundamental study courses, and need support for further academic work in their specific study fields.
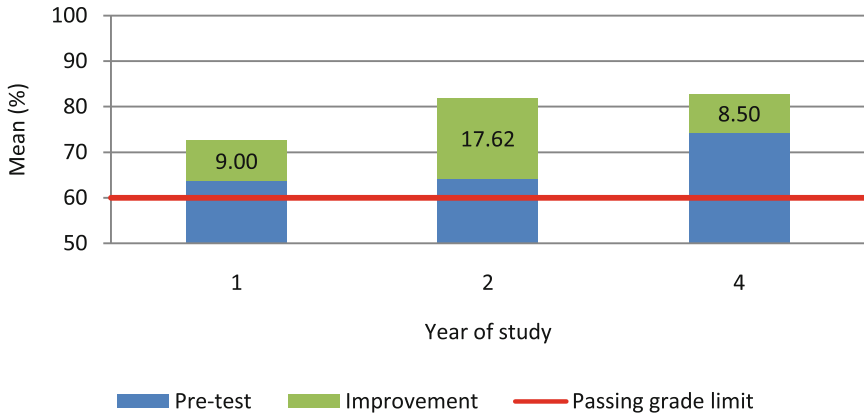
Fig. 2. Post-test improvement (mean difference in %) according to year of study

3.2   ACRL Subscales

Pre- vs. post-test analysis by subscales according to the ACRL standards is shown in Fig. 3. The significance of the improvement, demonstrated in all five subscales, is presented in Table 2. The main initial deficit in the students' IL was recorded in subscale 5 - to understand the economic, legal and social issues surrounding the use of information, and to access and use information ethically and legally (pre-test 55.57%), and 2 - the student accesses needed information effectively and efficiently (58.51%). These were the only topics with a mean achievement below the pass grade of 60%, which is often used at the Ljubljana University. On the other hand, the students were most successful in subscale 3 – to evaluate information and its sources critically and to incorporate information in the knowledge base (85.13%).

Table 2.   Pre-test vs. post-test difference for the ACRL subscales (paired-samples t-test)

ACRL subs.	Pre-test		Post-test		t	p<	d	Mean diff.	Confidence int.	
	Mean	St. dev.	Mean	St. dev.					Lower	Upper
1	69.85	13.67	80.71	10.83	15.004	0.000	0.88	10.86	9.44	12.29
2	58.51	16.71	74.42	14.82	14.654	0.000	1.01	15.91	13.77	18.05
3	85.13	19.66	91.69	15.85	6.379	0.000	0.37	6.56	4.54	8.58
4	80.95	23.72	95.02	14.38	10.100	0.000	0.72	14.07	11.33	16.81
5	55.57	17.76	66.60	18.21	9.668	0.000	0.61	11.03	8.79	13.29

After the students completed the ILSC, the most evident improvement was achieved in the ACRL subscale 2 (15.91%), followed by subscale 4 – the student uses information effectively to accomplish a specific purpose (14.07%). Despite a significant increase (11.03%) in subscales 5 and 2, the students continued to have relatively low post-test scores of <70% and <75%, respectively.
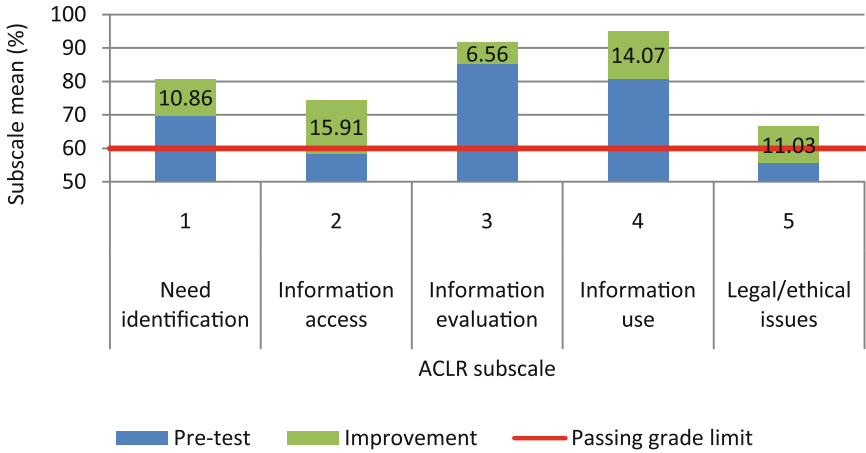
Fig. 3. Post-test improvement according to the ACRL subscales
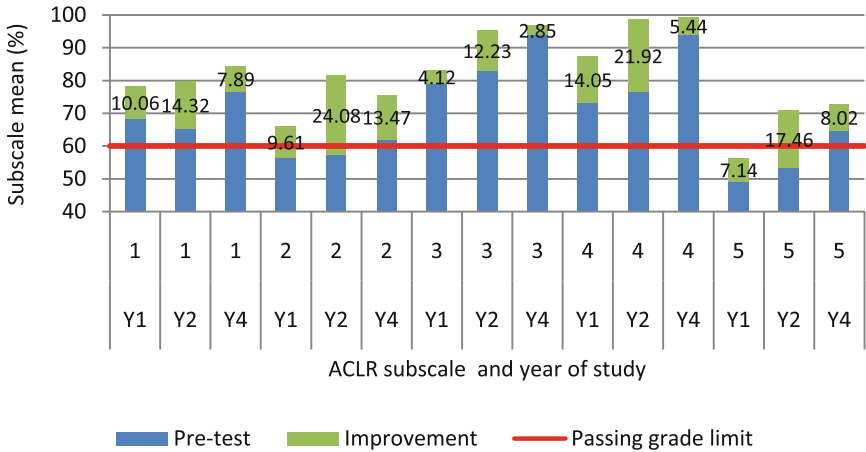
Fig. 4. Post-test improvement according to the ACRL subscales and years of study

Regarding the year of study (Fig. 4), the trend revealed for the ACRL subscales is similar to that of the total ILT: an increase of the initial IL level with study year, with particularly high scores (>90%) being recorded in subscales 3 and 4. The fourth year students' average was above the pass grade in all five ACRL subscales already in the pre-test. The smallest difference between the years is observed in subscale 2. There is a large difference in the improvement of IL between the first and second year students, with the latter being very successful, while the first year students remained below the threshold level in subscale 5 even after completing the ILSC. This finding further supports the recommendation to include the ILSC in the curriculum of the second study year.

3.3   Bloom's Subscales

An analysis of IL based on Bloom's cognitive categories (Fig. 5) shows a trend of decreasing pre-test subscale scores with increasing cognitive categories (reflecting difficulty levels). The mean in the higher cognitive levels (category 3: applying, analyzing and evaluating) was below the 60% threshold in the pre-test, while the mean in category 1 (remembering) was 75%. The students' progress in the post-test was significant in all three categories (Table 3), with the most evident improvement in category 3 (18.54%), and moderate achievements (<10% improvement) in remembering and understanding (category 2).
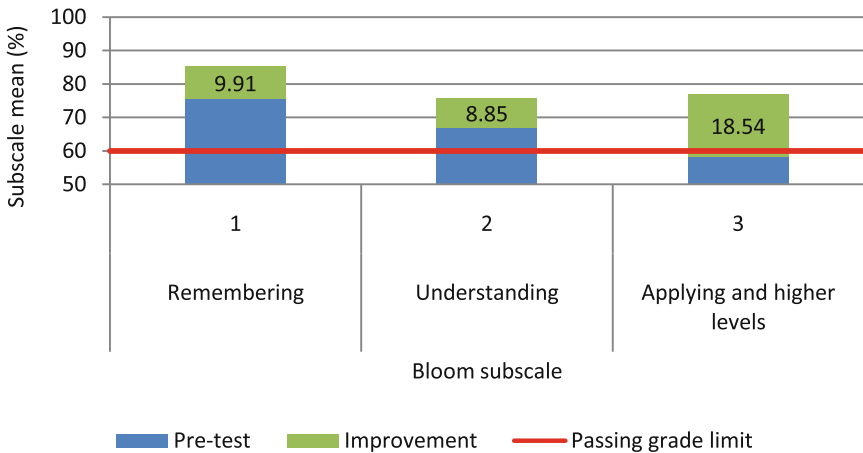
Fig. 5.   Post-test improvement according to the Bloom subscales

Table 3.   Pre-test vs. post-test difference for the Bloom subscales (paired samples t-test)

Bloom subs.	Pre-test		Post-test		t	p<	d	Mean diff.	Confidence int.	
	Mean	St. dev.	Mean	St. dev.					Lower	Upper
1	75.35	14.80	85.26	11.04	12.076	0.000	0.76	9.91	8.30	11.53
2	66.86	12.04	75.71	12.16	11.852	0.000	0.73	8.85	7.38	10.32
3	58.26	16.28	76.80	14.13	19.503	0.000	1.22	18.54	16.67	20.41

Cognitive categories in conjunction with year of study (Fig. 6) revealed an increasing trend with year of study. In the pre-test, the fourth year students were superior, especially in Bloom's category of remembering, while the first and second year students were under the 60% threshold in the category of applying knowledge. In the post-test, the group of second year students improved the most, coming close to the year 4 scores. The first year students progressed considerably in applying (16.48%), demonstrated less progress in understanding (4.17%), and remained below 70% in the post-test in the categories of understanding and applying knowledge.
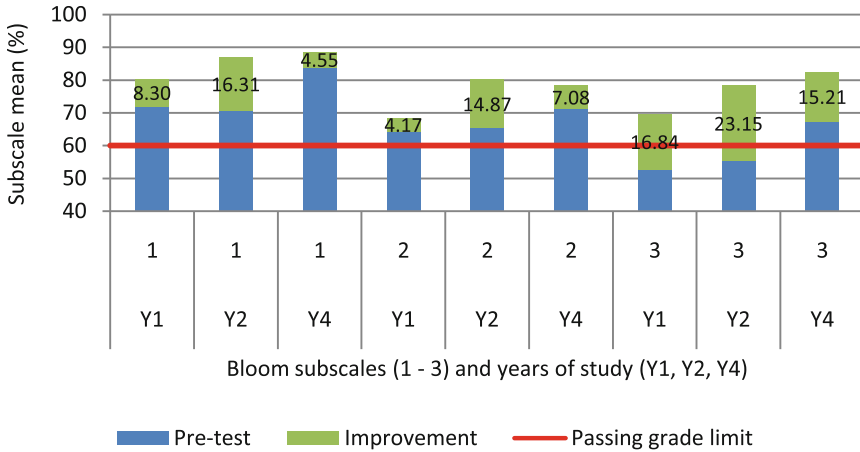
Fig. 6. Post-test improvement according to the Bloom subscales and years of study

4   Conclusions

The initial IL level of 308 life sciences students from three Slovenian faculties, measured with an information literacy test (ILT), was compared to the proficiency achieved after taking a stand-alone credit-bearing IL course. The course was designed in accordance with the ACRL IL standards in higher education, and was enriched with project- and/or problem-oriented assignments from the field of study. The post-test improvement in IL was statistically significant in all five content subscales according to the standards, and in three cognitive categories constructed according to Bloom's taxonomy. The main deficiencies displayed by the students were in advanced database searching and in legal/ethical issues of information use (mean <60%). Although they showed substantial progress in both topics after completing the IL course (16% and 11%, respectively), there is still room for further improvement, as these remain the weakest of the five subscales according to the standards. In the evaluation of cognitive levels, the initial proficiency according to cognitive categories in relation to IL was inversely proportional to the difficulty level, ranging from 58% to 75% of total achievements. After completing the IL course, the students achieved the most substantial improvement (18.5% increase) in applying knowledge and in higher cognitive levels of IL, which are essential for critical thinking and successful problem solving in life sciences. With regard to year of study, the older students displayed better initial proficiency in all aspects, especially in the use/evaluation of information (standard) and in remembering (cognitive category). The second year students progressed the most in all topics, especially in those related to advanced database searching (24%) and in the cognitive ability to apply IL knowledge (18.5%). Based on these results, it therefore seems most appropriate to include an IL-related study course in the second year of study. This recommendation is based on the results of the life sciences university curriculum, but can probably be extended to other science-related programmes, as the design of the questions was intentionally strongly

generic with regard to IL issues. The implications for other broader fields of science should thus not be very different, although they still need to be explored.

References

1. Šorgo, A., Bartol, T., Dolničar, D., Boh Podgornik, B.: Attributes of digital natives as predictors of information literacy in higher education. Brit. J. Educ. Technol. (2016). http://doi.org/10.1111/bjet.12451
2. Lowe, H., Cook, A.: Mind the gap: are students prepared for higher education? J. Furth. High. Educ. **27**(1), 53–76 (2003)
3. Information Literacy Competency Standards for Higher Education. Association of College & Research Libraries – ACRL, a Division of the American Library Association - ALA, Chicago (2000). http://www.ala.org/acrl/standards/informationliteracycompetency
4. Framework for Information Literacy for Higher Education. Association of College & Research Libraries – ACRL, a Division of the American Library Association - ALA, Chicago (2016). http://www.ala.org/acrl/standards/ilframework
5. Harmer, A., Lee, P.: Frameworks, standards, and benchmarks, Oh My! In: Georgia International Conference on Information Literacy (2015). http://digitalcommons.georgiasouthern.edu/gaintlit/2015/2015/39
6. Elmborg, J.: Critical information literacy: implications for instructional practice. J. Acad. Librariansh. **32**(2), 192–199 (2006)
7. Kos, D., Špiranec, S.: Understanding the field of critical information literacy: a descriptive analysis of scientific articles. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 579–589. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_58
8. Boh Podgornik, B., Dolničar, D., Šorgo, A., Bartol, T.: Development, testing and validation of an information literacy test (ILT) for higher education. J. Assoc. Inf. Sci. Technol. **67**, 2420–2436 (2016). http://doi.org/10.1002/asi.23586
9. Anderson, L.W., Krathwohl, D.R. (eds.): A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. Allyn & Bacon, Boston (2001)
10. Reece, G.J.: Critical thinking and cognitive transfer: implications for the development of online information literacy tutorials. Res. Strateg. **20**(4), 482–493 (2005)
11. Keene, J., Colvin, J., Sissons, J.: Mapping student information literacy activity against Bloom's taxonomy of cognitive skills. J. Inf. Lit. **4**(1), 6–21 (2010). http://ojs.lboro.ac.uk/ojs/index.php/JIL/article/view/189
12. Šumiga, B.: Understanding and use of information literacy in the industrial project management. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 90–98. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_10
13. Boustany, J.: Information literacy skills of students at paris descartes university. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 588–595. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_79

How University Students in Health Care Look for Information: Use and Initial Appraisal of Information Resources

Emmanouel Garoufallou[1,3], Chrysanthi Chatzopoulou[1(✉)], Eleni Tzura[1], Souzana Maranga[1], Rania Siatri[1], Georgia Zafeiriou[1], and Stavroula Antonopoulou[2,3]

[1] Alexander Technological Educational Institute (ATEI) of Thessaloniki, Thessaloniki, Greece
mgarou@libd.teithe.gr, chatzopoulou.c@gmail.com,
tzura.eleni@gmail.com, smaranga22@hotmail.com,
rsiatri@gmail.com, gzafeiri@libd.teithe.gr
[2] American Farm School, Perrotis College, Thessaloniki, Greece
santon@afs.edu.gr
[3] Alcala University, Madrid, Spain

Abstract. New developments in web infrastructure and information and communication technologies have revolutionized the way information is made available online, creating new opportunities and experiences for personalised information seeking. Furthermore, mobile and ubiquitous technologies offer new web based applications and devices that can be used to promote access in information and engage users. The aim of this study was to investigate the ways Greek university students in health sciences look for information. We specified student preferences and level of experience in use technology and the web for information seeking as well as their level of awareness of online information sources and the criteria used for choosing them. We used a web-based questionnaire method for collecting data. The results suggested that more effort should be given on enriching the students' information literacy skills.

Keywords: Information seeking behaviour · User studies · Information literacy · Mobile technologies · Health care · Evaluation information resources · Aesthetics and cosmetology

1 Introduction

Health care professionals should constantly update their clinical knowledge in order to be able to provide high-quality services. Therefore, the development of advanced information seeking skills is essential for health scientists and a major factor for the effective provision of health services. New developments in web infrastructure and information and communication technologies have revolutionized the way information is made available online, creating new opportunities and experiences for personalized information seeking. Furthermore, ubiquitous mobile and other technologies offer new web based applications and devices that can be used to promote access to information and engage users. Therefore, it is of great importance to investigate how users locate,

evaluate, and use available information. This also is of particular importance in the context of health sciences since the lack of appropriate information seeking skills of health care professionals can have a negative effect on the safety of their patients and the quality of care [1].

We conducted research in the Aesthetics and Cosmetology department of Alexander Technological Educational Institute (ATEI) of Thessaloniki in an attempt to examine the information seeking practices of Greek university students in health sciences, a. Our objectives of the study were: to specify student preferences and level of experience in the use of mobile technologies and the web for information seeking; to examine their knowledge of online information sources, relevant to their field of study; and to investigate the criteria used in order to evaluate these resources. Finally, we also evaluated the relationship between level of information literacy skills of those students and their information seeking practices.

2   Literature Review

The abundance, not to mention overload, of information on the Internet has streamlined a series of actions that affected all areas relating to information from its provision, to search tools and techniques used to locate information, to the information behavior of all kinds of user groups. Libraries are trying to catch up with the fast pace of continuous changes in the information landscape.

Google has changed dramatically the landscape of information search for users. The simple no frill search environment combined with a perceived "federated" like search capabilities has led Google to become the first search stop for users [2–5]. OCLC's research [2] indicated that 89% of users started off their search by using Google in comparison to only 2% who started with library resources. Research projects investigating information behavior of university students in medical and paramedical professions have also indicated that Google was their preferred search tool for general purpose enquiries [6–8].

Another university student focused research study [9] showed that, regardless of the nature of the search, students tended to focus on the most familiar to them tools, such as Google, Wikipedia, and social media with 76.2% of the participants indicating daily use of Google. At this point it is worth noting that 80.9% of the respondents indicated that they had received formal search training on medical resources but still preferred Google as their first stop. This finding also surfaced in other projects [10–12]. However, only 11.1% indicated that they had any sort of formal training on search in general resources such Google and Wikipedia. In this study respondents also indicated preference of Google use, indicating that accuracy and trust worthiness gave way to accessibility, usefulness, and ease of understanding. Thus, it is obvious that, due to information overload, information behavior tended to become simplified, a process that was assisted by the fact that developers of such tools, design and adapt them very quickly according to user needs perceptions and requirements.

A study on the information seeking of MIT students documented that Google was a first search tool followed by the library catalogue. There also seemed to be a

differentiation in resource use according to the nature and consequently the complexity of the task involved. Google was the preferred search tool when information needs involved quick answers to an issue or when the respondents had partial knowledge of the subject. When a specific item was required, then respondents chose the library catalogue and databases when conducting a search on a particular issue.

The British Library and the JISC carried out a comprehensive study in order to map the information seeking behavior of the Google generation those born after 1993) to document what we know about young people's information behavior, the generation that currently forms the university student population. Throughout the project they found that certain themes began to emerge regarding the generation that is now studying in universities:

- "the information literacy of young people, has not improved with the widening access to technology: in fact, their apparent facility with computers disguises some worrying problems;
- internet research shows that the speed of young people's web searching means that little time is spent in evaluating information, either for relevance, accuracy or authority;
- young people have a poor understanding of their information needs and thus find it difficult to develop effective search strategies;
- as a result, they exhibit a strong preference for expressing themselves in natural language rather than analysing which key words might be more effective; and
- faced with a long list of search hits, young people find it difficult to assess the relevance of the materials presented and often print off pages with no more than a perfunctory glance at them" [13].

In many cases lack of effective search strategies and convenience, resulted in students benefiting from the expertise of others: people in their professional or social background; professors; or other students who had already dealt with the subject in question. This illustrates the safety net of information experts to provide easy and fast access to relatively reliable information that each one of us has at our disposal through our social professional and family contacts. As Solomon indicated [14], personal interests are also relative, as in many cases they led to the selected sources while searchers also employed some ancillary search strategies such as decision-making, methods used for seeking information, browsing, scanning sources, information avoidance, and persistence.

In related studies, George et al. (2006) found that graduate students started performing their searches by asking other people questions related to their subject of interest, including students, professors, or librarians, in order to locate information resources when choosing an area of focus and developing a search strategy. This behavior was directly related to the fact that there was a vast amount of information available and students had difficulty designating which information was relevant to their search during the information hunting process. The second approach to their search was always more organized, but still included regular sessions with an expert advisor [15].

Furthermore, students who had English as a second language, preferred to look for information in Google and social media since they dealt with an interface that they were accustomed to, whereas library resources, such the OPAC, tended to have different

interfaces and lay out. Changing information environments held back the search and may have been affected by external factors such as language barriers, geographical isolation, or time spent in understanding the new search environment [16]. Moreover, in 2016 Segev and Sharon sought to provide insight into information seeking behavior focused on Google and Wikipedia. They created a list of scientific terms for a variety of fields, divided in two categories: ad hoc terms and cyclic terms. Ad hoc terms were the generalised terms designed to fit any problem or task while cyclic terms were those that were more specific and characterised by accuracy. Their results indicated that ad hoc patterns created bigger engagement between the user and the source even when the search topic was of scientific or specialized interest [17].

Regardless of the external factors that impinge on a person's search attitude when looking for information, information seeking is itself a process that blossoms through the problem – solving effort. At first approach students "fast surfed" in order to acquire a general knowledge on their search subject. Secondly, they "scanned" to related results in order to broaden and fortify their search and, lastly, when they felt well equipped with information, their search attitude was deep and strategic. Consequently, the more time and efforts they put into research, the more salutary their result was [18].

3   Methodology

We used a web-based questionnaire that included both open and closed-ended questions covering issues relating to information seeking behaviour. The contents of the questionnaire were also informed by relevant evidence in the context of health information seeking and information literacy research. We divided the questions into four sections:

- Information of demographic nature: including gender, age, and semester of attendance.
- Computer use knowledge and library use: questions that would define the training students received on computer skills during their studies both in their curriculum and through the library.
- Use and evaluation of information sources: questions regarding the preference on information sources and the criteria of their evaluating, as well as the information seeking strategies users selected in each search and their reconfiguration in case of deficient results.
- Information literacy: questions relating to their awareness of and the degree to which they followed referencing/citation management.

We collected data from April to July of 2015. We informed students about the survey through in-person announcements, in classes, and electronic announcements through Moodle on their department's webpages. All participants were undergraduate students in the Aesthetics and Cosmetology department. We informed students about the content of the research and the confidentiality issues in the face-to-face communication. to The initial page of the online questionnaire included a short text describing the project along with a privacy statement, reassuring participants that we would make no further attempt to capture any information that they did not provide.

A total of 130 students participated in the survey. We used SPSS version 20 to analyze the data.

4   Results

The first part of the questionnaire consisted of questions that provided information regarding demographics, including gender, age, semester of studies, and general experience using computers. To start with, all of the participants were students of the Aesthetics and Cosmetology department of School of Health Sciences and Care, in ATEI of Thessaloniki. All participants were women, apart from one, a fact that is easily understandable since this is a profession that is female dominated, at least in Greece. Seventy point seven percent of the participants were aged between 18 to 21, with the largest percentage (33%) indicating that they were in the third semester of their studies (Table 1).

Table 1.   Experience level on using computers

Level	Percentage
1. Novice	7.7
2. Beginner	11.6
3. Competent	33.8
4. Proficient	**39.2**
5. Expert	7.7

Through their self-assessment of computer use proficiency, 33.8% and 39.2% characterized themselves as competent and proficient users, respectively. This is easily justified by the fact that, given their ages, use of technology has been part of their daily routine from their early teens.

A great majority of the respondents (76.9%) preferred to start conducting a search with a Google search. They conducted such searches on a daily basis only for simple personal needs but also for their student papers. They preferred looking for information in Google, social media, or asking help from other people who already had conducted similar searches. In contrast, 48.8% of the participants indicated that they did not use any kind of library services. Google was the preferred first information for this generation due to its great availability coupled with the wide range of information accessible through Google search. This high percentage apparently also relates to the fact that, with the increased and constant rise of technology use, access to information has become possible through many media on a 24/7 basis, rendering the physical presence of the information seeker at the information source completely unnecessary. Thus, gradually but steadily, the notion of one's physical presence in a library seems to become more and more obsolete in the mind of users. Table 2 clearly shows that use of the Web is by far the students' preferred choice of. It is interesting that if responses regarding use of the "Web" and "Social Media" are combined they reach 83% and 65% for "always" and "very often", respectively.

Table 2. Frequency of use of resources

	Always%	Very often%	Often%	Rarely%	Never%
Opac	3	4	4	26	**63**
E-journals	2	7	13	**40**	38
Printed material	4	6	13	34	43
Databases	7	11	16	26	40
World Wide Web	**55**	**33**	11	5	6
Social media	28	32	19	13	8
Ask someone else	9	18	**24**	29	20

The terms OPAC, e-journals and database indicate that users accessed the library website to search specifically these services, although one might argue that accessing the library's website is use of the web and, indeed, it is. This study, along with many others, we tried to differentiate conscious determined use of library resources and services as opposed to unconscious/involuntary use of library resources such as use of Google scholar to access full text material to which the library subscribed. However, the user was unaware of this fact. This is an important issue that all libraries need to address. As far as search techniques were concerned, the most favored was use of keywords (86.9%) followed by thematic search (42.3%). It is worth noting that only 0.1% used Boolean operators even though a lot more students were aware of them. This percentage seems to be fully justified by the fact that most of the students in this department preferred to conduct a search using Google, which gives the desirable results through a simple search; they did not need to use an advanced search or use Boolean operators. An additional aspect that needed to be taken under consideration was the fact that almost 71% of the respondents indicated that they had not received any kind of formal training on information literacy. Simple and quick search seemed to be the solution for every query they had (Table 3).

Table 3. Search techniques employed by students

Level	Percentage
Boolean operators	1.5
Keywords	**86**
Phrase in Quotations	35
Search within 1st results	11
Truncation	5

Next, we asked users to indicate their preferred choice of an alternative search strategy when the preliminary search did not yield the desired results. Sixty-three percent of the users stated that they always (30%) or very often (30%) used different keywords as an alternative search technique when they are not satisfied with their initial results (Table 4).

Table 4. Alternative search strategies, when initial results are unsatisfactory

	Always%	Very often%	Often%	Rarely%	Never%
Change keywords	**33**	**30**	30	3	4
Use another search technique	6	20	26	28	20
Use different databases	7	16	31	33	13
Stop the search	2	4	13	**38**	**43**
Ask someone else	6	23	**43**	18	9

Our questionnaire included an open-ended question to investigate the issue of organizing the results and choosing the most relevant. We used the open-ended format so as not to restrict or guide respondents to specific answers. Almost a third of the respondents (29.5%) indicated that they were not aware of any evaluation techniques. We found this result to be very disturbing as it might have a long term impact in many aspects of their professional and personal lives. The second highest percentage indicated that they used the first results that appeared on the screen (Table 5).

Table 5. Result organising and choice

Benchmark	Percentage
By date	13.8
By title	10.7
I choose the first results	26.9
By source	10.7
By keywords	8.4
Do not know how to choose the more relevant	29.5

4.1 Information Literacy Issues

In relation to information seeking, 70.7% of the participants responded negatively to the question whether their curriculum included lessons related to information seeking on the web. The truth is that the current curriculum of Aesthetics and Cosmetology Department does not include any information literacy lessons and many students were not even aware of basic databases related to medical issues, including Medline. Even if they were aware of their existence, most of them had difficulties in using them properly. Although the library of ATEI of Thessaloniki provides a full online information literacy programme called Orion through the information literacy platform Callisto (http:// callisto.lib.teithe.gr/), most of the users stated that they were not informed correctly about their existence and usage. Academic staff can arrange delivery of information literacy lessons by library staff within the allocated time of their unit each semester. This service is available to any tutor who wishes to include it in their curriculum, but it is not mandatory. So, in effect, members of staff who tend to make use of the library through

in-erson visits as well as coverage of its electronic services tend to arrange such sessions each semester (Table 6).

Table 6. Awareness and assistance of online information literacy services Orion and Callisto

Answers	Percentage
I am not aware of them	68.4
Aware – Difficulty in use	3.0
Aware – Competent user	3.0
Aware – Do not use them	10.9
I do not know	14.6

As illustrated in Table 2, the level of awareness related to the online information literacy services of ATEI Library s rather disappointing. A largest percentage (68.4) of participants stated that they do not even know the existence of these services. This finding alone provides evidence for the need for further collaboration between the Library and the Aesthetics and Cosmetology department in order to inform users on relevant issues and train them effectively on how to incorporate these services to their everyday life.

Apart from that, most of the participants also stated that they visited the library in order to ask help from a librarian only once or twice per semester (30.6%), or once or twice per year (34.5%). We were disheartened by the percentage (32.2%) of students who do not visit the library at all. Table 7 shows the answers of the participants to the question "How often do you visit the library in order to ask help from a librarian or find material for your student work?":

Table 7. Frequency of library use

Frequency	Percentage
1–2 times per week	0.7
2–3 times per month	2.0
1–4 times per year	35.1
Never/not at all	32.2

5   Conclusions

The information literature reports on many studies of information seeking that concern how to create independent and well informed information users. The truth is that our users were out and about on the Web, they enjoyed its convenience, speed, accessibility, and they found or at least they thought that they found what they were looking for. The

students in our study were content with scouring results in the first page of results. We found that "there seems to be a mismatch between what traditional information literacy instruction programmes have emphasized and what students actually need to master competency for the purpose of gathering information in their learning environments" [13].

Libraries seem to be like parents who are holding on to their children by trying to contain them in a controlled environment. No matter the amount of discussion and the research findings that keep surfacing, parents and, in this case, librarians continue to disregard what their children, or students, need. We need to teach students to appreciate what the outside world has to offer and show them through trial and error when to trust and when to be cautious of the outside world. Librarians need to take them to the "outside world" and show them the tools and how to move more effectively. We need to show them how they can be more effective in Google search if that is what they want to use. We need to teach them what Google is and what is seems to be. Then, and only then, they will come to cherish and value the trustworthiness and accuracy that "home" has to offer. Our students are like children who go out and about but also feel, understand, and bear a deep appreciation in "coming home", even if it is only once a week for a Sunday lunch.

References

1. Hider, P., Griffin, G., Walker, M., Coughlan, E.: The information-seeking behavior of clinical staff in a large health care organization. J. Med. Libr. Assoc. **1**(97), 47–50 (2009)
2. OCLC: College Students' Perceptions of the Libraries and Information Resources, pp. 271–290, OH, Dublin (2006)
3. Head, A.: Beyond Google: how do students conduct academic research? First Monday **12**(8) (2007). http://ojs-prod-lib.cc.uic.edu/ojs/index.php/fm/article/view/1998
4. Head, A.J., Eisenberg, M.B.: Lessons Learned: How College Students Seek Information in the Digital Age. Social Science Research Network (2010). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2281478
5. Fast, K., Cambell, D.: I still like Google: university student perceptions of searching OPACs and the Web. Proc. Am. Soc. Inf. Sci. Technol. **55**(3), 138–146 (2004)
6. Kritz, M., Gschwandetner, M., Stefanov, V., Hanbury, A., Samwald, M.: Utilization and perceived problems of online medical resources and search tools among different groups of European physicians. J. Med. Internet Resources **15**(6), e122 (2013). http://www.jmir.org/2013/6/e122/
7. Duran-Nelson, A., Gladding, S., Beatle, J., Nixon, L.J.: Should we Google it? Resource use by internal medicine residents for point-of-care clinical decision making. Acad. Med. **88**(6), 788–794 (2013)
8. Hughes, B., Joshi, I., Lemonde, H., Wareham, J.: Junior physicians' use of web 2.0 for information seeking and medical education: a qualitative study. Int. J. Med. Inf. **78**(10), 645–655 (2009)
9. O'Carroll, A.M., Westby, E.P., Dooley, J., Gordon, K.: Information-seeking behaviors of medical students: a cross sectional web-based survey. JMIR Med. Educ. **1**(1), e4 (2015). http://mededu.jmir.org/2015/1/e4/

10. Rawlands, I., Nocholas, D., Williams, P., Huntington, P., Fieldhouse, M.: The Google generation: the information behaviour of the researcher of the future. New Inf. Perspect. **60**(4), 290–310 (2008)
11. Madden, M., Jones, S.: The Internet goes to college. Pew Internet and American Life Project (2002)
12. Johnson, P.T., Chen, J.K., Eng, J., Makary, M.A., Fishman, E.K.: A comparison of world wide web resources for identifying medical information. Acad. Radiol. **15**(9), 1165–1172 (2008)
13. British Library, JISC: Information Behaviour of the Researcher of the Future (2010)
14. Solomon, P.: Looking for information: a survey of research on information seeking, needs, and behavior. Inf. Retr. J. **6**(2), 284–288 (2003)
15. George, C.A., Bright, A., Hurlbert, T., Linke, E.C., Clair, G.S.: Scholarly use of information graduate students' information seeking behaviour. Inf. Res. **11**(4), 13 (2006). http://repository.cmu.edu/cgi/viewcontent.cgi?article=1021&context=lib_science
16. Sin, S.J., Kim, K.: International students' everyday life information seeking: the informational value of social networking sites. Libr. Inf. Sci. Res. **35**, 107–116 (2013)
17. Segev, E., Sharon, A.J.: Temporal patterns of scientific information-seeking on Google and Wikipedia. Publ. Underst. Sci. **17**(1), 31–52 (2016). http://pus.sagepub.com/content/early/2016/05/18/0963662516648565.abstract
18. Heinstrom, J.: Fast surfing, broad scanning and deep diving: the influence of personality and study approach on students' information seeking behavior. J. Doc. **61**(2), 228–247 (2005)

Self-reported Information Literacy Skills Among Researchers Within a Medical and Health Science Faculty

Ann De Meulemeester[1(✉)], Nele S. Pauwels[1], Renaat Peleman[1], and Heidi Buysse[2]

[1] Knowledge Center Ghent, Ghent University, Ghent, Belgium
{Ann2.Demeulemeester,Nele.Pauwels,Renaat.Peleman}@UGent.be
[2] Medical Informatics and Statistics, Ghent University, Ghent, Belgium
Heidi.Buysse@UGent.be

Abstract. Since research output is expanded from published work to research data and communication, guidance and support should follow this evolution. Ghent University Library (Belgium) conducted in 2015 a "Skills@UGent" survey comprising questions considering information literacy skills to identify actual needs. This paper focuses on research planning, deontology and visibility queried in a group of postdoctoral researchers of the Faculty of Medicine and Health Sciences. They encounter specific difficulties with respecting ethical codes of conduct, knowing how and where to store data, setting up a data management plan, and knowing and applying new insights concerning data management. Furthermore, they also encounter problems with different aspects of visibility. The results of this survey gave the Knowledge Center a better insight of the information literacy self-efficacy of postdoctoral researchers which lead to several initiatives such as customized lunch seminars and a more user-oriented website.

Keywords: Data management · Deontology · Visibility · Information literacy · Self-efficacy · Researchers · Health sciences

1 Introduction

Universities worldwide are part of a competitive market, implying that management is often focussed on ranking, reputation, performance, and efficiency. Researchers, as stakeholder of this institution, need specific research skills to become information literate persons within an academic setting. Laidlaw et al. reported that developing research skills at an early stage is required for further professional development and stated "Research involves the collection and processing of new information and interpreting these through logic and previous knowledge by a process of establishing facts, considering new ideas and postulating new theories to update expertise" [1]. These skills can indeed empower academic integrity and responsible research aims. Furthermore, within a complex community of scholarly communication, researchers need to be information literate to perform research and to evolve within the evolution that the digitalisation brings along. They need to function in an open-minded (for example, Open Access), transparent (for example, social platforms and data management) and ethical world.

The survey "Skills@UGent", was conducted by the Library of Ghent University in collaboration with the different Faculty Libraries, as part of the strategy framework "Facilitating open Knowledge creation", where "Information Literacy" is one of the four pillars of the policy objectives [2]. At Ghent University, students as well as researchers should have the necessary academic competences to produce and reproduce high-quality research and will therefore increase the focus on information literacy in its policies. Information literacy will become a fixed and evaluated part within the various curricula. Different stakeholders were engaged in developing this questionnaire, collecting and analysing the answers, and writing further recommendations for improving information literacy skills within the different user groups and faculties. The aim of this survey was to elucidate the specific information literacy needs as well as the current services providing information literacy in order to collect concrete ideas for improvement of these skills. Both quantitative and qualitative methods were used over a period of six months.

Even though information literacy self-efficacy has been studied well in students [3, 4], data for researchers are lacking. This paper will focus specifically on health-researchers' current view and needs on information literacy skills concerning research planning, deontology and visibility.

2   Methods

A cross-sectional web-based survey was used to question four different stakeholders (bachelors, masters, PhD students and researchers) at Ghent University (Belgium) about their self-efficacy towards information literacy. This paper will focus specifically on the group of researchers. Invitation to participate anonymously was sent via appropriate university channels such as the electronic platform, different online subscription and mailing lists. Reminders were sent after three weeks. Data was collected in March–April 2015. The online survey addressed to researchers consisted of 40 questions which could be scored on a Likert scale (0 'strongly disagree' to 7 'strongly agree'), since a Likert scale seems to offer an acceptable method of measuring self-efficacy [5]. Furthermore, per question there was an additional option to add free comments. Some questions were institutional-specific (for example, "I know how to use the institutional repository" and "I know the procedures for external funding", among others) and were not taken into account for this paper. Three specific subtopics will be discussed: research deontology; research (data) management; and research visibility. Besides the information about information literacy, some general information has been gathered: age and gender.

2.1   Statistical Analysis

Descriptive statistics are presented as median (interquartile range [IQR]) with minimum-maximum [min-max] intervals. To look into whether or not certain skills were accomplished (score 5), one-sample Wilcoxon signed ranks tests were used. Mann-Witney U tests were used to compare continuous data between unrelated samples. To look for a correlation of skills with age, Spearman correlation coefficients were calculated. SPSS version 23 (SPSS Inc., Chicago, USA) was used to perform all statistical analyses. Alpha was set at 0.05.

3   Results

A total of 118 researchers participated in the survey, of which 70 (59.3%) were women. Female respondents were significantly younger compared to male respondents ($p < 0.001$) [median (IQR) age (y): females: 37 (28–47); males: 52 (37–62)].

Table 1. Descriptive statistics for research deontology, (data) management, and visibility. P-values whether results are different from median = 5 (skill accomplished) as well as Spearman correlation coefficients calculated for every specific question with age (y)

Question	Median (IQR)	Min-max	Different from median = 5	rS with age
Research deontology				
I know how to apply the ethical rules and guidelines for conducting research	5.0 (4.8–6.0)	0–7	0.032	0.223*
I know when to contact an Ethics Committee	6.0 (5.0–7.0)	0–7	<0.001	0.164
I know the Ethics Committee procedure to be followed	6.0 (5.0–7.0)	0–7	<0.001	0.169
Research (Data) management				
I know how to plan a research project	6.0 (4.0–6.0)	0–7	0.119	0.182
I know how to set up a protocol (literature study, competitors, …)	5.0 (4.0–6.0)	0–7	0.671	0.151
I know how to compile a data management plan	3.0 (2.0–5.0)	0–7	<0.001	0.098
I know how to preserve data of my research	5.0 (4.0–6.0)	0–7	0.001	0.062
I know where to store the data of my research	4.0 (2.0–5.0)	0–7	<0.001	−0.007
I am aware of recent developments in research data management	2.5 (1.0–4.0)	0–7	<0.001	−0.054
I know how to apply recent developments in research data management to my own research data	2.0 (1.0–4.0)	0–7	<0.001	−0.092
Research visibility				
For the contacts in my research area, I use network platforms such as Mendeley, LinkedIn, ResearchGate…	4.0 (2.0–6.0)	0–7	<0.001	−0.209*
I know how to prepare a presentation of my research	6.0 (6.0–7.0)	2–7	<0.001	0.155
I know how I can increase the visibility of my research project	5.0 (3.0–5.0)	0–7	<0.001	0.048
I know how to publish my research in a peer-reviewed journal	6.0 (6.0–7.0)	1–7	<0.001	0.360**
I know how to publish my research in an Open Access journal	6.0 (4.0–7.0)	0–7	0.029	0.172
I know how I can make my publication available in Open Access	5.0 (3.0-6.0)	0–7	0.437	0.100
I know what my rights as the author are after the publication of my article	4.5 (3.0–6.0)	0–7	<0.001	0.267**
I know how to determine the journals in my field that are most advantageous for my articles	6.0 (4.0–7.0)	0–7	0.038	0.166
I know how to use bibliographical software (EndNote, Zotero, …) to manage my sources	6.0 (3.0–7.0)	0–7	0.789	−0.427**
As a researcher, I need additional information about the process of publishing	4.0 (2.0–6.0)	0–7	<0.001	−0.135
I share my presentations or posters via platforms such as Slideshare, YouTube,…	0.0 (0.0–1.0)	0–5	<0.001	−0.021
I know what data of my research I may share	5.0 (4.0–6.0)	0–7	0.358	0.067

Spearman correlation coefficients: * p-values < 0/05; ** p-value < 0.01

3.1   Research Deontology

As can be seen in Table 1, researchers know when to contact the Ethics Committee (EC) ($p < 0.001$) and know what the EC-procedures are ($p < 0.001$). When looking at whether they know how to respect the ethical codes of conduct and follow the respective guidelines, not all researchers accomplished this skill ($p = 0.032$). Younger researchers, in particular, seem to encounter problems ($r_S = 0.223$).

3.2   Research (Data) Management

Researchers seem to encounter quite some problems with (data) management (Table 1). They state that they do not know how to set up a data management plan ($p < 0.001$); do not know how ($p = 0.001$) and where ($p < 0.001$) to archive data; do not know what the most recent insights are concerning data management ($p < 0.001$); and – consequently – do not know how to implement these new insights ($p < 0.001$). For any aspect, significant correlations could be found with age.

3.3   Research Visibility

Not all researchers use network platforms to enhance research contacts ($p < 0.001$) however, young researchers seem to make more use of it ($r_S = -0.209$). Knowing how to optimise the visibility of a research project seems to be a problem ($p < 0.001$). Even though researchers know which research results they can share ($p = 0.358$) and how to present their research results ($p < 0.001$), they do not share them on specific platforms (for example SlideShare and YouTube) ($p < 0.001$). Researchers know how to publish in a peer-reviewed journal ($p < 0.001$), where older researchers seem to have more experience with it ($r_S = 0.360$). Once the paper is published, researchers do not always know what their rights are ($p < 0.001$); young researchers, in particular, seem to have difficulties with it ($r_S = 0.267$) (Table 1).

4   Discussion

The fast evolving research area emphasizes the increasingly valuable aspects of research (data) management, deontology and visibility. This survey demonstrated that researchers – even though they all have PhD degrees – still lack important information literacy skills. As can be seen in the results, not all researchers lack all skills; for almost all questions, the range is between 0 (not at all accomplished) and 7 (completely accomplished). Also, there seems to be an age-difference. While young researchers who just obtained their PhD seemed to be more up-to-date with novel technologies (for example, network platforms and bibliographic software), older researchers seem to have more experience with publishing and seem to know more about what their rights are. Previous research already showed that acquiring information literacy skills is part of lifelong learning [4]. Already when being a student, research-specific information literacy skills

should be encouraged and continuing refreshment courses of those skills should be foreseen and integrated into the whole curriculum as part of lifelong learning [1, 3, 4].

Different studies illustrate the need for developing information literacy support for researchers [6–8]. Because of the differences in skills researchers have, it is not easy to create supportive solutions for all researchers. Furthermore, supporting researchers can be done through different channels and by different means. Libraries could get out of their more traditional role of 'book keepers' and offer more support and guidance. The medical library of Ghent University changed his name already some years ago to Knowledge Center Ghent because of the change in focus from a more traditional to a more user focused view. Recently new skilled staff was recruited to further expand support for researchers. Furthermore, a closer collaboration between the Knowledge Center Ghent and the academic research department has been established. Because researchers need to know where to get which support, it is important that the role of library support is defined in close collaboration with the academic research department. As a result of this survey, a more user-oriented website with online guidance, tutorials and contact details for support, will be installed.

Research data management is nowadays recommended and sometimes obliged by (inter)national funding bodies and the government. For example, the European Commission required the use of a data management plan for projects participating in the Open Research Data pilot [9]. The results of this survey indicate that younger as well as older researchers encounter quite some problems with all aspects of data management. Special attention should be given to these particular skills as data management will become even more important in this fast evolving digitalized world. Another important factor in health research is everything concerning ethics. Even though most researchers know the EC-procedures, there seems to be a gap between knowing the ethical principles and conducting according to these principles. Looking at research visibility, there is a great variety of information literacy scores. Some researchers could need to learn more about research communication, while others could be more interested in digital platforms for researchers. In the open answer possibility, some researchers indicated that they do not know what their rights are on those specific platforms and are therefore reticent about using the platforms.

Some limitations of this paper should however be stressed. This survey was addressed to all stakeholders of Ghent University, implying that there were no (health) faculty-specific questions included. In the Faculty of Medicine and Health Sciences, some aspects of, for example, ethics and privacy are more important compared to other faculties. Only limited questions were included in this questionnaire. Furthermore, the Faculty of Medicine and Health Sciences consists of different departments. For example, the use of big data, re-use of data and sharing data can be different from the perspective of Movement Sciences compared to, for example, Medical Sciences. In this survey, it was not possible to connect researchers to their departments. Furthermore, only 'age' was recorded. There is no data available on the time the researcher already spends in his/her role as researcher, nor how many publications he/she has, nor how many research projects he/she led. Focus groups with specific target groups could possibly lead to more in-depth information and would be helpful to fully understand the needs concerning these specific skills. Also, information literacy skills were not tested but only surveyed.

Furthermore, 'median equals five' was set as 'skill accomplished'. No literature exists about which value should be taken as a cut-off point. Additionally, specific research should be addressed to fully understand health researchers' needs concerning information literacy.

As a result of this survey, researchers can get now support and guidance through different means. A more user-oriented website with up-do-date information for this specific target group will be installed. Also, next to online guidance and tutorials, *ad hoc* one-to-one and small group training sessions or information support are provided by the library staff, which stresses the importance of skilled (library) personnel. Furthermore, so-called lunch-meeting seminars have been organized. The topics for these sessions are oriented on problem-areas detected in this survey, for example, the use of network-platforms, use of supportive tools for data management and Open Access. Even though there are some shortcomings, this survey indicates that health researchers are in need of information and support concerning research (data) planning, deontology and visibility.

References

1. Laidlaw, A., Aiton, J., Struthers, J., Guild, S.: Developing research skills in medical students: AMEE Guide no. 69. Med. Teach. **34**(9), 754–771 (2012)
2. Borderé, M., De Loose, M., De Meulemeester, A., Defoort, H., Hochstenbach, P., Moreels, D., Osselaer, M., Scheltjens, S., Van Nieuwerburgh, I., Van Conkelberge, V., Van Coppenolle, B., Van Peteghem, S.: Facilitating open knowledge creation: Van Visie Tot Actieplan Voor De Universiteitsbibliotheek Gent, pp. 1–13. s.n. (2015)
3. De Meulemeester, A.: The "information literacy self-efficacy scale" and the medical curriculum at Ghent university. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 465–470. Springer, Heidelberg (2013). doi: 10.1007/978-3-319-03919-0_62
4. Meulemeester, A., Buysse, H.: Progress testing of information literacy versus ınformation literacy self-efficacy in medical students. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 361–369. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_38
5. Maurer, T.J., Pierce, H.R.: A comparison of likert scale and traditional measures of self-efficacy. J. Appl. Psychol. **83**(2), 324 (1998)
6. Richardson, J., Nolan-Brown, T., Loria, P., Bradbury, S.: Library research support in Queensland: a survey. Aust. Acad. Res. Libr. **43**(4), 258–277 (2012)
7. Streatfield, D., Allen, D., Wilson, T.: Information literacy training for postgraduate and postdoctoral researchers: a national survey and its implications. Libr. **60**(3), 230–240 (2010)
8. Federer, L.M., Lu, Y.-L., Joubert, D.J.: Data literacy training needs of biomedical researchers. J. Med. Libr. Assoc. **104**(1), 52 (2016)
9. European Commission - Directorate-General for Research & Innovation. Guidelines on Data Management in Horizon 2020 (2016). http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

Seeking Creativity: A Case Study on Information Problem Solving in Professional Music

Iwan Wopereis[1(✉)] and Egbert Derix[2]

[1] Faculty of Psychology and Educational Sciences, Open University of the Netherlands,
Heerlen, The Netherlands
iwan.wopereis@ou.nl
[2] Fontys Rock Academy, Tilburg, The Netherlands
egbert.derix@fontys.nl

Abstract. This study explored the information problem solving behavior of a professional jazz musician during creative work. It aimed at revealing information seeking activities necessary to execute present-day musical projects. A single case was studied in depth. First, a narrative interview was conducted to reveal project phases and corresponding information seeking behavior. Second, hereupon a semi-structured interview was taken to identify information seeking activities per phase. Results indicate that the musician deliberately searched for musical information especially in the first project phases. The internet was used as main source. Both data and goal driven strategies were applied, of which the latter were relatively scarce. This means that in this case the musician sporadically searched information based on a contemplated search plan. Future research should aim at generalizing findings. It should further validate the underlying analytical framework that proved to be useful for describing and categorizing musical information seeking behavior.

Keywords: Information problem solving · Information seeking · Creativity · Music

1 Introduction

Do professional musicians deliberately seek information when they work on a musical project? Or, do they solely rely in such contexts on knowledge and skills developed across the lifespan through formal and informal learning activities, such as by means of enculturation? With the proliferation of the internet one would expect that musicians–like professionals in many other domains–increasingly make use of online sources for musical inspiration and creative problem solving [1, 2]. Although the likelihood is high that musicians intentionally make use of the web for such activities, little is known on the exact way they use the web in their present-day professional work. Studies on information-seeking behavior in musical experts are scarce [3]. Most research and development projects concentrate on musical information seeking in education [4] or non-professional every-day life [5]. In these contexts information needs relate to learning and leisure, which are unarguably important themes in professional work [6]. In order

to reveal musical information seeking behavior that addresses information needs in work-related contexts we initiated the present study. Our aim was to scrutinize this behavior in project-based work, which is the most prominent type of work in music [7]. Results of this study are of interest for conservatoires to prepare future professionals for musical practice in an information-rich society. In addition, providers of musical information (i.e., musical scores, (video) recordings, documentaries, interviews, and (historical) analyses) may benefit of better insight in seeking behaviors of professionals to optimize both products and services.

Since there is not much literature on musical information seeking in professional musical contexts, we built on conceptual studies of Lavranos et al. [3, 8] on musical information seeking of aspiring musicians in general settings. Based on a literature review, Lavranos et al. [3, 8] proposed a model that connects musicians' information seeking behavior and creative processes in music. Their model merges Wilson's [9] model of information seeking behavior and Webster's [10] model of creative thinking in music. Figure 1 shows Lavranos et al.'s model.
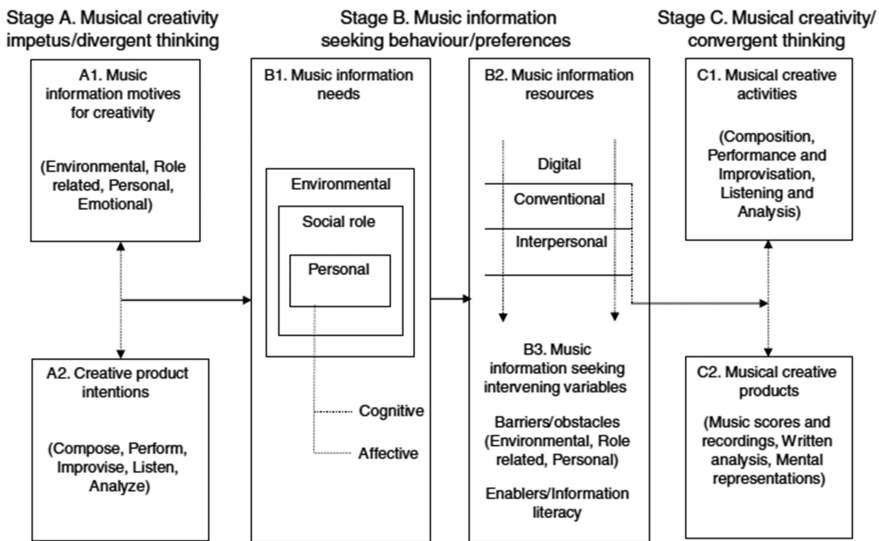
Fig. 1. A conceptual information seeking behavior model for musical creativity (Source: Journal of Documentation, 71, p. 1084)

The basic assumptions of this 'merged' model are as follows. First, information seeking behavior in a musical creative context includes three stages. In the first stage an impetus for a musical product is identified. This product can be a musical composition, performance, analysis, or recording. The second stage includes an identification of a need for musical information that relates to the wish for a creative product and a subsequent search for sources. This search can be enabled or hampered by environmental and personal factors. In the third stage musical activities emerge that may benefit from the information found in the previous stage. Kostagiolas et al. [11] identified musical information seeking behaviors among a community of amateur musicians. Their results

showed that this group of musicians sought information for learning and leisure using internet sources like online social networks. The question is whether professional musicians have similar information needs and whether they use the same tools and sources to fulfill this need.

In the present study we focused on information seeking within the context of project-based work. This type of work is predominant in the domain of professional music making and is characterized by diversity and a high degree of self-directedness and independence in performance of activities [7]. Project-based work in the arts features four core phases, namely preparation, conceptualization, realization, and evaluation [12]. For reasons of simplification, project-based work is often defined as linear (see Fig. 2). However, when scrutinized in depth, activities in projects generally are erratic and iterative in nature. For instance, in a musical recording project, product conceptualization (i.e., ideation and composition) may frequently alternate with product realization (i.e., selection and recording). In the present study we used both Lavranos et al.'s model (Fig. 1) and Kolsteeg and Mulder's model (Fig. 2) as points of departure for the analysis of information seeking behavior of a professional musician. Since the domain of music is broad we decided to explore a musical project of an experienced professional who works on the intersection of popular, jazz, and improvised music. The project central to the case included various musical creative activities (C1, see Fig. 1), which makes it an appealing prototypical case in the realm of professional musical creativity. The case will be explained in detail in the method section of this paper.

preparation phase → concept phase ↔ realization phase → evaluation phase
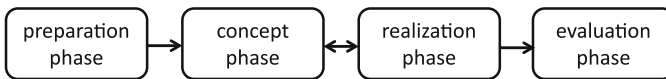
Fig. 2. Phases in art projects (based on [12])

The aim of our study was to identify musical information seeking behaviors in a project-based professional context and to validate existing conceptual models on both musical information seeking and project-based work. Our research questions (RQs) were:

- RQ1. What comprises musical information-seeking behavior of a professional musician when executing a musical project?
- RQ2. Does musical information-seeking behavior relate to specific project phases?
- RQ3. Does the professional's information seeking behavior identified in this study fit the conceptual model of Lavranos et al.?

2   Method

2.1   Case

In this case study we explored the information seeking behavior of a professional musician in the context of a musical project. This project, named 'Falco', was initiated, conceptualized, and executed by the second author, a professional Dutch pianist with

over 25 years of experience in popular, jazz, and improvised music; we will use the
initials ED in the remainder of the article to refer to him. The core of the project consisted
of both compositional and recording activities for a solo-piano album (i.e., Compact
Disc). Although the production of an album has become a rarity in the musical domain
[13], it still is regarded an important musical achievement for professionals [14]. As the
work central to the project included various musical creative activities such as compo-
sition, improvisation, performance, recording, listening, and analysis, it was seen as
good practice for exploration. For two other reasons, it was appealing to examine the
project in depth. First, it was a solo piano project, which is a type of project that is highly
valued by peers in the musical domain. Second, the project was crowdfunded, which is
a relatively new and emerging way to obtain project funding [13]. In a crowdfunded
project the originator of the project informs on a regular basis the funding crowd. This
information was taken as additional source of data for the analysis (i.e., triangulation).
The musical project took about eight months. During the project three recording sessions
were conducted.

2.2 Procedure

We followed a two-step interview procedure [15, 16]. First, we conducted a narrative
interview to reveal project phases and corresponding information seeking behavior on
a general level. Second, we added a semi-structured interview to identify information
seeking activities per phase. We compared results of the first interview to existing liter-
ature on conducting projects in artistic domains [12]. The first part of the second inter-
view included a member check to improve narrative accuracy of the results. The second
part of that interview specifically focused on revealing musical information needs and
activities in the context of the project. We compared the results with the conceptual
model of Lavranos et al. [3].

   We used other sources to triangulate data. We analyzed the weblog facility of the
crowdfunding site used by the musician to inform the 'funding crowd' to validate project
phasing. Furthermore, we read an autobiographical work [17] and a personal profes-
sional website to verify musical background variables.

3 Results

In this section we first present identified information seeking behavior. Subsequently,
we categorize musical information needs and activities and relate these to project phases.

3.1 Musical Information Seeking

Within the context of the project 'Falco', we identified various musical information
seeking activities. Some of them were intentional, planned, and goal-directed (see, for
example [1, 18]). Other activities started with an obscure impetus and not necessarily a
need that resulted in data-driven, opportunistic searches for musical information. We
first present the goal-directed information seeking activities identified in this case.

In this musical project, goal-directed searches for musical information mainly focused on finding information about inspiring musicians. Most information seeking activities aimed at retrieving information on Falco, the central theme of the musical project. Falco was an Austrian musician, poet, and songwriter whose life fascinated ED: "Falco was someone whose life was uncompromising." This feature made him someone to feel a kinship with. "After seeing a movie about his life, last summer [2015], I wrote the solo piano piece 'Falco'. That song was also the motivation to write other new piano music, which altogether led to the idea to start the solo CD project." The interest for Falco resulted in a hunger for information about the artist. "I can't control myself. When a topic fascinates me, I can become absorbed by it.… I searched the Internet. For instance, I checked Amazon on written resources on Falco. I searched for interviews, websites." ED also visited Falco's birthplace Vienna, a trip he characterizes as "a pilgrimage to the places which are connected to Falco." The information gathered both in the virtual and real world inspired ED not only to write music, but to write a booklet for the solo piano album as well. For the latter, information had to be reliable and correct. On trustworthiness of (social) network sources ED for instance mentioned: "I always pay attention to the 'tone' of the site. This tone should be serious."

Another example of goal-directed information seeking was our search for information on Canadian piano player Paul Bley. ED started listening to this pianist again at some point in the middle of the project for no specific reason. Since ED had already planned to visit Canada for another musical project, he initiated the idea for meeting the pianist. Unfortunately, beginning January 2016, Paul Bley passed away. This tragic moment stirred up ED's interest in the musical work and life of Paul Bley and it was an incentive to deliberately search for music and information on the pianist. Besides using Google as a starting point to search information, 'direct' searches in musical sources like YouTube, Amazon, and Facebook were an important strategy to retrieve interesting information. For ED, 'Facebook Appreciation Groups' like those related to Paul Bley were important sites to find information. They contain links to other sources like interviews and music.

Both examples of goal-directed information seeking show that ED deliberately searched for information. However, the needs for information that underlay the information seeking activities were not related to severe problems that could jeopardize the progress of the musical project. Information needs were most related to curiosity and seen as influential to project content. "In the process of deciding what to record and what to improvise, I have listened much to free improvisation. To broaden my horizons. I started listening to Paul Bley, but I also started listening to Andrew Hill and Jasper van 't Hof. People who play a lot 'in the moment' and 'from the moment'. And I have taken over principles."

From the beginning of the project up to and including the recording sessions ED searched for solo piano music. As mentioned earlier, this was often intended and 'goal-directed' (for example, looking for music of a specific pianist or composer). However, ED regularly searched for solo piano music and information on this type of music in an opportunistic way. This was done both online and offline. The offline search included 'old fashioned' searches in record stores, a dying breed in retail business. Such searches for instance resulted in examples of how solo recordings sound. Interesting information

regarding sound was shared with the sound engineer. It could eventually lead to choices regarding sound.

3.2   Project Phases

The project phases as described in Fig. 2 can be regarded as 'anchors' to describe project activities. On a global level we concluded that the present musical project followed the sequence of the four phases. However, when analyzed in depth an iterative 'back and forth' phasing was a more accurate characterization of how the project ran. Especially between the concept phase and the realization phase iterations were common. The realization phase included the recording, selection, and producing of album tracks; the completion of the album definitely marked the end of this phase. Since the recording included three sessions, ED could (and did) decide to compose new material and alter existing compositions. New ideas (based on incidents) resulted in new material. The Paul Bley case described earlier is an example of this. Also activities between the preparation phase and the concept phase alternated. During the concept phase it became clear that the crowdfunding campaign was more successful than expected. The result was that a double album could be recorded. This success opened up new prospects for ideation and conceptualization of the musical product (e.g., to define a different sound for each album). The evaluation phase was clearly a demarcated end of the musical project and included reflection activities in addition to evaluation.

3.3   Validation of Models

The stage model of Lavranos et al. (see Fig. 1 for the legend) helped to identify information needs and subsequent information seeking behavior (Stage B) in the context of a musical creativity project (Stages A to C). Information needs (B1) in the present musical project were mainly 'personal' (i.e., cognitive and affective) and they were not perceived as 'problems' or 'threats' to the project's progress. Instead, they were regarded the starting point for seeking 'inspiring' and 'musically enriching' information. Music information resources (B2) used to find information were both digital (i.e., internet) and conventional (e.g., record stores). Barriers related to the information seeking process were not mentioned (B3). Goal-directed searches (as part of Stage B3) were mainly related to the concept phase of the project. Opportunistic searches were part of the preparation, concept, and realization phases of the project. ED described the motives for the musical project. He wanted to record a solo piano album, got inspired by the artist Falco, and started a successful crowdfunding campaign (cf. Stage A). He also elaborated on the outcomes of the musical project: (a) a double album and (b) additional services (e.g., a private concert) and products (e.g., a custom made composition) for those who financially contributed to the project (cf. Stage C).

Lavranos et al.'s stage model suggests linearity in creative musical projects. However, our data shows that the nature of a creative musical project is highly iterative, which in our view should be emphasized in their model.

4   Discussion

In this case study we analyzed information seeking behavior in the context of a professional musical project. It validated a conceptual information seeking behavior model for musical creativity and a model for project-based work in the domain of the arts. Our study showed that, within a professional project-based work context, musical information seeking is a constituent of project work. Information seeking in this case study consisted of goal-directed online searches in serious social network sites and websites and opportunistic, data-driven searches in both online and offline music information stores and databases. Information needs were present, though not always regarded 'problematic'. Not solving these information problems would most likely not jeopardize the progress of the musical project. As such, information problem solving or information seeking in musical projects of professionals might be not as important as one would expect. Expert professional musicians seem to have clear ideas on what to create and probably can rely to a large extend on their own 'resources'. In such cases, seeking for additional information is not a vital necessity. For musical students and amateur musicians this might be different. For them new musical information can be valuable for learning [4, 11].

This case study further showed that musical information seeking is something that is part of the 'daily repertoire' of an expert professional musician. Today, musical information is abundantly present on the internet and musical experts seem to make use of this presence. They often aimlessly go through it, seeking instances of creativity in order to get inspired. However, the question is whether this information seeking behavior is efficient and effective. It might be interesting to find out whether 'efficiency' and 'effectivity' is relevant in the context of creative work. Does having contemporary knowledge and skill about searching information in present-day professional musical databases for instance have a positive effect on creative processes and products? Future research could aim at revealing effects of musical information literacy on musical creativity.

Project-based work is a predominant way of work in music. This contemporary case showed that 'phase-related' activities in contemporary professional projects can alternate. Analytic, design, and developmental activities interchange during a project, making it iterative. Information seeking (both goal-driven and opportunistic) can be part of all project phases, although it is mainly manifest in ideation and conceptualization phases. Our study further aimed to validate the conceptual work of Lavranos et al. [3, 8]. The study showed that their model is helpful to analyze and describe professional musical creativity in projects. However, iterativity should be emphasized in their model's description. Future research should aim at generalizing our findings to other types of musical projects and other kinds of musical work.

This case study was a first attempt to understand information seeking behavior of professional musicians. However, several limitations applied and should be addressed in future research. First, although the retrospective interview data provided good insight in information seeking behavior of the professional musician, this insight could be improved when interview data is complemented with data collected by means of a diary instrument and computer log files. Second, such triangulation of data could be repeated in a study where several musical projects of one professional musician are studied. Third,

projects of various musical artists could be studied in multiple case study designs. Since musical creativity among musical genres differs [19] this is an important step to generalize findings.

5 Conclusion

Our study shows that 'seeking creativity' is in the first place an introspective endeavor for a professional musician. However, it also indicates that seeking musical information and inspiration online is an increasingly important activity in contemporary musical work. Insight in how experts solve musical information problems can be valuable for aspiring musical professionals. Knowing efficient, effective, and enjoyable ways to solve musical information problems in a professional context may positively effect the quality of creativity. We, therefore, advise continuing research on solving information problems in professional musical contexts as it can provide the necessary input for musical information literacy learning-teaching trajectories at music schools, conservatories, and professionalization programs.

References

1. Brand-Gruwel, S., Wopereis, I., Vermetten, Y.: Information problem solving by experts and novices: analysis of a complex cognitive skill. Comput. Hum. Behav. **21**, 487–508 (2005)
2. Brand-Gruwel, S., Wopereis, I., Walraven, A.: A descriptive model of information problem solving while using internet. Comput. Educ. **53**, 1207–1217 (2009)
3. Lavranos, C., Kostagiolas, P.A., Martzoukou, K., Papadatos, J.: Music information seeking behaviour as motivator for musical creativity: conceptual analysis and literature review. J. Doc. **71**, 1070–1093 (2015)
4. Meyers, A., Ishimura, Y.: Finding sound and score: a music library skills module for undergraduate students. J. Acad. Librarianship **42**, 215–221 (2016)
5. Laplante, A., Downie, J.S.: The utilitarian and hedonic outcomes of music information-seeking in everyday life. Libr. Inf. Sci. Res. **33**(3), 202–210 (2011)
6. Leckie, G.J., Pettigrew, K.E., Sylvain, C.: Modeling the information seeking of professionals: a general model derived from research on engineers, healthcare professionals, and lawyers. Libr. Q. **66**, 161–193 (1996)
7. Umney, C., Kretsos, L.: "That's the experience": passion, work precarity, and life transitions among London jazz musicians. Work Occup. **42**, 313–324 (2015)
8. Lavranos, C., Kostagiolas, P., Korfiatis, N., Papadatos, J.: Information seeking for musical creativity: a systematic literature review. J. Am. Soc. Inf. Sci. Technol. **67**(9), 2105–2117 (2016)
9. Wilson, T.D.: Models in information behaviour research. J. Doc. **55**, 249–270 (1999)
10. Webster, P.: Creative thinking in music: advancing a model. In: Sullivan, T., Willingham, L. (eds.) Creativity and Music Education, pp. 16–34. Brittania, Toronto (2002)
11. Kostagiolas, P.A., Lavranos, C., Korfiatis, N., Papadatos, J., Papavlasopoulos, S.: Music, musicians and information seeking behaviour: a case study on a community concert band. J. Doc. **71**, 3–24 (2015)
12. Kolsteeg, J., Mulder, N.: De Kunst van Projectmatig Werken (The Art of Project-Based Work). Utrecht Arts Management Press, Utrecht (2010)

13. Hracs, B.J., Leslie, D.: Aesthetic labour in creative industries: the case of independent musicians in Toronto. Canada. Area **46**, 66–73 (2014)
14. Wopereis, I.G.J.H., Stoyanov, S., Kirschner, P.A., Van Merriënboer, J.J.G.: What makes a good musical improviser? An expert view on improvisational expertise. Psychomusicol. Music Mind Brain **23**, 222–235 (2013)
15. Stroobants, V.: Stories about learning in narrative biographical research. Int. J. Qual. Stud. Educ. **18**, 47–61 (2005)
16. Yin, R.K.: Case Study Research: Design and Methods, 5th edn. Sage, Thousand Oaks (2014)
17. Derix, E.: De Muze Brengt Mij (The Muse Brings Me). Boekscout.nl, Soest (2015)
18. Marchionini, G.: Information Seeking in Electronic Environments. Cambridge University Press, Cambridge (1995)
19. Benedek, M., Borovnjak, B., Neubaurer, A.C., Kruse-Weber, S.: Creativity and personality in classical, jazz and folk musicians. Personality Individ. Differ. **63**, 117–121 (2014)

Research Methods

Institute for Research Design in Librarianship: Impact on Information Literacy Research and Practice

Lili Luo[1(✉)], Marie Kennedy[2], and Kristine Brancolini[2]

[1] School of Information, San Jose State University, San Jose, CA, USA
`lili.luo@sjsu.edu`
[2] Loyola Marymount University Library, Los Angeles, CA, USA
`{Marie.Kennedy,Kristine.Brancolini}@lmu.edu`

Abstract. This paper provides a detailed view of the impact of a research methods training program (Institute for Research Design in Librarianship, or IRDL) on librarians' research and practice related to information literacy. Participants identified the following benefits: improvement in research confidence, improvement in capability to interpret published research, improvement in capability to design and conduct research, improvement in capability to perform job responsibilities, a supportive network of librarian researchers, and career advancement.

Keywords: Information literacy research · Research methods for information literacy · Research methods training

1 Introduction

Information Literacy (IL) is one of the most extensively researched and published topics in academic library research. In a recent study that examined articles published in the *Journal of Academic Librarianship* in the past decade [1], IL was the most popular topic, covered by more than one-fifth of the articles, investigating a wide array of issues such as instruction, assessment, perceptions, attitudes, interpretation, and skills. Given the significance of IL in academic library research, it is essential that IL librarians be competent and confident in interpreting published literature and applying it to inform decision making, and conducting research and contributing to the knowledge growth of IL. Research methods training/education has been identified as an effective way to equip librarians with the knowledge and skills to engage in research. In this study, we seek to examine the impact of a research methods training program on librarians' research and practice related to IL.

2 Literature Review

The brief literature review focuses on two areas: importance of academic library research, and barriers to librarians' research engagement. The purpose of the literature review is to provide a context for this study, demonstrating the necessity of understanding the value and impact of research methods training, particular with regards to IL related research and practice.

The importance of research in academic libraries is widely acknowledged. As early as 1972, Association of College and Research Libraries (ACRL)'s "Joint Statement on Faculty Status of College and University Librarians" highlighted librarians' research roles in both professional interests and work responsibilities. Research serves to create new knowledge and therefore contribute to the growth of librarianship, and it is needed to improve problem solving and decision making in the workplace, to make professional practitioners critical consumers of the research literature, and to better equip librarians to provide optimal information services to researchers in other fields [2].

In their foundational article about the role of research in librarianship, Hernon and Schwartz [3] stated that research "can and should provide insights and guidance into how well library programs, services, and collections function, especially in making libraries more responsive service organizations" (p. 102). An analytical examination of librarianship through research fosters growth, curiosity, awareness and promotes new learning. Neal [4] emphasized the need for librarians to pursue research that advances knowledge at the individual, organization, professional, and national levels. Perkins and Slowik [5] reviewed ACRL's "Standards for College Libraries" in the past half-century, and pointed out that the professional standards have clearly confirmed the importance of inquiry and research activities such as scholarly publication, presentation of papers and reviews of books, and set the line for determining research quality of academic librarians so that their world could be more easily translatable to the academic community as a whole. The specific benefits of engaging in research are also well-documented in the literature. Such benefits include job promotion, personal acknowledgement, enriched relationships with teaching faculty, increased ability to change and identify/solve problems, and improve library services and programs [6].

Despite the recognition of the value for librarians' conducting and applying research, it appears that research has not been sufficiently involved in library practice. The library profession was criticized for being overly focused on practice and lack of research-mindedness. One study analyzed the contents of 1,880 articles in library and information science journals and found that only 16% "qualified as research" [7]. The gap between research and practice is so concerning that the 2016 Annual Conference of the Association of Library and Information Science Education dedicated its prestigious President's Panel to address this issue [8]. There are a variety of barriers that hinder librarians engagement in research, such as lack of time, unfamiliarity with the research process, lack of support (both moral and monetary), lack of access, lack of confidence, discouraging jargon, inadequate education in research methods, and lack of motivation [9]. Researchers have called for more endeavors to explore how to overcome these barriers and gradually bridge the research-practice gap in librarianship [10].

Among these proposed solutions to bridge the gap between research and practice, a common theme is establishing a mutual understanding of research among researchers and practitioners so that they can better communicate with each other. A reasonable path leading toward such a mutual understanding is research methods education/training. Offering formal research methods courses in Library and Information Science (LIS) degree programs can enhance practitioners' understanding and appreciation of the practical value of research and equip them with necessary knowledge/skills to interpret/conduct research to solve problems at work [11]. Numerous studies have examined the efficacy of research methods courses for

LIS students, primarily from two angles – topics covered and perceived usefulness. However, little research exists to investigate research methods training for working librarians, such as how the training is implemented, what is the curriculum, and what is the impact of the training on librarians' work, particularly their work related to IL, a topic most widely researched and published in the academic library literature. We seek to fill this void by studying how the most prominent research methods training program for academic librarians in recent years, the Institute for Research Design in Librarianship (IRDL), influences librarians' research and practice related to IL.

3   Institute for Research Design in Librarianship

Institute for Research Design in Librarianship (IRDL) is a federally funded three-year project that aims to provide research methods training and support for academic librarians in the US. In the summers of 2014, 2015 and 2016, IRDL gathers a group of twenty to twenty-five academic librarians from around the country who have written research proposals and been selected through a competitive process, and provides them with nine-day intensive training on research methods. The training program consists of expert instruction, small group activities and one-one-one consultation between instructor and participant. The learning objectives of the program include:

- Write effective research questions and hypotheses
- Choose an appropriate research design for a library science study
- Conduct a literature review
- Explain the conceptual logic behind various data collection approaches and describe the rationale for selection of specific methods
- Identify appropriate sampling strategies for research projects
- Use and apply commonly used qualitative data collection methods
- Assess and apply different qualitative data analysis options
- Design and implement a survey
- Understand survey data management
- Explain various analytic options for surveys
- Understand basic principles of mixed methods research design
- Choose an appropriate research dissemination forum
- Write and disseminate an effective research report
- Access and participate in the Institute's virtual community and related networks for support during the research process.

In the following academic year, participants continue to receive support in conducting their research and preparing the results for dissemination. Each month, an hour-long online meeting is held for IRDL participants to share updates and connect with each other. They can also communicate and interact with each other via a closed Facebook group titled "IRDL Scholars", and via Twitter using the hashtag #IRDL. Among the 46 IRDL participants in 2014 and 2015, 28 were engaged in research related to IL. A qualitative survey study was conducted among them to explore how IRDL has impacted their research and practice. Details of the methodological design are presented in the next section.

4   Methodology

A qualitative survey was chosen as the methodology because we intend to capture a nuanced view of IRDL's impact on IL research and practice. The survey asked IRDL participants to recall their experience in research and professional practice since the conclusion of IRDL, and describe three most memorable incidents where they strongly felt the benefits of IRDL. These incidents could be about any aspect of their research and practice, such as conducting research, reading and interpreting the literature, publishing and presenting, accomplishing job responsibilities, networking, and making career advancement. When describing each incident, the participants were asked to provide the following details – When did it happen? What was the context? Which particular aspect of the IRDL experience did they find beneficial in that incident? How were the benefits manifested? They are also welcome to provide any other details that could illustrate how they found their IRDL experience beneficial in that incident.

The survey was administered online via Qualtrics. It remained available for three weeks, and a reminder was emailed to all participants one week before the survey conclusion. No monetary incentives were provided, however, it was stressed in the study invitation that the participants' input would be critical to uncovering how research methods training can help address obstacles in conducting and publishing IL research, enhance IL practice, and connect IL research with practice for broader impact.

5   Findings

A total of 20 survey responses were received, representing a 71.4% response rate. The survey respondents were working on a variety of IL-related research projects as part of their participation in IRDL. Table 1 presents an overview of their research topics and the research methods they used.

Thematic analysis was conducted to analyze respondents' qualitative descriptions of how IRDL has impacted their research and practice related to IL. The following themes arose from the analysis:

- Improvement in research confidence. Exemplar quotes:
  - "I think one of the huge benefits of IRDL is deeply personal. I feel far more confident as a researcher and even in my own work. I understand research methods and concepts that I did not previously understand and the way I speak to faculty at my institution has changed."
  - "Immediately after completing the institute, I felt more comfortable reading the professional literature and analyzing in terms of "what questions were asked" and "were those questions effectively answered?" While I cannot point to one specific aspect of IRDL, I believe that generally the ability to discuss, critique, and analyze research methods increased my confidence and lowered any cognitive barriers that I may have had before IRDL."
- Improvement in capability to interpret published research. Exemplar quotes:

- "When reading through supplemental literature, I was able to identify bad research. It also allowed me to eliminate certain studies from my lit review. Before IRDL, I could not identify bad research in the field."
- "At the ACRL conference following IRDL, I noticed myself gravitating toward posters and presentations that had more rigorous research methods, something I had avoided in the past. I was able to competently speak with the authors of those studies about their methods."

Table 1. Respondent's research topics and methods

IL-related research topic	Research methods
Civil engineering practitioners information management practices	In-depth interview
Impact of messaging reference service both on perceived confidence in information skills and interactions with a reference librarian amongst undergraduate psychology students	Focus group and survey
Librarians' practice of critical information literacy	Survey with follow-up interviews
Exploration of Vine videos for library instruction.	Focus group interview
Why selected faculty teaching research courses and instruction librarians work together and why others do not	In-depth interview
How undergraduate students value the threshold concepts outlined in the new ACRL Framework	In-depth interview
How academic librarians make decisions about their information literacy instruction practices	In-depth interview and survey
University and library experiences of international students	In-depth interview, survey, and photo diaries
How academic librarians integrate mobile devices into the design of information literacy instruction, and the impact on student engagement	Survey and observations
Information literacy and critical thinking/higher order thinking skills	Concept Mapping (combines qualitative and quantitative methods)
Academic library use of foreign-born students	Focus group interview and survey
Impact of activity-based learning exercises in information literacy instruction in live, online classes, on information anxiety	Survey
Barriers impacting data literacy in human subjects research settings	In-depth interview
Impact of frequent and early engagement through course design centered on information literacy and critical thinking on academic outcomes for new student athletes	In-depth interview, survey
Information literacy of Doctor of Physical Therapy (DPT) students during the didactic and clinical portion of the DPT program	Survey and content analysis
Information literacy of urban public university students	Survey
Effectiveness of activity-based learning in reducing information anxiety in the live, online classroom.	Survey
Faculty Conceptions of Information Literacy	In-depth interview
Information seeking behaviors of nursing students in clinical courses	In-depth interview and survey
How social identity influences the research behavior of distance graduate students	In-depth interview

- Improvement in capability to design and conduct research. Exemplar quotes:
  - "When it came time to plan and conduct my focus group last month, I had a good understanding of how the group should work, thanks to the simulation we had during IRDL. The textbook I received at IRDL was also helpful in planning the focus group. I was able to train my research partner on note taking techniques. I knew how many group members I needed (I got six), how to seat them, and how to warm up the group before questioning. The result was a very successful focus group!"
  - "I decided to include an incentive to research participants in my project. My library agreed to procure a Kindle Fire for me to give away to one participant (via lottery drawing). I remember a couple discussions of participant recruitment strategies at IRDL and I actually specifically got the idea for doing a lottery drawing from one of the instructors. These helped when thinking about how to get participants for my research."
  - "Working on a different project for Assessment in Action (that I started before IRDL) - after IRDL, I had a much better idea of how to focus a broad social science research project, define a population, and identify the correct method for analysis. The instruction at IRDL all helped me immensely with this project."
- Improvement in capability to disseminate research. Exemplar quotes:
  - "I was able to write an article about research methods with 3 others in the cohort. It was the training and the networking that allowed me to do this."
  - "I was accepted to present at a conference based on the knowledge gained at IRDL."
- A supportive network of librarian researchers. Exemplar quotes:
  - "After I wrote a draft of my screening questionnaire, I sent it around to my cohort for feedback. The changes they suggested made a vast improvement to it. It was already better than it would have been because of the IRDL instruction, but the collective expertise made it even better."
  - "In planning a panel proposal for ACRL 2017, I asked one of my IRDL colleagues to participate. I would not have known she had the expertise in this area, or known her at all, if not for hearing her describe her IRDL project."
  - "At one point during this research I was starting to feel really overwhelmed. It's been a lot of work, I never really feel like I know what I'm doing, and it's easy to get discouraged when things don't work out the way you expect. So at that point, I emailed about 4 friends from the institute about how things were going. This was really helpful because they all knew what I was doing and were in similar situations. So I could hear how they were doing and they also provided helpful feedback for me. After talking with them I didn't feel as alone and was encouraged to keep going."
- Improvement in capability to perform job responsibilities. Exemplar quotes:
  - "Once I returned to my institution I recognized the immediate benefit of my training manifest in my teaching. I teach several library one shot classes for graduate students in sociology, economics, and business. The material I learned at IRDL readily transferred to teaching graduate students and undergraduate students how to do better searches for literature reviews. For example, I showed them how to do searches isolating the kind of methodology and research design used to study

a particular theory, community, or organization. I called it methods and research design searching."

– "When I returned to the university I worked at and attended a faculty meeting. I realized that I had a new way to connect with faculty and I could build new relationships by discussing my research and seeing if there were possibilities for collaboration."

- Career advancement. Exemplar quote:
  – "Not long after attending IRDL I applied for a new position with a focus on assessment. In this interview process it was very clear to me how much my IRDL experience had prepared me to take on an assessment role. I was able to apply what I had learned at IRDL to communicating how to approach a structured and rigorous inquiry project. I have no doubt that IRDL prepared me to advance in my career. Since that time, I have used the skills I learned at IRDL on a daily basis–so what I noticed in the interview process I have been able to implement in my new position."

6   Conclusion

Through an in-depth examination, this study has shown that librarians benefited from IRDL in a variety of ways in their research and practice concerning IL. We hope this paper will further the professional understanding of the role of research methods training in advancing research and practice for IL librarians, and yield insights on designing effective research methods training programs that will promote research-mindedness among IL librarians, lead to the enhancement of research and scholarship in IL, and support more evidence-based IL practice that ultimately benefits our user communities.

References

1. Luo, L., McKinney, M.: JAL in the past decade: a comprehensive analysis of academic library research. J. Acad. Librariansh. **41**(2), 123–129 (2015)
2. Powell, R., Baker, L., Mika, P.: Library and information science practitioners and research. Libr. Inf. Sci. Res. **24**(1), 50 (2002)
3. Hernon, P., Schwartz, C.: Can research be assimilated into the soul of library and information science? Libr. Inf. Sci. Res. **17**, 101–103 (1995)
4. Neal, J.: The research and development imperative in the academic library: path to the future. Portal Libr. Acad. **6**(1), 1–3 (2006)
5. Perkins, G., Slowik, A.: The value of research in academic libraries. Coll. Res. Libr. **74**(2), 143–158 (2013)
6. Luo, L.: Fusing research into practice: the role of research methods education. Libr. Inf. Sci. Res. **33**(3), 191–201 (2011)
7. Turcios, M.E., Agarwal, N.K., Watkins, L.: How much of library and information science literature qualifies as research? J. Acad. Librariansh. **40**(5), 473–479 (2014)
8. Stephen, M., Abbas, J., Garnar, M., Kennedy, M., Kenney, B., Luo, L.: Bridging the divide: exploring LIS research and practice. In: President's Panel presented at the 2016 Annual Conference of the Association of Library and Information Science Education, 5–8 January, Boston (2016)

9. Kennedy, M.R., Brancolini, K.R.: Academic librarian research: a survey of attitudes, involvement, and perceived capabilities. Coll. Res. Libr. **73**(5), 431–448 (2012)
10. Chu, H.: Research methods in library and information science: a content analysis. Libr. Inf. Sci. Res. **37**(1), 36–41 (2015)
11. Stoan, S.K.: Research and library skills: an analysis and interpretation. Coll. Res. Libr. **45**, 99–109 (1984)

Children and Youth

Use of Digital Tools by Preschool Children: Preliminary Results

Ioanna-Ersi Pervolaraki[1,2(✉)], Emmanouel Garoufallou[1,2], Rania Siatri[1],
Georgia Zafeiriou[1], Sirje Virkus[3], and Stavroula Antonopoulou[2,4]

[1] Department of Library Science and Information Systems,
Alexander Technological Educational Institute (ATEI) of Thessaloniki, Thessaloniki, Greece
ersi212004@yahoo.gr, {mgarou,gzafeiri}@libd.teithe.gr,
rsiatri@gmail.com
[2] Alcala University, Madrid, Spain
santon@afs.edu.gr
[3] School of Digital Technologies, Tallinn University, Tallinn, Estonia
sirje.virkus@tlu.ee
[4] American Farm School, Perrotis College, Thessaloniki, Greece

Abstract. Nowadays, preschool children are growing up at ease with technology and become familiar with the use of digital devices such iPads, tablets, computers and mobile phones very early in their lives. Therefore, children are expected to develop different literacy skills [1]. The aim of the study is to explore the use of digital tools by preschool children. The results of the study contribute to a better understanding of how children cope with visual and textual searching, provide useful feedback on how to encourage children to become lifelong learners and further our understanding of age differences in children and adult learning along with the impact of ICTs on children's learning.

Keywords: Preschool children · Early childhood · Kindergarten · Digital literacy · Literacy skills · Information literacy · Digital tools · Media literacy

1 Introduction

The daily use of digital technologies of the children of the 21st century has an impact on their reading and information seeking behavior. Digital devices offer more reading opportunities to children and they can develop better literacy skills [2–4]. According to Snow [5] children must be able to "decode" letters and words, learn to sustain their attention, acquire new words, understand their meaning, and follow the plot. All these literacy skills can be fostered with the use of digital devices such as tablets, computers, and cellphones.

2   Literature Review

2.1   Information Literacy for Digital Natives

Children under the age of eight enjoy playing with digital technologies and there is a lot of discussion on the effectiveness of digital devices on the information literacy (IL) skills of young children. Vanderwater et al. [6] studied media use among US children aged zero to six. More than, 75% of children watch television, videos and DVDs for approximately one hour and 20 min and children of five to six years old use computers about 50 min every day. According to Livingstone's [7] national report on UK children, preferable activities on digital devices are games, listening to music, visiting familiar websites, the production of photographs and videos. Livingstone [7] reports that children prefer the digital tool that is mostly being used by their parents and that the interface design is important for them. Digital tools offer a more "fun" way of learning. Froes [8] expanded the definition of IL to playful literacy. "Playful literacy is defined as the ability to use, interact, relate, communicate, create, have fun with and challenge digital tools through playful behavior" [8, p. 48].

Blanchart and Moore [1] argue that "digital literacy includes not only traditional emergent literacy skills like reading and writing, but also the psycho-motor skills needed for keyboarding and cell phone use and the problem-solving skills needed for navigating Google sites and using iPhone apps" [1, p. 14]. So, parents and educators need to support children to become lifelong learners. Guernsey, Levine, Chiong and Severns [3] highlight that parents, children and educators must know how to use "technology to strengthen their interactions with each other and improve children's familiarity with sounds, words, language and knowledge" [3, p. 2].

2.2   Digital Devices in Kindergarten

Computers and digital tools in general are frequently used in formal education, though there is a research gap in the use of digital devices in early childhood education [9]. Kindergarten children are more familiar with visual and auditory information than textual sources [10]. In this context, digital devices can be used as tools to promote this type of learning. There are not many studies focused on how children around the ages of four to seven search for information and what strategies they use.

Digital tools can be used in kindergarten and offer well-designed activities have a positive impact on children's skills [11, 12]. According to Biancarosa and Griffiths [13] digital "technology can be conceptualized as affording tools that teachers can deploy in their quest to create young readers who process the higher levels of literacy skills and background knowledge demanded by today's information-based society" [13, p. 139]. A case study in New Zealand showed the impact of smart devices as learning tools on the capture and evaluation of children's learning stories [14].

2.3   Learning Through Digital Devices

Children, especially at young ages, learn more easily when they listen and see something. Balat [15] studied the relationship between learning styles and the level of basic concept

knowledge of 176 preschool children in Turkey. The data indicated a strong relation between learning style and basic concept knowledge.

Unfortunately, parents and educators are skeptical about the use of digital tools as means of promoting learning. One of the few studies on the usage of mobile devices and apps of children aged four to seven year old showed that they had limited access to mobile devices mainly for playing games. However, kids used the devices for other activities such as taking/viewing pictures, placing calls, listening to music, and taking/watching videos. The research also showed that children, especially seven year olds, learnt from mobile usage (vocabulary, letter identification and rhyming) [16].

It has been proved that digital tools can foster young children's basic literacy skills such as letter writing, sight words, spelling, vocabulary, comprehension, ability to understand and tell stories, and grammar [3, 17–19]. Bird [12] investigated the activities that engage children in preschool classrooms through video recordings, observations, children's drawings, digital photographs and discussions. Findings indicated that children engage in a wide range of activities such as social, exploring the technology, capturing an event and imaginative play.

Mathematics and other subjects can be more attractive and more easily learnt through the use of digital tools [20, 21]. Digital tools have been effective on the cognitive skills' development of young children [22–24]. Kucirkova, Messer, Sheehy and Panadero [23] found that iPad story-making apps have a positive impact on children's individual and collaborative engagement and problem-solving skills. Lieberman, Bates and So [22] reported that digital media products have a positive impact on a plethora of cognitive skills like observing, thinking, collaborating, creativity and problem solving. Similarly, Couse and Chen [25] videotaped 41 kindergarten children drawing with tablets. The results proved that tablets have a positive impact on children's learning and engagement.

Lieberman, Fisk and Biely [26] categorized digital games according to the experiences they offer to young children. Well-designed games can foster children's learning; poorly designed games can be time-wasting, and very poorly designed games can harm children's learning, skills and health.

2.4   Digital Devices at Home

Tablets, computers, iPads and smartphones are part of a modern family's daily life. According to Livingstone et al. [27] family's income and parents' education affects parental mediation of digital devices' use. A recent study conducted in Bulgaria by Shahbazyan, Hajdinjak, and Kumanova [28] showed that parents do not seem to understand the beneficial role of digital tools and do not encourage the digital literacy and critical thinking of their children. Parents who adopt effective strategies can support the emergent literacy of their children [29, 30]. Rideout et al. [31] reported that US families allow their children to play with digital media to keep them occupied. Nevertheless, digital tools offer social interaction among children and their families. The study of Verenikina and Kervin [32] indicated strongly social interactions among young children and their families as parents become part of their children's imaginative play.

3   Current Study

3.1   Methodology

The main aim of the current research was to address the following question: how do preschool children aged four to six years old engage with digital tools? This research question formed the research goal that was to study the use of digital tools by preschool children, aged four to six years old, and to depict what they usually do when they are at school, at home and at the library. To address the objectives of the study a qualitative methodological framework was applied aiming to capture as many aspects of the children's digital tools' use as possible and to view the topic from their perspective.

Semi-structured interviews with the preschoolers were the main data collection tool. The reasons that forced such a decision on the specific form of interviews dealt with the fact that this type of interviews best suited the aim of the study, as they provide the researcher with the opportunity to ask additional questions that rise naturally from the interview data. The interview guide consisted of three sets of questions aimed at gaining data on what children do at school, home and at the library when they use digital tools, and how they feel about them. The sample consisted of sixty-one children who attended public and private kindergarten schools in Greece. Children participating in the research were aged four- to six-years old. Each interview was recorded using a voice recording device and transcribed to gain a more holistic picture of what happened during the interview and to make sure that crucial pieces of information were not missed.

The grounded theory approach, as developed by Strauss and Corbin, was adopted for the analysis of the interview data. The Grounded Theory approach, inductive in nature, uses a set of techniques to try to discover and capture human behaviour with the purpose of developing theory about a phenomenon [33, p. 24]. The Atlas.ti software was utilised to facilitate data analysis in organizing the interviews, searching, retrieving, comparing segments of data, constructing concepts and building networks to depict diagrammatically data relations.

3.2   Results

Interview results were grouped around three main categories. Data on what children do at school, at home and at the library.

At School. Answers varied to the question of what types of digital aids the children used at school. Some children did not have any digital aids such as PCs or tablets at school. In cases where a digital aid was used at the school, it was a PC. In some cases children referred to the use of a mobile phone that belonged to the teacher. Some children also were not able to answer the question and provided yes or no answers. One child said:

> *"we use the PC and sometimes the teacher's mobile phone when she wants us to see something"*
> (Gabriella, age 5,5)

Children gave a variety of answers to the question of what they usually do when they use digital aids at school. They *play games, watch movies*, *photos*, *videos*, *TV*. Apart
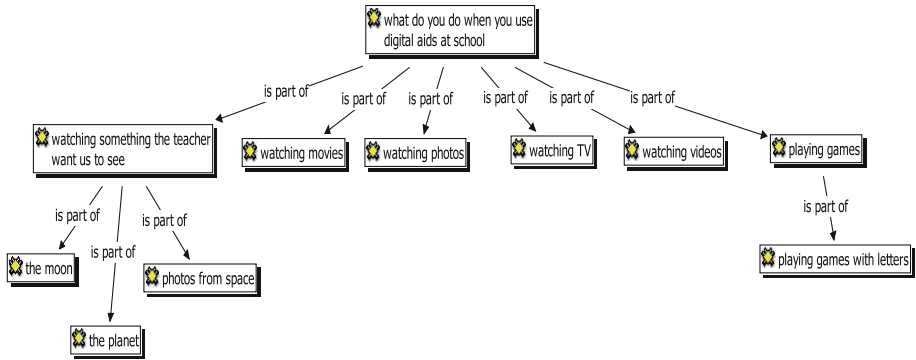
Fig. 1. The use digital aids at school varies from an *everyday activity to once or twice per week.*

from leisure, digital aids were also used for educational reasons such as *watching videos* or photos from the earth or *space* or *play* some kind of educational games, for instance a *game with letters* (Fig. 1).

In the question of how long they engage in such activities, children seem to be confused. One child mentioned:

> *"Q = how long do you use digital aids per day? A = For 15 h, Q = That is little time or lots of time? A = A little time"* (Giannis, age 5).

In the question about how they feel when they are engaged in activities involving the use of digital aids, the majority of the children answered that they feel "good", "great". One child commented *"it makes me feel happy"* (Aggelos, age 5). Another added:

> *"it feels like I am listening to music"* (Anna, age 5).

To the question of why they like to use digital aids a child responded:

> *"because it contains lots of games"* (Mary, age 5).

To the question of whether they want to use digital aids at school alone, with peers or the teacher, most of the children commented that they preferred to get involved in *group activities with their friends and the teacher*.

When children were asked if the digital aids help them with their learning, most of the children answered yes although some of them gave a negative answer. One child added:

> *"Initially I might not know a game then I play it and I learn how to use it"* (Mary, age 5).

At Home. Children reported the use of a variety of electronic devices at their homes such as PCs, tablets, laptops and mobile phones. At home children seem to engage in the same activities, as they do at school, when using electronic devices, like *watching videos*, *photos*, *listening to music* and *playing games*. When asked how many times per week they are allowed to use the electronic devices most of the children replied once a week or *only at weekends*. However, as shown in the following diagram children provided a set of different answers (Fig. 2).
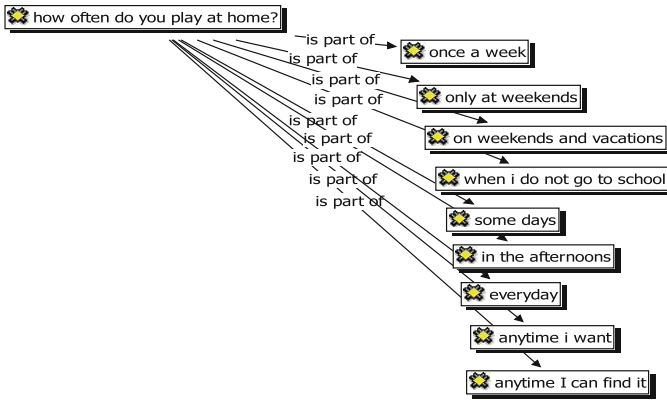
Fig. 2. Digital devices use at home

Children commented:

"Q = Do you play in the evenings after school? A = No, only on the days I do not go to school" (Antonis, age 5)

"I do not play every day, I play only I get bored with TV" (Alkisits, age 5)

"I play with my mum's mobile phone. Everything is difficult on the PC. I play at nights" (Evangellia, age 4,5)

Maria who is six years old commented that she plays with the tablet any time she can find it:

"I do not play only on weekends, I play anytime I can find it" (Maria, age 6).

When children were asked who showed them how electronic devices work, they replied their *parents*, the *father*, the *mother* or their *brothers* and *sisters*. In the majority of the cases it seems that it is the father who takes the role of showing the child how tablets, PCs or mobile phones work. However, quite a few of the respondents commented that they were *self-taught* without requiring help by an adult (Fig. 3).
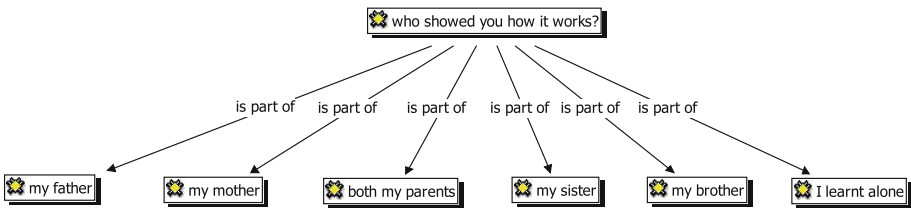

Fig. 3. Who showed you how it works?

The following remark indicates how children manage to learn how to use the new technologies by themselves. Anna commented that nobody taught her how to use the tablet. She learnt by watching and observing her sister playing.

"Q = Who showed you how it works? A = I watch my sister playing" (Anna, D. age 5)

Moreover, there were two cases where children replied that their grandparents taught them to use digital aids.

Children said that they use digital aids mostly alone at home, sometimes accompanied by their brothers and sisters if there are any. Some children commented that the father is sometimes around to offer assistance in order to get through difficult rounds on a game.

"Sometimes I play with my dad. When I have a difficult round he helps me win it" (Aggelos, age 5).

In the questions concerning the reading of fairy tales children said that sometimes they listen to stories read by their parents on tablets and PCs. However, reading stories is something they prefer to do in the traditional way by using a hard copy. According to the interview data parents read fairy tales to their children mostly at night before bed time.

In the question "what do you prefer to do when you are with your friends - play with them or spend your time on the tablet or the PC?" children provided three different answers. Some of them commented that they like to do both; some others that they prefer to use the tablet because "they like it" or because the tablet "contains lots of games". Others said that they prefer to play with their friends. It is quite remarkable that these children when asked why they have such kind of preference provided some quite concrete and interesting arguments commenting mainly on the enjoyment of the interactivity.

"I prefer to play with my friends because I am having fun with them" (Giannis, age 5).
"I prefer to play with my friends because on the tablet you just play alone" (Mihaela, age 5).
"I prefer to play with my friends because I love my friends" (Alkistis, age 5).
"I prefer mostly my friends because the tablet will ruin my sight!" (Anna, age 5).
"I prefer my friends because we play hide and seek" (Giannis, age 6,5).
"I prefer my friends because I never play with them" (Gabriella, age 5).
"I prefer my friends because we can find lots of games to play together" (Kostis, age 6).

At the Library. The questions referring to the children's experiences in the library provided us with limited data. It seems that the most of the children did not have much experience of going to a library. Therefore, there was not much to tell about digital aids in the library. The comment made by one of the children is quite remarkable:

"You need to get older in order to be able to go to the library" (Aggelos, age 5).

As shown in the following diagram (see Fig. 4) children mostly preferred *reading books* and *fairy tales*, *playing with their friends* and *toys*, *going to the books section* and *taking out books.*

One of the children's remarks about why they like the library seemed like the appropriate way to finish the results section of this article. Anna, age 5, commented:

"I like the library because I choose any book I want, without asking my mother, take it and read it" (Anna, age 5).
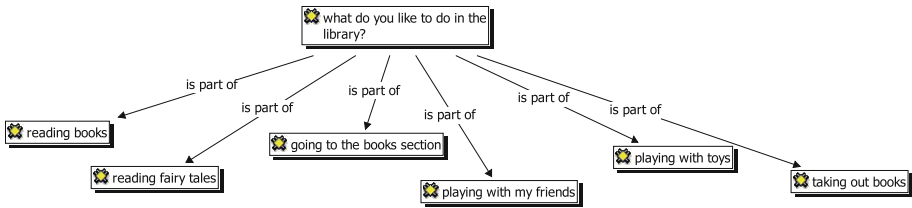
Fig. 4. The activities in the library

4   Discussion and Conclusions

Research findings revealed certain themes arising from the data that can be summarized as follows. Interview data suggested that children were familiar with digital tools and devices. Children 4 to 6 years old seem to love digital tools such as tablets, PCs, and smartphones. Greek households are digital-tools-rich. Children seem to love the use of these tools as they relate them to entertainment, fun and playing games. They reported that they make them feel good when they achieve something and ultimately happy. Children noted that they would like to have access to more media at school and use them in collaboration with their teachers and classmates. The children were engaged in a variety of activities when using electronic devices, like watching videos and photos, listening to music and playing games. These results seem to support the finding of other studies [16, 27]. Apart from leisure, digital aids were also used for educational reasons such as watching videos or photos. Interview data revealed that children preferred inter-acting and playing games with friends instead of using digital media. Livingstone's study [7] reported similar results. Children also talked with enthusiasm about playing with friends, doing creative or craft activities, engaging in sports or playing outside, playing board games with their family or undertaking shared or solitary imaginative/fantasy games at home. Children interviewed used the digital devices mainly at weekends or vacations, depending on their parents' rules and accessibility of such tools at home and at school. In most cases, children learnt how to use these technologies from their parents or older siblings and other family members. Children also learnt by observing their older brothers or sisters.

Teachers ought to follow the rapid increase of technology and incorporate digital devices in their classrooms. Klein, Nir-Gal and Darom [34] argue that educators must change their role "from 'teacher as information source' to 'teacher as guide and mediator of thinking'" [34, p. 606]. Many studies demonstrate that kindergartens compared to other grades do not fully exploit and derive benefit from the role of digital media on children's learning [35]. Teachers need to attend seminars on digital media use and effectiveness and search for apps that can really foster different cognitive and literacy skills.

Poor government funding is the main reason for low use of digital tools in Greek kindergartens. The BOYD policy (Bring Your Own Device) can be adopted to allow users to bring their personal device(s) to school that could be used to access online resources or facilitate communication and productivity. Guernsey, Levine, Chiong & Severns [3] propose that digital tools can be used to strengthen basic literacy skills, build

background knowledge for children and become a tool to connect educators and parents. Although, educators as the National Association for the Education of Young children and the Fred Rogers Center [36] indicate that use of digital tools can be very effective regarding children's learning. However, early childhood teachers need information on the use and the implications of using these tools in teaching young children. So, further research is needed to explore the perceptions of educators in order to help them with guidelines,

The current study investigated the topic of digital aids' use from the children's point of view. Further research should gain a more holistic view by incorporating observations along with interviews with teachers, parents or other family members in its process and methodology.

References

1. Blanchard, J., Moore, T.: The digital world of young children: impact on emergent literacy: a white paper. Pearson Foundation (2010). http://www.kqed.org/assets/pdf/education/earlylearning/media-symposium/digital-world-children-pearson.pdf?trackurl
2. Jennings, N.A., Hooker, S.D., Linebarger, D.L.: Educational television as mediated literacy environments for preschoolers. Learn Media Techn. **34**(2), 229–242 (2009)
3. Guernsey, L., Levine, M., Chiong, C., Severns, M.: Pioneering Literacy in the Digital Wild West: Empowering Parents and Educators. Campaign for Grade-Level Reading, Washington, DC (2012)
4. Blackwell, C., Lauricella, A., Wartella, E.: Factors influencing digital technology use in early education. Comp. Educ. **77**, 82–90 (2014). http://cmhd.northwestern.edu/publications/
5. Snow, C.E.: The theoretical basis for relationships between language and literacy in development. J. Res. Childh. Educ. **6**(1), 5–10 (1991)
6. Vandewater, E.A., Rideout, V.J., Wartella, E.A., Huang, X., Lee, J.H., Shim, M.S.: Digital childhood: electronic media and technology use among infants, toddlers, and preschoolers. Pediatrics **119**(5), 1006–1015 (2007)
7. Livingstone, S., Marsh, J., Plowman, L., Ottovordemgentschenfelde, S., Fletcher-Watson, B.: Young Children (0–8) and Digital Technology: A Qualitative Exploratory Study-national Report-UK (2014). http://eprints.lse.ac.uk/60799/1/_lse.ac.uk_storage_LIBRARY_Secondary_libfile_shared_repository_Content_Livingstone,%20S_Young%20children%200-8_Livingstone_Young%20children%200-8_2015.pdf
8. Fróes, I.C.G.: Once upon a tablet: a school toy in the making. In: 9th International Conference, UAHCI, pp. 43–53 (2015). https://pure.itu.dk/portal/en/publications/once-upon-a-tablet-a-school-toy-in-the-making
9. Wartella, E., Schomburg, R.L., Lauricella, A.R., Robb, M., Flynn, R.: Technology in the lives of teachers and classrooms: survey of classroom teachers and family child care providers (2010). http://cmhd.northwestern.edu/wp-content/uploads/2015/10/TechInTheLivesofTeachers.pdf
10. Cooper, L.Z.: A case study of information-seeking behavior in 7-year-old children in a semi structured situation. J. Am. Soc. Inform. Sci. Techn. **53**(11), 904–922 (2002)
11. McManis, L., Gunnewig, S.: Finding the education in educational technology with early learners. Young Child. **67**, 14–25 (2012)

12. Bird, J.: The rabbit ate the grass! Exploring children's activities on digital technologies in an early childhood classroom (Doctoral dissertation) (2012). http://dlibrary.acu.edu.au/digitaltheses/public/adt-acuvp391.25062013/02whole.pdf
13. Biancarosa, G., Griffiths, G.G.: Technology tools to support reading in the digital age. Futur. Childr. **22**(2), 139–160 (2012)
14. MacCallum, K., Bell, H.: Smart devices for supporting inquiry and conversations in early childhood education. He Kupu Word **4**(1), 31–39 (2015)
15. Balat, G.U.: Analyzing the relationship between learning styles and basic concept knowledge level of kindergarten children. Educ. Res. Rev. **9**(24), 1400–1405 (2014)
16. Chiong, C., Shuler, C.: Learning: is there an app for that. In: Investigations of Young Children's Usage and Learning with Mobile Devices and Apps. The Joan Ganz Cooney Center at Sesame Workshop, New York (2010). http://www.joanganzcooneycenter.org/wpcontent/uploads/2010/10/learningapps_final_110410.pdf
17. Lewin, C.: Exploring the effects of talking books software in UK primary classrooms. J. Res. Read. **23**, 149–157 (2000)
18. Bebell, D., Dorris, S., Muir, M.: Emerging results from the nation's first kindergarten implementation of iPads. Research Summary (2012). https://s3.amazonaws.com/hackedu/Adv2014_ResearchSum120216.pdf
19. Sides, M. S.: Kindergarteners and Learning Devices (Doctoral dissertation) (2015)
20. Zaranis, N., Kalogiannakis, M., Papadakis, S.: Using mobile devices for teaching realistic mathematics in kindergarten education. Creat. Educ. **4**(7), 1 (2013)
21. Aladé, F., Lauricella, A.R., Beaudoin-Ryan, L., Wartella, E.: Measuring with Murray: touchscreen technology and Preschoolers' STEM learning. Comp. Hum. Beh. **62**, 433–441 (2016)
22. Lieberman, D.A., Bates, C.H., So, J.: Young children's learning with digital media. Comput. Sch. **26**(4), 271–283 (2009)
23. Kucirkova, N., Messer, D., Sheehy, K., Panadero, C.F.: Children's engagement with educational iPad apps: insights from a spanish classroom. Comput. Educ. **71**, 175–184 (2014)
24. Ray, K.: Integrating iPads in the kindergarten classroom: how does technology engage students in learning? (2015). http://digitalcommons.unl.edu/cehsgpirw/35/
25. Couse, L.J., Chen, D.W.: A tablet computer for young children? Exploring its viability for early childhood education. J. Res. Techn. Educ. **43**(1), 75–96 (2010)
26. Lieberman, D.A., Fisk, M.C., Biely, E.: Digital games for young children ages three to six: from research to design. Comput. Sch. **26**(4), 299–313 (2009)
27. Livingstone, S., Mascheroni, G., Dreier, M., Chaudron, S., Lagae, K.: How parents of young children manage digital devices at home: the role of income, education and parental style. EU Kids Online, A, pp. 1–25 (2015)
28. Shahbazyan, L., Hajdinjak, P.M., Kumanova, A.: Young children (0–8) and digital technology: a qualitative exploratory study, National Report, Bulgaria (2016)
29. Neumann, M.M., Neumann, D.L.: Touch screen tablets and emergent literacy. Earl. Childh. Educ. J. **42**(4), 231–239 (2014)
30. Neumann, M.M., Neumann, D.L.: The use of touch-screen tablets at home and pre-school to foster emergent literacy. J. Earl. Childh. Liter. 1–18 (2015)
31. Rideout, V., Saphir, M., Pai, S., Rudd, A.: Zero to eight: children's media use in America (2013)
32. Verenikina, I., Kervin, L.: IPads, digital play and pre-schoolers. He Kupu **2**(5), 4–19 (2011)
33. Strauss, A.L., Corbin, J.: Basics of Qualitative Research: Grounded Theory Procedures and Techniques. Sage Publications, London (1990)

34. Klein, P.S., Nir-Gal, O., Darom, E.: The use of computers in kindergarten, with or without adult mediation; effects on children's cognitive performance and behavior. Comput. Hum. Behav. **16**(6), 591–608 (2000)
35. Paciga, K.A., Lisy, J.G., Teale, W.H.: Better start before kindergarten: computer technology, interactive media and the education of preschoolers. Asia-Pacific J. Res. Earl. Childh. Educ. **7**(2), 85–104 (2013)
36. National Association for the Education of Young Children and Fred Rogers Center for Early Learning and Children's Media: Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8: A Joint Position Statement (2012)
37. Trautweiler, C.C.: The effects of Ereaders on school libraries and student achievement (Doctoral dissertation) (2013)
38. Blackwell, C.: Teacher practices with mobile technology: integrating tablet computers into the early childhood classroom. J. Educ. Res. **7**(4), 1–25 (2014)
39. Wartella, E., Blackwell, C., Lauricella, A., Robb, M.: Technology in the lives of teachers: survey of early childcare providers. Report for the Fred Rogers Center (2013). http://cmhd.northwestern.edu/publications/
40. Epstein, A.S.: Using technology appropriately in the preschool classroom. Highscope Extens. **28**(1), 1–19 (2015)

Expanding Children's Digital Literacy Experiences and Skills: Public Library Practices in Guangzhou, China

Qiong Tang[1(✉)], Cuihong Wu[2], and Yantao Pan[1]

[1] School of Information Management, Sun Yat-sen University,
Guangzhou, People's Republic of China
{tqiong,puspyt}@mail.sysu.edu.cn
[2] Guangzhou Children's Library, Guangzhou, People's Republic of China
369454047@qq.com

Abstract. This paper analyzes a series of digital literacy instruction programs provided by Guangzhou Children's Library and Guangzhou Library, the main large public libraries providing services for children in Guangzhou. The paper found that all the programs were presented in the forms of games and contests that attracted learners and had good effects on expanding children's digital literacy experiences and skills. Some guidelines were developed to help public libraries to successfully delivery digital literacy training and services for children in their communities including: making a good plan; identifying specific learning outcomes; promoting to the public; cooperating with other organizations to conduct digital literacy instruction; and, developing online digital literacy resources.

Keywords: Digital literacy · Digital literacy gap of children · Digital natives · Public library · China

1 Introduction

Due to the rapid and continual development of digital technology, individuals are required to possess growing classification skills in order to solve problems in a digital environment. These skills are referred to as "digital literacy" [1]. Prensky [2] pointed out that, nowadays, children are raised in a digital, media-saturated world; he called these children "digital natives". As "digital natives", it is necessary for children to possess digital literacy to survive and thrive in the digital age. Public libraries have played an important role in helping children and people of all ages gain access to computers and the Internet. They also have the responsibility to support digital literacy for children to ensure their digital inclusion and empowerment. Guangzhou Children's Library and Guangzhou Library are the main large public libraries that provide services for children in Guangzhou. Librarians in these two libraries have developed a series of programs to deepen literacy skills needed for children to survive and thrive in the digital age. The purpose of this paper is to analyze the characteristics of these programs to develop some guidelines for the digital literacy instruction for children in public libraries.

2   Literature Review

In recent years research has focused on the need for digital literacy given the arrival and rapid dissemination of digital technology. Digital literacy can be defined as survival skills in the digital era. It constitutes a system of skills and strategies used by learners and users in a digital environment [1]. In addition, Gilster [3, p. 1] defined it as "the ability to understand and use information in multiple formats from a wide range of sources when it is presented on computers." However, Buckingham [4] argued that digital literacy was much more than the mastery of skills: children need to learn how to locate and select materials, evaluate and use information critically, and understand how these technological developments are related to broaden social, political, and economic forces. Furthermore, Eshet-Alkalai [1] proposed a conceptual framework for digital literacy that comprised of five types of literacy skills: (1) photo-visual literacy; (2) reproduction literacy; (3) information literacy; (4) branching literacy; and, (4) socio-emotional literacy. Likewise, Hobbs [5] believed that there were five essential competencies of digital and media literacy that called on learners to access, analyze and evaluate, create, reflect, and act.

According to these studies, digital literacy is perceived as a combination of technical-procedural, cognitive, and emotional-social competencies. In our opinion, digital literacy skills needed by children include the ability to use information and communication technologies to find, understand, evaluate, create, and communicate digital information [6].

Scholars of digital literacy studies have specifically drawn attention to the innovative and productive potentials of literacy practices in the electronic environment where children are in and out of school settings [7–11]. For example, Shuker and Terreni [12] explored the role of self-authored e-books as a vehicle for helping early childhood professionals to engage young children in new literacy and language experiences. Moreover, Flewitt et al. [13] discussed how iPads offer innovative opportunities for early literacy learning but also present challenges for teachers and children. They found iPad-based literacy activities stimulated children's motivation and concentration. They also offered rich opportunities for communication, collaborative interaction, independent learning, and high levels of accomplishment for children. Similarly, Bekker et al. [14] tried to figure out how to teach digital literacy and design thinking to children at primary and secondary schools, with a particular focus on exploring tools that may support children's learning in these domains.

Some researchers tried to identify strategies for how to address possible challenges related to digital literacy faced by all libraries or communities. Hobbs [5] focused on studying some plans of actions for how to bring digital and media literacy education into formal and informal settings through a community education movement. The American Library Association's (ALA) Office for Information Technology Policy (OITP) Digital Literacy Task Force [6] released the final conclusions and recommendations for digital literacy programs and libraries, calling on library and information science professionals to: increase investment in digital literacy; develop and sustaining robust partnerships and collaborations; strengthen and expand research and assessment; and increase access to digital literacy programming.

However, little is yet known about digital literacy instruction for children provided by public libraries in China. We conducted this study in order to explore characteristics of digital literacy programs for children put forward recommendations.

3   Methodology

We employed a case study methodology in our study. We set up an assessment panel from February 10th to May 10th, 2016, whose members included the directors of Guangzhou Children's Library and professors from School of Library and Information Science, Sun Yat-sen University. Panelists reviewed different kinds of documents of these digital literacy education programs, including:

- Statistics. For example, how many children or families attended programs? How frequently these programs were held?
- Comments. Comments collected from children and their parents who attended the programs.
- Photos. Librarians took several activity photos that recorded the programs.
- Reports. Including news reports and post-event reports written by librarians.

We interviewed three librarians who were responsible for running the programs. The main purpose of these interviews was to investigate their experiences in holding these programs.

We focused on the following research questions:

1. What elements of these programs can be utilized in other public libraries to deepen children's digital literacy skills?
2. What are the opportunities and challenges related to digital literacy instruction?

4   Digital Literacy Instruction Programs Conducted by the Two Public Libraries

Digital literacy education offers a potential to maximize what we value most about the empowering characteristics of media and technology while minimizing its negative dimensions [5]. Librarians of Guangzhou Children' s Library and Guangzhou Library who are responsible for digital literacy instruction believed that it was important to help children obtain digital literacy to learn language, mathematics, sciences and art. They supported using digital technology to:

- learn language, such as manipulating word processing software to write and developing skills to find and read e-books or digital media production;
- collect and evaluate scientific knowledge on websites;
- possess digital reading skills; and,
- use different kinds of applications to produce multi-media works, like pictures, vidio, and e-books.

Since 2013, the Guangzhou Children's Library and Guangzhou Library have developed several kinds of digital literacy instruction for children.

4.1   Computer Basics and the Internet Fundamentals Instruction

Although children do not need to be coaxed into adopting Internet technologies. Many quickly acquire and advance their digital skills than their elders do. Yet, without guidance, children remain amateur users of information and communications technology (ICT) skills. Guangzhou Library developed the "I'm the Mini-superman of Computer" program to provide a computer basics tutorial and Internet fundamentals instruction. This program provided training courses for children to learn computer and Internet skills needed in today's online environment including:

- the history of the Internet;
- an understanding of common ICT terminology;
- the ability to use basic features of software tools such as word processors and spreadsheets; and,
- the ability to save data, copy and paste, manage files, and standardize formats within documents.

Over forty children ranging in age from ten to fifteen years attended the program. Some children from poor families may have few chances to access a computer or the Internet and lack the ability to access information resources or the knowledge to use these resources effectively. As a result, librarians invited children from impoverished backgrounds, most of whom were migrant workers' children, to participate in the program to bridge these gaps.

4.2   Finding Books Instruction

The two libraries offered children a series of instruction programs about how to find a specific book or books on a particular topic through the library catalog, self-service stations, or social media. One such book locating activity was "Celebrating Monkey Year and the Lantern Festival: Looking for Books Related to Monkey". The event focused on finding all the books with the word "monkey" in the title or the books on monkeys. The goal was to improve children's ability to find books by using the modernized self-service equipment in Guangzhou Children's Library. Over thirty children joined in the activity. The librarians divided the training into two parts. First, the librarian introduced book location through content on PowerPoint slides. Then, he or she introduced retrieval methods by using pictures and examples. Children who could write or type could use Guangzhou Children's Library Catalog through its website or the multifunctional self-service retrieving machine. They could also follow Guangzhou Children's Library' social media – We chat, named "Micro service hall" to use its bibliographic retrieval services. Those who cannot write or type could use the Little Yue Yue automatic "Question & Answer" machine to find books. Each of the participants found several books related to monkeys and, as a result, they received gifts from the libraries.

This kind of book-finding activity was very popular among users. They spoke highly of it because they not only had a good time but they also learned information literacy skills.

4.3   Tablet Training Courses

Guangzhou Library carried out a series of tablet training courses called "Small Tablet, Great Experience", that has been held four times. The courses aimed at teaching children to learn some apps and functions of a tablet including like Fresh Paint, Sketchbook, and making videos. In February 2015, Guangzhou Library held an electronic painting competition for the purposes of celebrating the Lantern Festival after training children to use a drawing application, Sketchbook. At another event, children learned how to use a fun, easy painting application called Fresh Paint in Surface RT to create an artwork or convert photos into beautiful images automatically. Figure 1 shows examples of some student work.

In addition to some courses on learning how to use painting applications, there are also courses to teach children how to use vidio maker applications on tablets. There was an event named as "One Day in the Library". After receiving instructions for tips and methods of video shootings and makings, children and their parents made their own digital videos for their activities happened in Guangzhou Library. Children served as directors and/or actors/actresses and had plenty of fun.

4.4   Digital Reading Skills Training Programs

Digital reading skills training programs helped children to learn how to find, evaluate, utilize, and share digital resources from the library and even learn how to create e-books by themselves or with their family members.

Fig. 1. Pictures drawn by children using Sketchbook

During the 2015 summer vacation, Guangzhou Library offered a series of "digital reading" literacy skills training classes for children in order to help them to know and learn "digital reading" skills, such as catalogue searching, online renewing, e-books reading, and so on. Among all of the classes, self-authored e-books course was set up especially to engage children in new literacy and language experiences [12]. Under the instructions of librarians, children collected images, text, photos, audio, animations, videoed and other information to create their own e-books on computers using the software program, DianDian Creation System. The students' work was collected in the DianDian collection. One hundred and eighteen children attended the courses.

In 2013 Guangzhou Children's Library purchased a application software, named "Easy Creating System" to help children produce e-book by themselves. Each year, children with their parents create self-authored e-books on different themes such as "Happy Family" (2013), "My Growing Experiences" (2014), "…and My Story" (2015), and "My Growing with Children's Library" (2016). All the participants received training and instruction from librarians. All the student works were collected in the library where it could be shared and distributed to the public.

Such activities are regarded as a good promotion for the application of library digital resources. Children are encouraged to use the information retrieval skills learned from librarians to create e-books and, in return, they experienced creative learning opportunities with digital technologies.

4.5 Virtual Reality Immersive Learning

Immersive Learning is uses virtual reality (VR) technology to provide learners with a realistic learning environment and a virtual equipment. Learners enhance their skills through participating in interactive exercises. Guangzhou Children's Library held the zSpace immersive learning activity to help children explore the mysteries of knowledge in virtual reality. More than 50 children participated in the event. zSpace VR workstations provided a three-dimensional (3D) space for children to freely imagine, create, and explore knowledge. Children sought answers to questions such as: (1) how is the heart functioning?; and (3) What is the difference in how an object moves on the moon and the earth? Children found the answers in zSpace. A 3D heart, 3D moon, and 3D earth would appear on the screen as long as children wore tracking glasses and picked up touch pens to touch the screen. Children could also capture VR pictures of full figures with a touch pen. In addition, some apps would provide multi-sensory feedback. For example, when children interacted with a 3D heart, they could see, hear, and feel it beating. ZSpace brought an in-depth digital learning experience by providing children with an authentic learning environment and personalized learning style and changed the way they learned, explored, and discovered knowledge. This activity is illustrated in Fig. 2.

Fig. 2. Virtual Reality Immersive Learning activities

5   Discussion and Conclusion

We found that all the programs were applied in the form of games or contests that attracted most learners. Moreover, we found that these programs resulted in expanding children's digital literacy experiences and skills. Through studying these successful cases, we developed some guidelines to help public libraries to successfully delivery digital literacy training and services for children in their communities:

5.1   Making a Good Plan

Librarians need to schedule time to clarify goals, develop the guides, find trainers, and deliver sessions. Planning is important in enabling instructors to be well prepared to teach and help to ensure that instructional time is spent efficiently and effectively. Librarians told us that their plans for all programs normally included the activities' mission, objectives, audience, content, time and location, outreach, resources and supplies, budgets, and collaboration.

5.2   Identifying Specific Learning Outcomes

Identifying specific learning outcomes not only enabled librarians to better evaluate the success of the program, but also helped learners identify exactly what should be learned and what was to be accomplished. It was especially useful in improving the quality of digital literacy offerings. All the instruction programs we introduced set some tasks that participants needed to accomplish. Children who finished the tasks could get gifts. In the future, librarians from these two libraries want to develop measures of digital literacy to assess learning progression in order to evaluate the impact of digital literacy training

in both formal and informal learning settings on individual learning and community development [6].

5.3   Promoting

The library should cooperate with local media, such as local newspaper or TV news to provide coverage of the activities as well as announce all the digital literacy programs through social media and the library's websites. They are good ways to promote the benefits of digital literacy that can encourage more children to participate in the instruction programs.

5.4   Cooperating

As suggested by the report of the Office for Information Technology Policy's Digital Literacy Task Force [6], "mutually beneficial partnerships were vital for delivering and sustaining high-quality digital literacy programming". Libraries can actively find community partners to build the capacity of all agents involved in providing digital literacy programming. Both Guangzhou Children's Library and Guangzhou Library emphasized cooperating with community partners such as schools and technological companies to provide digital literacy instruction programs. For example, Guangzhou Library worked with Microsoft to provide the program, "I'm the Mini-superman of Computer"; the program "Virtual Reality Immersive Learning" was a cooperation between Guangzhou Children's Library and a technological company.

5.5   Developing Online Digital Literacy Resources

We noticed that the number of children who could participate in the instruction program was limited. Developing online instructional resources could be a solution. The resources could address digital literacy and citizenship topics in an age-appropriate way and provide child-centred, media-rich lesson materials that emphasize skills building, critical thinking, ethical discussion, media creation, and decision making. Meanwhile, it could address the whole community by providing materials to educate parents and families about digital citizenship.

Digital literacy competencies that constitute core competencies of citizenship in the digital age have enormous practical value [5]. Digital literacy training for children has become an important component of public library services. Although public libraries face many challenges in their efforts to provide access and instruction services, they are embracing their role ensuring children have the skills and abilities to succeed in the digital age. Therefore, they will continue to expand their services and innovate their practices.

References

1. Eshet-Alkalai, Y.: Digital literacy: a conceptual framework for survival skills in the digital era. J. Educ. Multimedia Hypermedia **13**(1), 93–106 (2004)
2. Prensky, M.: Digital natives, digital ımmigrants. Horizon **9**(5), 1–6 (2001)
3. Gilster, P.: Digital Literacy. Wiley Computer Publishing, New York (1997)
4. Buckingham, D.: Defining digital literacy: what do young people need to know about digital media. Nordic J. Digit. Lit. **1**(4), 263–277 (2006)
5. Hobbs, R.: Digital and Media Literacy: A Plan of Action. The Aspen Institute Communications and Society Program, Washington, D.C. (2010). http://www.knightcomm.org/wp-content/uploads/2010/12/Digital_and_Media_Literacy_A_Plan_of_Action.pdf
6. ALA Office for Information Technology Policy's Digital Literacy Task Force: Digital Literacy, Libraries, and Public Policy: Report of the Office for Information Technology Policy's Digital Literacy Task Force. http://www.districtdispatch.org/wp-content/uploads/2013/01/2012_OITP_digilitreport_1_22_13.pdf
7. Unsworth, L.: E-Literature for Children: Enhancing Digital Literacy Learning. Routledge, London (2006)
8. Carrington, V., Robinson, M. (eds.): Digital Literacies: Social Learning and Classroom Practices. Sage, Los Angeles (2009)
9. Burnett, C.: Technology and literacy in early childhood educational settings: a review of research. J. Early Child. Lit. **10**(3), 247–270 (2010)
10. Mills, K.A.: A review of the "Digital Turns" in the new literacy studies. Rev. Educ. Res. **80**(2), 246–271 (2010)
11. Ávila, J.A., Pandya, J.Z. (eds.): Critical Digital Literacies as Social Praxis: Intersections and Challenges. P. Lang, New York (2013)
12. Shuker, M.J., Terreni, L.: Self-authored e-Books: expanding young children's literacy experiences and skills. Aust. J. Early Child. **38**(3), 17–24 (2013)
13. Flewitt, R., Messer, D., Kucirkova, N.: New directins for early literacy in a digital age: the iPad. J. Early Child. Lit. **15**(3), 289–310 (2015)
14. Bekker, T., Bekker, S., Douma, I., Poel, J.V.D., Scheltennar, K.: Teaching children digital literacy through design-based learning with digital toolkits in schools. Int. J. Child Comput. Interact. **5**, 29–38 (2015)
15. Digital Literacy & Citizenship: from the south west grid for learning. http://www.digital-literacy.org.uk/Home.aspx

Computer Science for the Community: Increasing Equitable Opportunity for Youth Through Libraries

Marijke Visser[1(✉)] and Hai Hong[2]

[1] American Library Association, Washington, DC, USA
`mvisser@alawash.org`
[2] Google Inc., Mountain View, CA, USA
`haihong@google.com`

Abstract. Using preliminary qualitative research underway through the American Library Association and Google, Inc., we explore the need for computer science (CS) learning opportunities such as coding activities to be made widely available to students through U.S. libraries, as well as the importance of intentionally infusing computational thinking (CT) skills development into these activities through librarian facilitation. The paper examines factors influencing the perception of, and participation in, CS programs among youth, their family, and educators through analysis of previously-collected Google-Gallup research data on learning opportunities in- and outside of schools. We discuss the development of a library-centric approach to facilitating CT learning and investigate how learning CS in informal environments can mitigate perceptions that curtail participation through an analysis of programs provided by libraries. The paper concludes with recommendations for further investigation, leading to best practices for libraries and other stakeholder institutions. In our presentation, we will engage in discussion with attendees regarding implications of this work in other countries, and we will provide a list of practitioner resources.

Keywords: Computer science education · Computational thinking · Libraries · Informal learning · Coding · Equitable access for diverse youth

1 Introduction

There is growing recognition of the need to provide young people with the requisite literacy skills of the 21st century, most notably computer science (CS) skills. The Computer Science Teachers Association (CSTA) defines CS as an academic discipline that encompasses "the study of computers and algorithmic processes, including their principles, their hardware and software designs, their applications, and their impact on society" [1]. Both the United States and Europe have made significant strides in recent years to provide all students with CS education. Several European countries, such as Estonia and the United Kingdom, have taken steps to incorporate CS into national curriculum. In the U.S. parallel efforts are underway to include CS in schools and through out-of-school initiatives in informal learning environments such as public libraries.

For many educators and advocates, these initiatives are rooted in a mission to provide all children with opportunities to understand increasingly ubiquitous technology and to build foundational computational thinking (CT) skills. CT is the process of breaking down complex problems into more familiar or manageable sub-problems (problem decomposition), using a sequence of steps (algorithms) to solve problems, reviewing how the solution transfers to similar problems (abstraction), and finally determining if a computer can help efficiently solve those problems (automation) [2].

Developing a skilled and competitive workforce is another priority, as evidenced in commitments by the White House, the Department of Education, and other federal agencies. In his State of the Union address on January 12, 2016, President Obama emphasized the need for CS education: "In the coming years, we should build on that progress, by… offering every student the hands-on computer science and math classes that make them job-ready on day one" [3]. Shortly thereafter, he announced _Computer Science for All_, a plan to provide all U.S. students the chance to learn CS in school and be equipped with the skills needed to be creators in the digital economy [4].

In addition to this access in schools, offering CS education through libraries can help broaden participation and support seamless learning across formal and informal environments. This most often takes the form of coding activities—lessons teaching introductory or foundational programming skills through tools and platforms such as Blockly, Scratch, and AppInventor 2. It is important to note that not all coding experiences teach CT, and content of these activities must be specifically crafted to call out and teach CT concepts. It is, therefore, necessary that libraries identify ways to infuse CT skills into coding activities they offer.

This additional access is imperative, as projected rates of growth in high-paying jobs that require these skills continue to outpace the supply of qualified workers. In the U.S., jobs in STEM (Science, Technology, Engineering, and Math) fields make up nearly 13% of total national employment, and their annual average wages are 1.7 times the national average wage for all occupations [5]. The U.S. Bureau of Labor Statistics projects an 18% increase in jobs in computer and mathematical occupations (a subset of STEM) during the period of 2012 to 2022, creating more than 1.3 million open jobs by 2022. Unlike most other occupational groups, the majority of these job openings come from new growth in the sector rather than the need to replace workers leaving the field or labor force. Moreover, roughly 4 out of 10 new jobs in computer and mathematics will require knowledge of CS. These are expected to grow by 279,500 jobs by 2022. Code.org's analysis of all new wages in the U.S. found that at 16.3%, computing jobs are the largest category of new wages, exceeding management, sales, healthcare, and other occupation categories [6].

2   Access to CS Education

Despite the dramatic demand for computing skills, student preparation in this area is lacking. In a survey of 16,000 respondents (including nearly 10,000 U.S. school principals), Google-Gallup (2015) found that while 9% of parents want their children to learn CS, less than 30% of educators say CS is a top priority at their school or district, and

only 1 in 4 U.S. schools offers programming [7]. Moreover, demographic disparities exist in access to CS in schools. Hispanics are less likely to have computer *exposure*; low-income students and Blacks are less likely to have CS *access*; and low-income students, girls, and Hispanics are less likely to have *learned* CS. Additionally, administrators in rural and small school districts are less likely to agree that CS is a top priority or that their school boards think CS is important.

Studies show a link between access to and pursuit of CS and STEM. Google found that high school girls enrolled in CS were more likely to pursue a computing-related major in college [8]. Similarly, Ma found high school math and science coursework to be predictive of STEM degree attainment [9]. Out-of-school experiences, such as those offered through libraries and afterschool programs, also improved access and awareness of CS. In a study of middle school students, Denner, Werner, Martinez, and Bean [10] found Hispanic girls in an after-school coding program developed increased interest in CS careers, mediated by increases in self-reported computing skills and confidence with computers and computer use.

Whether in- or out-of-school, students' early exposure to CS and other STEM fields changes their perceptions of the fields and encourages further study. A follow-up study to the National Education Longitudinal Study of 1988, found that roughly half of students who reported a science career expectation in the eighth grade showed follow-through over a decade later, while only a third of students who reported a non-science career expectation in the eighth grade switched into science [11]. Similarly, nearly two-thirds of 116 interviewed scientists reported that their initial interest in science developed during or before middle school; only 30% reported the interest developing in high school [12]. Both studies suggest a critical role of early exposure in attracting students into STEM careers later in life.

Because 75% of U.S. schools *do not* offer programming or coding classes, and because in-school access to CS tends to be limited to certain demographic groups, there is a need to provide more equitable access within schools [7]. Meanwhile, libraries can and should play a critical role in filling existing gaps, broadening participation to more diverse youth, providing safe community-based learning spaces, and engaging students in ways complementary and supplementary to formal education. To achieve this, we are working to develop a library-centric approach to facilitating CT learning that will help libraries adopt and deploy these activities as a core library service.

3   Computational Thinking Parsed

As defined above, CT refers to the analytical thinking and problem solving processes derived from computer science; it is a critical skillset regardless of field of interest or study. While coding activities are a commonly-implemented way of introducing students to CS, not all coding activities teach CT skills. It is imperative that libraries utilize activities where the learner experience is specifically crafted to include CT concepts, such as including a focus on problem deconstruction and solution processes.

3.1   Computational Thinking Applied in Non-computing Domains

In the U.S., a recently-introduced CS curriculum known as Advanced Placement Computer Science Principles seeks to broaden participation, particularly through exposure to CT, helping students understand the role of computing in the world, and offering "a multidisciplinary approach to teaching the underlying principles of computation" [13]. CT fosters creativity by empowering students to *create*, rather than simply *consume*, technology [14]. In their article on integration of CT in teacher professional development, Yadav, Hong, and Stephenson [15] presented the evolution of CT and the importance of these skills, making the case for providing teachers with the content, pedagogy, and instructional strategies to embed CT within K-12 curricula and practice [15]. Their work focused on the trans-disciplinary nature of CT skills, extending the teaching of CT to any domain.

The need to provide content, pedagogy, and strategies for facilitating CT learning also holds true for preparing librarians in their teaching roles. This is mirrored in the concepts in the Stripling Model of Inquiry, which is embraced in many K-12 school libraries and aligns with their learning objectives [16]. Similar to CT, the Model posits the importance of integrating inquiry-based learning across disciplines. According to the Model, inquiry is a process in which learning begins with a question followed by structured investigation to make sense of retrieved information to develop new understanding that results in new knowledge. The goal of inquiry is not to uncover final answers but rather to develop layered understanding that leads to additional questions and continued pursuit of new knowledge [17]. These concepts share a common thread with those of CT as applied in CS education.

Another similar learning model that is beginning to resonate in the library community as a rich library-centric learning pedagogy is the Connected Learning Framework [18]. The Framework is rooted in designing learning opportunities that derive from the desire among educators, including librarians, to provide highly engaging, authentic, and inspirational learning opportunities for the youth they serve. Such experiences encourage youth to be creators of information through technology use. Similar to the definition of CT used in CS, both the Stripling Model and the Connected Learning Framework encourage learners to apply what they learn in one situation to other similar questions or situations. Further, because these learning models include CT concepts, they can inform the development of a library-centric approach to build CT opportunities for youth served through libraries.

3.2   Computational Thinking in the Library

During a 2016 American Library Association conference workshop, library professionals were tasked with de-constructing common CT definitions from the CS community to identify the concepts most relevant to libraries. While a library-centric approach remains in draft, workshop participants expressed a strong understanding that fostering a CT mindset among youth is closely aligned with core objectives of librarians serving youth. A summary of the de-construction exercise is as follows:

> Computational thinking refers to an underlying set of skills foundational to computer science though also transferable to broader applications for college and career readiness. Mastery can be seen in the ability to ask and answer questions using procedural thinking; the ability to define, model, and solve complex and ill-defined problems; and the ability to create personal meaning by processing information; and creating connections to transform data into understanding.

Initial feedback received on the draft definition underscores the potential contributions of library staff in fostering CT skills among young people. Workshop participants felt that librarians can guide the learner as she or he develops a fluency with the problem solving process following a CT progression model. The librarian is trained to play a role as a navigator to coach learners through information resources and problem solving methods/processes necessary to put resources to use [16]. It is important that a library-centric approach to CT includes the concept that these skills not only transfer across domains and assist with college and career readiness, but they can also be made directly relevant to the learner when coupled with the pursuit of individual interests—a strong motivational factor among youth [18]. Designing youth learning experiences that are interest-driven, peer-supported, academically-oriented, and connected to the daily experiences of young learners aligns closely to libraries that operate as community hubs for lifelong learning [19]. Libraries that embrace a Connected Learning model to design their youth services, including elements of inquiry-based learning, are well positioned to foster CT skills. CT, while specifically attached to CS nomenclature, also underlies learning that occurs through libraries. Developing a library-centric approach to facilitating CT learning will aid librarians in embracing CS activities as a critical service.

4   Scaffolds for Learning Opportunities Through Libraries

Demographic disparities in access to CS exist in U.S. schools, exacerbating the lack of diversity later in the workforce pipeline. While efforts at the national, state, and local level to change these dynamics in formal education are underway, parallel efforts in informal learning spaces such as libraries can provide an incubator for innovative approaches to teaching CS. Libraries have a unique contribution to make at a time when decision-makers and key stakeholders grapple with addressing gaps. There are three broad areas where libraries can contribute: access, adoption, and application.

Access. Google-Gallup found that students with increased exposure to computer technology are more confident in their own skills and more likely to consider learning CS [7]. This access, however, is unequally distributed: Hispanic students are least likely to have access to computers at home or at school relative to Blacks and Whites. Moreover, data from Google-Gallup's upcoming report provide insight into the role of informal spaces for CS learning: Black and Hispanic students are more likely than White students to learn CS in a school group/club or out-of-school program (40% for Black, 23% for Hispanic, and 17% for White) [20].

Building on these findings, one of the primary recommendations from the 2015 Google-Gallup report is—in addition to expanding equitable access to CS in schools—to "[b]roaden access to computer technology by offering a variety of paths: in school in

various subjects; **after school, outside of school at libraries and community centers** and at home; through both computers and mobile devices to learn CS…" [7].

The Pew Research Center found that among low-income Americans and people of color, libraries play a strong role in supporting educational goals and employment opportunities [21]. These populations are more likely than others to say that the library has a role to play in introducing people to new technologies (42% for Hispanics, 35% for Blacks, and 38% for low-income Americans compared to 31% overall) and that libraries have a positive impact on their lives and communities. A more recent Pew Research Center study found that Blacks and Hispanics are more likely than whites to say that libraries serve the learning and education needs of their communities "very well" [22]. Similarly, those in households earning less than $50,000 are more likely than those in higher-income households to say that libraries serve community learning needs "very well."

Today, libraries are on the front lines of digital inclusion efforts nationwide, providing access to technology and rich digital content; supporting learners at varying stages of need and adoption of technology; and providing services linked to community needs such as workforce development, health information, civic engagement, and applying newly-gained knowledge in personally relevant ways [23].

Adoption. On its own, access to technology such as devices and applications is not sufficient. It is critical to help youth become fluent with technology, utilizing these tools to accomplish a desired task or outcome. U.S. libraries have traditionally played a key role in promoting information literacy and workforce development in local communities, reaching people of all ages, income levels, and ethnicities. Providing equitable access to information and promoting lifelong learning are core tenants across U.S. libraries [24]. Internationally, information literacy is also widely recognized as a principle on which library services are based such that the business of libraries is to foster lifelong learning [25]. Information literacy, especially in an increasingly networked world is a critical policy area for libraries of all types [26]. School, academic, and public libraries all embrace these values in the design and implementation of services. Information literacy remains a fluid concept allowing libraries to adapt their services to incorporate the evolution of what constitutes literacy. For example, libraries have embraced digital literacy, including fluency with information technologies, as a recent addition to the information literacy family [27].

Application. The concepts embodied in CT run parallel to components of the library-centric information literacy framework. Specifically, the ability to view a problem in its disparate though related parts; apply previous knowledge and/or build new pertinent knowledge to solve the problem; develop a strategy to solve the problem and refine assumptions in response to "bugs;" and then model the results in other settings are inherent in inquiry-based learning and the development of critical thinking skills. Layer onto that the emphasis libraries place on interest-driven and personalized learning, and libraries can be an ideal place to enhance traditional classroom learning experiences. Learning that happens outside of the classroom facilitated by a caring adult can increase opportunity for youth to practice emerging skills, take a school initiated project further,

and apply skills learned in the classroom to personal interests beyond a specific assignment.

Libraries promote inquiry-based, lifelong learning, central to CT. Martin [28] described multiple ways and places youth learn outside of school and opened the door for librarians working with youth to build on the Connected Learning Framework to further engage youth in learning in and through libraries [28]. Coding activities that foster CT skills, are prime fodder for a pathway to design learning activities building on the principles of Connected Learning to create better linkages between the informal learning environment in the library, the librarian as a facilitator of learning, youth interests, and academics. While not all youth may be interested in coding, the librarian can explore with the learner how elements of coding can be integrated into individual interests, thus opening new ways to explore those interests while exposing youth to CT skills.

Increasing school-based CS education for youth, particularly the development of CT skills, should remain a priority, but simultaneous efforts to augment those opportunities and provide alternatives where it is not available in schools will catch youth who are not afforded equal access. As U.S. initiatives focus on K-12 schools, little is known about what is either currently available outside of school nor what might be available given sufficient resources, such as staff, facilities, materials, and funding. Libraries are a strong infrastructure to leverage with over 16,000 public and 98,000 school libraries across the country in rural, suburban, and urban communities. As the national focus on CS continues to grow, it will be important to understand the role that community-based institutions, such as libraries, can and should play in providing access. It is equally important to understand how libraries can foster CT skills and a CT mindset through coding activities.

5   The Nature and Scope of CS Learning in Library Programs

While it is clear libraries have much to contribute to ensuring broad access to CS learning, the extent to which librarians are prepared to embrace CS learning and the capacity of libraries to engage in coding activities that foster CT is not clear. Further, it is not clear what constitutes robust and sustainable CS services.

5.1   Libraries Ready to Code

In January 2016, The American Library Association's Office for Information Technology Policy, in partnership with Google, Inc., began a yearlong project to better understand the extent to which libraries are engaged in coding activities generally and those that specifically foster CT skills, particularly for groups underrepresented in CS (for example, Hispanic, American Indian, Black, and girls). "Libraries Ready to Code: Increasing CS Opportunities for Young People" investigates current programs and aims to (1) increase library capacity to implement CS activities as core services for youth and (2) identify best practices to assist libraries in developing innovative and effective approaches to fostering a CT mindset among youth.

Methodology. Research conducted between March and July 2016 included focus groups, interviews, site visits, and a scan of library writings and websites. Focus group participants were selected through surveys to gauge their scope of involvement with coding activities and ensure diversity among library types and demographics served. Three initial in-person focus groups of seven to ten participants identified themes that constituted the basis for four virtual focus groups on narrowed topics. Three additional groups were conducted with selected focus group participants to test emerging themes and assumptions. Interview participants were selected through individual contacts recommended from librarians familiar with coding activities in place in libraries. Interviews were also conducted during site visits. Observation sites were selected based on an environmental scan of libraries offering coding activities and to represent rural, suburban, and urban libraries and also representing libraries that serve diverse populations. At this writing three site observations of five programs had been completed with three additional sites that will include multiple programs planned. A final report and recommendations will be completed at the end of 2016.

Preliminary Findings. Library coding programs range from one-time events such as Hour of Code; drop-in programs; regular after school clubs and summer camps; to formal programs lasting over a school year. Across all focus groups and interviews there was a strong desire to build opportunities for peer learning among library staff. In all instances, library staff understood the value of the current focus on coding as a learning priority (for parents, communities, and generally among educators). As one focus group participant stated, "I'd like us to become a partner in helping to educate our community." Generally, participants felt coding fits within the scope of library services for youth and is something libraries *should* offer to their patrons. These coding activities can and should be a vehicle for facilitating CT learning.

Library staff are exploring avenues to use coding activities to extend learning beyond coding-specific skills. Participants described successful programs as encouraging learners to incorporate personal interests into the activity and experiment with alternative ways to approach the activity. Participants generally agreed that coding can be a successful method for building transferable skills such as critical thinking and other information literacy skills. However, while participants described basic learning outcomes, many had difficulty articulating a direct connection between the activity and the explicit development of the full range and progression of CT skills.

A number of participants shared efforts to build relationships among the youth participants and create a community of learning. For example, in the case of using teen volunteers, librarians viewed this as an opportunity to engage the teens with designing the activity and taking ownership, another way to scaffold learning. "We are seeing a lot of peer leadership and peer mentorship coming out of the program," reported one focus group participant. In addition to building rich learning opportunities, there was focus on ensuring support for all genders, first generation families, and diverse ethnic groups.

Participants expressed a need for youth to be exposed to coding and hoped the library activities "sparked an interest" among the youth involved. Additionally, some participants felt their coding activities were additive to what may happen in school, providing

youth with opportunities to extend what was offered in school or to pursue ideas that could not be accommodated through school scheduling. Library staff were committed to designing coding activities that were inclusive: a number of participants reiterated that coding is for everyone. As a welcoming place to learn, libraries can positively influence youth perceptions of who codes. For example, there was wide agreement to a statement made by a young library patron: "A fourth grader said 'I like it here, because I can say I like science and no one makes fun of me.'"

The activity facilitators varied. In larger libraries, especially urban libraries where the pool of relevant organizations and businesses may be greater than in smaller communities, volunteers from local community organizations or businesses often provided the program. Local maker groups, teens with tech interest and skills, and college professors are all examples of outsourcing. Library staff who led the programs reported they either had a personal interest and ability in coding or CS or they were ready to "learn with the kids." Library staff did not necessarily view their own lack of coding knowledge as inhibiting offering activities, but an opportunity to model lifelong learning behaviors.

5.2 Emergent Themes for Further Exploration

Staff Capacity. To ensure library staff have the skills necessary to develop rich coding programs that intentionally foster CT skills as a priority in meeting patron interest and community need, library school and formal professional development courses should investigate sustainable means to support this emerging area. Understanding the role of local library administration and decision making bodies as well as support roles the state library agencies can play will also be important to increasing the scope of current activities and the number of libraries deeply engaged in this area. Libraries will continue to augment their capacity with volunteers. Thus, identifying the most impactful mix of volunteers and library staff and sharing information about successful volunteer use will also aid librarians. Effective strategies for sustaining programs will be important to explore.

Community and Industry Partnerships. Libraries typically engage with other community organizations and industry partners to further enrich their services. These partnerships can assist with sustaining programs and providing resources, volunteers, and funding for libraries. Libraries can also increase access for youth to CS learning through partnerships with organizations serving youth outside of school, as well as connecting directly with K-12 schools. Additionally, partnerships can aid libraries in outreach to specific youth groups. It is also worth exploring how libraries could bring coding activities *into* the community as a way of increasing opportunities to engage youth who may not routinely visit the library.

Learning Impacts. At present, there are few consistently-used best practices for assessing the impact of library coding programs. Creative metrics should be developed and disseminated to capture how library programs foster both interest in CS and CT skills among youth. More needs to be done to bridge the relationship between informal

and formal learning to ensure that the former augments the latter. The potential for using a Connected Learning framework as a scaffold for libraries to build coding programs that teach CT skills among youth merits further investigation. It will also be important to identify the most effective delivery methods. Should libraries, for example, provide a combination of drop-in sessions, formal class series, coding clubs, and open "lab" time? Additionally, ascertaining the effectiveness of outreach to target demographics remains important as will the extent to which the inclusive nature of library programs impacts perceptions of CS education among youth.

6   Conclusion

Libraries can be a community hub for facilitated exposure to CS, providing increased opportunities for youth through a broad range of informal learning programs and helping them to develop CT skills that are broadly applicable to any interest. Sustaining and building the impact of the initiatives underway will require diligence across stakeholder groups, including from educators, parents, policymakers, and youth-serving organizations. Libraries welcome collaboration with a range of stakeholders including anchor organizations (government or non-profit), businesses, or foundations. These collaborations are key to sustaining initiatives.

References

1. CSTA: Bugs in the System (2013). https://csta.acm.org/ComputerScienceTeacherCertification/sub/CSTA_BugsInTheSystem.pdf
2. Wing, J.M.: Computational thinking. Commun. ACM **49**(3), 33–35 (2006)
3. White House: 2016 State of the Union Address (2016). https://www.whitehouse.gov/the-press-office/2016/01/12/remarks-president-barack-obama
4. White House: Computer Science for All (2016). https://www.whitehouse.gov/blog/2016/01/30/computer-science-all
5. Jones, J.: An Overview of Employment and Wages in Science, Technology, Engineering, and Math (STEM) Groups. Beyond the Numbers: Employment and Unemployment, vol. 3, no. 8 (2014). http://www.bls.gov/opub/btn/volume-3/an-overview-of-employment.htm
6. Code.org. Computing Occupations are Now the #1 Source of New Wages in America (2016). http://blog.code.org/post/144206906013/computing-occupations-are-now-the-1-source-of-new
7. Google-Gallup: Searching for Computer Science: Access and Barriers in U.S. K-12 Education (2015). https://goo.gl/oX311J
8. Google Inc.: Women Who Choose CS: What Really Matters (2014). http://goo.gl/rLX6ax
9. Ma, Y.: Gender differences in the paths leading to a STEM baccalaureate. Social Sci. Q. **92**(5), 1169–1190 (2011)
10. Denner, J., Werner, L., Martinez, J., Bean, S.: Computing goals, values, and expectations: results from an after-school program for girls. J. Women Minorities Sci. Eng. **18**(3), 199–213 (2012)
11. Tai, R.H., Liu, C.Q., Maltese, A.V., Fan, X.: Planning early for careers in science. Science **312**, 1143–1144 (2006). http://afterschoolalliance.org/documents/STEM/RHTai2006Science_PlanEarly.pdf

12. Maltese, A.V., Tai, R.H.: Pipeline persistence: examining the association of educational experiences with earned degrees in STEM among U.S. students. Sci. Educ. **95**(5), 877–907 (2011)
13. College Board: AP Computer Science Principles (2016). https://advancesinap.collegeboard.org/stem/computer-science-principles
14. Mishra, P., Yadav, A.: Of art and algorithm: rethinking technology and creativity in the 21st century. TechTrends **57**(3), 10–14 (2013)
15. Yadav, A., Hong, H., Stephenson, C.: Computational thinking for all: pedagogical approaches to embedding 21st century problem solving in K-12 classrooms. TechTrends **60**, 565–568 (2016)
16. Stripling, B.K.: Inquiry-based learning. In: Stripling, B.K., Hughes-Hassell, S. (eds.) Curriculum Connections through the Library, pp. 3–39. Libraries Unlimited, Westport (2003)
17. Stripling, B.K.: Inquiry: Inquiring Minds Want to Know. Sch. Libr. Media Activities Mon. 25(1), 50–52 (2008)
18. Connected Learning Alliance. "What is Connected Learning?". http://clalliance.org/why-connected-learning/
19. Nygren, A.: The Public Library as a Community Hub for Connected Learning. Paper presented at the IFLA World Library and Information Congress, Lyon France, 16–22 August 2014. http://library.ifla.org/1014/1/167-nygren-en.pdf
20. Google-Gallup: Challenges and Unconscious Bias (in press)
21. Pew Research Center: Libraries at the Crossroads (2015). http://www.pewinternet.org/2015/09/15/libraries-at-the-crossroads
22. Pew Research Center: Libraries and Learning (2016). http://www.pewinternet.org/2016/04/07/libraries-and-learning
23. Information Policy and Access Center, University of Maryland College Park: What is Digital Inclusion. http://digitalinclusion.umd.edu/content/what-digital-inclusion
24. American Library Association: About ALA. http://www.ala.org/aboutala/
25. Lau, J.: Guidelines on Information Literacy for Lifelong Learning. International Federation of Library Associations and Institutions, Veracruz, Mexico (2006). http://www.ifla.org/files/assets/information-literacy/publications/ifla-guidelines-en.pdf
26. The American Library Association: Principles for the Networked World (2003). http://www.ala.org/offices/sites/ala.org.offices/files/content/oitp/publications/issuebriefs/principles/principles.pdf. Accessed 29 May 2016
27. The American Library Association: Digital Literacy, Libraries, and Public Policy. Report of the Office for Information Technology Policy Digital Literacy Task Force (2013) http://www.districtdispatch.org/wp-content/uploads/2013/01/2012_OITP_digilitreport_1_22_13.pdf
28. Martin, C.: Connected learning, librarians, and connecting youth interest. J. Res. Libr. Young Adults **6** (2015). http://www.yalsa.ala.org/jrlya/wp-content/uploads/2015/03/Martin_ConnectedLearningandLibraries.FINAL_PDF.pdf

Using I-LEARN to Foster the Information and Digital Literacies of Middle School Students

Vera J. Lee[(✉)], Allen Grant, Delia Neuman, and Mary Jean Tecce DeCarlo

Drexel University, Philadelphia, PA, USA
{vjw25,acg48,mdn29,mt623}@drexel.edu

Abstract. This paper summarizes the findings from focus group data of four teachers and 41 middle school students in an urban school who were involved in a project that used the I-LEARN framework to develop the participants' skills in information and digital literacy. An analysis of the data revealed that the students found it useful and/or challenging to find and evaluate information on the Internet and to design digital products and that their digital skills improved in different ways. The teachers cited various approaches and purposes for using technology during the project and held varying assumptions about their students' digital literacy skills.

Keywords: I-LEARN · Information literacy · Digital literacy · Middle school students · Urban schools

1 Introduction

Technology innovations have changed the way students are enacting literacy practices. The United States National Council of Teachers of English (NCTE) stated as one of its 21st century learning standards the importance for middle and high school students to "develop proficiency and fluency with tools of technology." Beyond acquiring digital skills, students must also "create, critique, analyze, and evaluate multimedia texts" [1]. Understanding how students choose, evaluate, and use informational texts continues to be an important topic in the fields of literacy studies and information literacy. This paper presents the preliminary data analysis of a study that utilized the I-LEARN framework [2] to support the information and digital literacy development of students (ages 10–13) in an urban school located in the northeast region of the United States. While the study investigated three research questions, this paper focuses on the findings related to the second question: (1) How can the I-LEARN model be used to support problem-based, information-rich learning at Belmont School[1]? (2) What dimensions of digital literacy are most salient for urban teachers and students? (3) How can these dimensions be taught and evaluated? The findings from focus group interviews conducted with the students and teachers suggest that the areas of digital literacy that were important to the students involved learning how to use technology applications to develop a product and learning

---

[1] Pseudonyms are used to protect the identities of the school and research participants.

how to search for information online. For the teachers, the most important use of technology was to increase student engagement during the project.

2   Information and Digital Literacies and 21st Century Learning

Definitions of "information literacy" have appeared regularly over the past 30 years, but perhaps the most familiar one appeared in the final report of the American Library Association's Presidential Committee on Information Literacy, published in 1989:

> To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. … Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them [3].

Other groups have also defined and explored the concept of information literacy. In the United States, the Association for College and Research Libraries issued its definition in 2000, released a new *Framework for Information Literacy for Higher Education* in 2016, and maintains a website that includes a variety of information literacy resources. Internationally, the National Forum on Information Literacy, UNESCO, and the International Federation of Library Associations have long worked together to raise the prominence of the topic, producing the Prague Declaration in 2003 and the Alexandria Proclamation in 2005.

The Alexandria Proclamation in particular opened the way for an examination of digital literacy as a key component of information literacy:

> Information literacy lies at the core of lifelong learning. It empowers people in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational, and educational goals. It is a basic right in a digital world and promotes social inclusion of all nations [4].

The Proclamation's mention of a "digital world" in the same paragraph as its definition of information learning indicates that the students' development of digital literacy shows a natural progression of "information literacy" itself toward the world in which these students will work out their futures. In addition, the idea of teaching students how to evaluate information in digital contexts is supported by the International Literacy Association's (ILA) 2009 statement: "We must assist students to become critical consumers and informed creators of information in these new online contexts" [5, p. 3]. The 21st century learning skills needed by students include both information and digital literacies in order to use, apply, and assess digital tools and texts for their own purposes and goals.

3   I-LEARN Model

The I-LEARN model is based upon the assumptions that learning is a critical goal for information-seeking activities and practices in schools and that information literacy encompasses important skills for students in the 21st century. Informed by literature from

the fields of both information science and instructional design [2, p. 4], the model was developed by Neuman [2, 6] as a "teaching tool created specifically for information-age learning" [2, p. 1]. The model is grounded in well-established tenets of information literacy, with Anderson and Krathwohl's 2001 modification of Bloom's taxonomy influencing the model in terms of stages of learning and kinds of learning that can occur at each stage [7, p. 4]. Furthermore, the model draws from constructivist perspectives that view learning as a "dynamic process" between the learner and informational texts [2, p. 5]. While the I-LEARN model is related to information-seeking models like Eisenberg and Berkowitz's [8] "Big Six" and Kuhlthau, Maniotes, and Caspari's [9] guided inquiry process, I-LEARN is more comprehensive because it addresses the learning side of the information-and-learning equation in addition to the information-seeking one. Figure 1 lists the major dimensions of the I-LEARN model (see [10] for a detailed explanation of the components).

I: Identify	Choose a problem, topic, or question that can be addressed through information
L: Locate	Access information, either recorded or in the environment, related to the problem/topic/question through a variety of people and media
E: Evaluate	Judge the quality and relevance of the information found
A: Apply	Use the information to generate a new understanding—that is, to learn
R: Reflect	Examine the adequacy of the process and product of learning and revise as appropriate
N: kNow	Instantiate the knowledge gained so it can be used in the future

Fig. 1. The I-LEARN model

4 Methods

4.1 Overview

Belmont School is an urban charter school located within 2 miles of the researchers' university. During the beginning of the 2014–15 academic year, the research team obtained permission from the school principal to work with teachers on a project using the I-LEARN model. The researchers initially met with the teachers selected by the principal to offer a brief overview of the I-LEARN model and to discuss places in either the Social Studies or Language Arts curriculum where the model could be used. Two professional development sessions introduced the research project and explained how the I-LEARN model had been enacted with younger students and their teachers at another urban school. Researchers discussed the model in greater depth, introduced an I-LEARN focused rubric sheet, and presented several digital platforms for the teachers to consider for the students' products. In addition, an information night was held for 5th and 7th grade parents to discuss the research project and address any questions they

might have. Lastly, in order to assess the teachers' knowledge about integrating technology, pedagogy, and content, a TPACK (technological, pedagogical, conceptual, knowledge) survey was sent to the teachers [11].

4.2   Participants

The participants in the project originally included the two 5th grade Language Arts teachers, Ms. Jones and Ms. Moore, two 7th grade Social Studies teachers, Mr. Leonard

Code Name	Description
Design(DE)	Teachers' creation of projects, lessons, assessments, and selection of technology platforms related to the I-LEARN project.
Implement (IMT)	Teachers' strategies for completing the project.
Implement (IMS)	Students' strategies for completing the project.
Evaluate (EVT)	Teachers' strategies for evaluating the project.
Evaluate (EVS)	Student strategies for evaluating their experience with the project.
Benefits (BEN)	Positive outcomes of using the model.
Steps of the I-LEARN Model (Each step is a major code)	Identify, Locate, Evaluate, Apply, Reflect, and kNow
Teacher Prior Experience (TPE)	Background (Non-I-LEARN related projects)
Information Literacy (IL)	Ability to access,evaluate, and use information.
Digital Literacy (DL)	Ways to use technology to read, write, locate, and share information.
Context (CON)	Conditions not directly related to the I-LEARN project.
Model (MO)	Instances in which participants discussed the I-LEARN model as a whole; could also include discussions of individual steps.
Challenges (CH)	Challenges teachers faced when implementing a curriculum innovation. Sub-code:Technology (TE)—Specific issues with access to technology.
Solutions (SO)	Describes instances where teachers found a solution to a problem they encountered during the I-LEARN project.
Insight (IN)	Teachers' reflections about the design and implementation of the project.
Recommendations (REC)	Recommendations offered by the teachers and students for improving the overall project process, implementation, design, etc.

Fig. 2. Coding scheme for the focus group data

and Mr. Beck, and 41 students, including 21 7th grade (13 year old) students and 20 5th grade (10 year old) students. Ultimately, Mr. Leonard's students were unable to complete the project because of an unrelated scheduling problem that arose within the school.

4.3   Data Collection and Analysis

The primary data included artifacts of student work related to the project; materials the teachers created for the project; and transcripts of focus group interviews with the four teachers, four groups of 7th grade students and three groups of 5th grade students. The secondary data included field observation notes taken in each teacher's classroom and the TPACK survey that the teachers had completed at the start of the project.

This paper focuses on the preliminary findings from the focus group data. The research team used deductive and inductive coding methods to analyze the transcripts of these interviews. First, organizational categories or "pre-established sets of categories" [12] were established and assigned codes (i.e. design, implementation, challenge, and recommendation). Then each researcher individually coded the data, using these initial codes and expanding the coding scheme by discovering new categories. The team convened over multiple weeks to discuss the data, revising the initial categories several times and adding new "substantive categories" developed through open coding [12, p. 97] and collective discussion of the data. Ultimately, 21 major coding categories and 1 sub-category emerged (Fig. 2).

The research team looked closely at the data coded for "digital literacy" in understanding key findings that answered the second research question.

5   Findings

The focus group data of the 5th and 7th grade teachers and students yielded important insights about this research question and their perceptions about how the students' digital literacy skills developed during the I-LEARN project. An analysis of the student focus group transcripts suggested three central themes: (1) Technology was either useful or difficult to use for locating and evaluating information; (2) Technology was useful in designing a product; and (3) Digital literacy skills improved in various ways, ranging from minimal changes to advancing student knowledge about digital tools. An analysis of the teacher focus group data also revealed three themes: (1) Teachers used varying approaches to technology; (2) Technology was used to increase student engagement; and (3) Teachers held a variety of assumptions about the students' digital literacy skills.

5.1   Students' Reflections About Using Technology During the Project

At each student focus group session, the research team presented a question that connected to the larger research question about the dimensions of digital literacy that had emerged during the project: Do you think the project helped you learn more about

technology? The following quotes exhibit how an Internet search was useful for some students in locating information about their topics:

Aaron: Instead of using dot.com you could use more advanced kinds of websites like dot.org or [I] think it's education, and it let[s] you get better information than what other people think, or what the websites provided for you (Mr. Beck's class)

Carl: It helped me learn how to research…I was told that Wikipedia…was more, so, like anybody can put something on Wikipedia. The way that Mr. Beck showed me that, all he did was click in between the sentence, and type it, and then it'll work. When he tried to do it on the dot.org, it didn't work. (Mr. Beck's class)

The students referred to a lesson Mr. Beck had presented to the class about finding reliable sources on the Internet, such as using ".edu" or ".org" websites rather than ones that are less reliable (e.g. Wikipedia because the information can be added and altered by any user). Carl recalled that Mr. Beck showed the class how he was able to go into a Wikipedia page and add information, whereas he could not do this on an ".org" website. Both students remembered this lesson and cited it as a way in which the project advanced their understanding of searching for trustworthy sources on the Internet thus developing their digital literacy skills as well.

However, some students found it difficult to search for relevant information that would deepen their understanding of their topics.

Dr. Grant: Did you feel like it took a long time to find the resources that you needed?

Mark: Yeah

Anita: That's why we [were] running out of time…I myself had to go to like 20 different websites…It was all over the place. (Ms. Jones' class)

Anita and other students cited the difficulty of searching for appropriate information on the Internet. Anita claimed that she had to visit 20 websites; another student in the same class mentioned that she had to "go on 5 different websites just to find it…I thought it was [going] to pop up the first time." The student had assumed that she would find the information right away, but this was not the case. Some students found the process of searching for information frustrating and hard.

The focus group data also revealed how students in Mr. Beck's class used technology to build their PowerPoint presentations. Specifically, students cited the digital tools they had learned how to use to enhance their products.

Janet: Some of the things I didn't know how to do, like the animations and stuff—I needed help with that at first, but then Mr. Beck showed me a little more, and then I got to know more things about it.

Tanya: I learned how to upload a photo, and put in on what you're working on, and how to make the letters pop out more.

Kate: Yes, because at first I didn't know how to do the animations and stuff. I learned how to do that and I learned how to crop the pictures if I didn't want some surroundings. I learned how to arrange the pictures on my PowerPoint.

All three students cited specific digital tools they learned to use during the project that helped them to construct and design their PowerPoint presentations. Their teacher had shown the students how to use specific features of the program, such as adding

Fig. 3. Janet's PowerPoint Slide

animations to their slides, thus supporting their digital literacy development. Figure 3 shows a slide from Janet's presentation that demonstrates a sophisticated use of background imaging and a mirroring technique with the words.

Lastly, the focus group data exhibited how many of the students' digital literacy skills were fostered in different ways that ranged from basic skills to more advanced concepts and applications; some students, however, shared that their technology knowledge remained unchanged.

> Teresa: Well, I learned how to use the keyboard…I was having trouble with it at first. Then Mr. Beck showed me how to use it.
>
> Dr. Lee: Okay, when you're saying he showed you how to use it, is that you never…typed as much before?
>
> Teresa: Yeah. I didn't know how to get the capital…I mean make it (capital letters).
>
> Keith: It (the project) helped me…type faster.

Although Teresa and Keith stated that the project helped them to improve only their keyboarding and typing skills, it is important to note that even these basic digital literacy skills are important building blocks for these students.

5.2   Teachers' Reflections About Using Technology During the Project

The teacher focus group data revealed varying approaches and purposes for using technology during the I-LEARN project. Mr. Beck was the only teacher who required a digital product for his students (PowerPoint presentations), whereas the two 5th grade teachers required their students to create a group poster. The 7th grade students selected individual research topics based on local problems that exist in their community and were tasked with investigating solutions to this problem as addressed in a country other than the United States. The 5th grade students, by contrast, all investigated the same topic—creating safe recreational places for children in their community.

The teachers used technology in different ways for the project. Ms. Jones had her students use the computer lab to conduct research on their class topic. She also discussed valid versus invalid sources with them before they started their research:

> A lot of them were clicking…the first link. They would just jot all of the information down off of it. I'm like, "Okay, how does that apply to what you're asking for? What trigger words in your question correlate to this? Is this person a good person to get information from?"

She had soon noticed that her students were arbitrarily clicking on websites without any close analysis of their reliability or relevance to the research question. This prompted a discussion about finding reliable sources for information. In addition, Ms. Jones noted a significant obstacle to pursuing the project revolved around a lack of access to technology: "Then when we would be scheduled for computers, we wouldn't be able to get the computers. That was a big issue with the technology." This may be one important reason why the 5th grade teachers opted for a group poster instead of a digital product.

The 7th grade teachers used laptop computers and the school computer lab so their students could conduct research via the Internet. Mr. Beck articulated the reasons for integrating technology into the project:

> Students, ultimately, they want to be in control of their learning. They like it when they know what they're [going to] do, they know what's expected of them, and then they can figure out how to get there. Plus, it's a change of pace.

Mr. Beck viewed technology as an intentional move towards student-directed learning to give them more autonomy and control over their projects, to figure out how to navigate each phase of the project, to make decisions about what to include/not to include, and to design their products with some level of independence.

In addition, the 5th and 7th grade teachers had differing views about their students' digital skills. During their focus group interview, the 5th grade teachers shared that the students did not take technology class until the latter part of the school year—that is, after the project had been completed. In response to a question about the students' digital literacy skills, Ms. Moore stated: "Some of my kids struggled. Some of my kids were a little more equipped to use it, and they were able to offer assistance with the other kids." It was clear that the some of the students had more advanced digital literacy skills and could navigate applications such as Google maps more easily than their peers. Mr. Beck reported a similar finding: when asked whether he felt his students' technology skills improved he said: "Yeah, I would say they improved. Believe or not, a couple of them did not know how to use Google or a search engine." Mr. Beck took a differentiated approach with technology in his classroom, offering more support to students with basic digital literacy skills while letting all the students work at their own pace.

Both the 5th and 7th grade teachers viewed technology as an important way to engage students. In reflecting on what she could have done differently, Ms. Moore stated: "Well, maybe we can incorporate laptops a little bit more and technology a little bit more for them to actually be using instead of me standing and doing everything." She realized that giving more opportunities for her students to use laptops was not only a way for them to gain experience conducting research on the Internet but would provide valuable opportunities for student-directed learning. Mr. Beck also viewed technology as a way to gain "100 percent buy-in" from his students:

> They're playing with technology, students love technology. They love going to the lab. They love doing those different things. We were able to get 100 percent buy-in and 100 percent engagement, which was a little shocking. They liked it.

Technology provided the incentive for students to participate fully and to engage energetically in the I-LEARN project. The students enjoyed "playing with technology" and creating the PowerPoint presentations that demonstrated their aptitude with the different tools of this application. Figure 4 is another example of a slide from one of Mr. Beck's students who integrated music, animation, stylized fonts, and other features that demonstrated his aptitude with using PowerPoint tools.
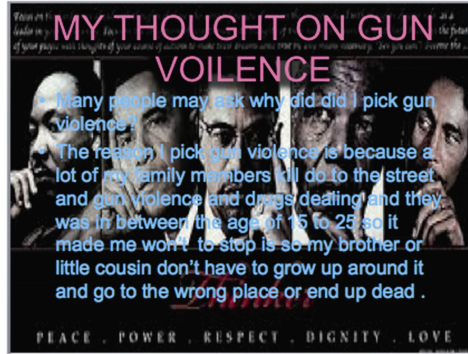

Fig. 4. Jake's PowerPoint slide

6   Discussion

The findings from this study revealed the teachers' different approaches and purposes for using technology in connection to the I-LEARN model and to the project and the different learning experiences and outcomes for the students. Capturing the perspectives of the students and the teachers in understanding what was salient for each group in terms of developing digital literacy knowledge and skills was an important goal of the study. It is not surprising that only Mr. Beck's students expressed a range of responses in the ways in which their knowledge about using technology grew during the project, since they were the only class to have completed a digital product at the end of the project timeline.

The students' responses about the dimensions of digital literacy that were signifcant for them during the project centered on two areas: (1) understanding how to locate, evaluate, and use information on the Internet, and (2) learning digital skills that ranged from basic keyboarding functions to more sophisticated uses of digital tools and applications. In addition, the PowerPoint products were meant to inform a wider audience about local issues—e.g. gun violence, kidnapping, bullying—that are present in their community and that might be addressed by searching for and applying information about potentially effective solutions from other countries. For the students who expressed growth in the areas of using and evaluating information within digital contexts, their

responses aligned with the Alexandria Proclamation's stance that information literacy "empowers people in all walks of life to seek, evaluate, use and create information." The advancement of technology in an increasingly digital global world requires students to have the ability to understand how to use information purposefully and critically to advance their own goals. Overall, the findings from the study highlight the importance of developing information literacy skills together with digital literacy skills for the ultimate purpose of "learn[ing] how to learn" [3].

One recommendation for future research is closing the gap of knowledge for teachers who want to use the I-LEARN model in their classrooms, but do not possess a solid background in information literacy. While the students in Mr. Beck's classroom noted what they learned about searching for reliable sources, he advised his students to avoid Wikepedia altogether and to trust ".edu" and ".org" websites over ".dot" sites which suggested his narrow understanding of finding trustworthy sources. Targeted professional development in the area of information literacy could be valuable to teachers who want to grow their own and their students' information and digital literacy skills.

References

1. National Council of Teachers of English: NCTE Framework for 21st Century Curriculum and Assessment. NCTE, Illinois (2013)
2. Neuman, D.: Learning in Information-Rich Environments: I-LEARN and the Construction of Knowledge in the 21st Century. Springer, New York (2011)
3. American Library Association: Presidential Committee on Information Literacy: Final Report. ALA Editions, Chicago (1989). Addison-Wesley Longman, New York (2001)
4. International Federation of Library Associations and Institutions: Alexandria Proclamation on Information Literacy and Lifelong Learning. IFLA, Netherland (2005)
5. International Literacy Association: New Literacies and 21st Century Technologies. International Literacy Association, Delaware (2009)
6. Neuman, D.: Constructing knowledge in the twenty-first century: I-LEARN and using information as a tool for learning. Sch. Libr. Res. **14**, 1–14 (2011)
7. Anderson, L.W., Krathwohl, D.R.: A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives (2000)
8. Eisenberg, M.B., Berkowitz, R.E.: Information Problem Solving: The Big Six Approach to Library and Information Skills Instruction. Ablex, Norwood (1990)
9. Kuhlthau, C.C., Maniotes, L.K., Caspari, A.K.: Guided Inquiry: Learning in the 21st Century. Libraries Unlimited, Santa Barbara (2007)
10. Neuman, D.: I-LEARN: information literacy for learners. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 111–117. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_13
11. Mishra, P., Koehler, M.J.: Technological pedagogical content knowledge: a new framework for teacher knowledge. Teachers Coll. Rec. **108**(6), 1017–1054 (2006)
12. Maxwell, J.A.: Qualitative Research Design: An Interactive Approach, 2nd edn. Sage, California (2005)

Exploring the Lived Experience of Middle School Students Engaged in Inquiry Based Learning

Shelly Buchanan[1,2(✉)]

[1] Information Systems School, Queensland University of Technology (QUT),
Brisbane, QLD, Australia
shellycbuchanan@gmail.com
[2] Gateway Program, San Jose State University, San Jose, CA, USA

Abstract. This paper discusses the phenomenological investigation and study findings of middle school students engaged in a unique Inquiry Based Learning (IBL) model named here as Student Driven Inquiry (SDI). SDI is a form of IBL that privileges student autonomy. Phenomenology allows an in-depth look into the student lived experience through the use of open-ended interviews. This pilot study elicited six common themes of student experience: joy in study immersion; appreciation for autonomy; satisfaction with self-selected topic; enthusiasm for learning; considerations of time management; and stress in project completion. These themes suggest the SDI model is one of deeper, joyful student engagement and learning with a certain measure of stress. The student perspective of the lived experience of SDI adds important information to the growing conversation on K-12 Information Literacy (IL), inquiry learning models, and student motivation. Implications for curriculum development, instructional practice and further research are discussed.

Keywords: Information literacy · Inquiry based learning · Lived experience · Phenomenology · Project based learning · Self-directed learning · Student-centred learning · Student driven inquiry

1 Introduction

The purpose of this study is to illuminate the lived experience of middle school students engaged in a Student Driven Inquiry (SDI) approach to Inquiry Based Learning. SDI is a unique and emerging form of Inquiry Based Learning (IBL) that privileges student autonomy. In SDI, students steer their own learning by: determining the topic, designing the research, synthesizing multiple texts, conducting academic writing, creating relevant artifacts, and presenting findings. The goal of this research study is to glean an understanding of how students engage in this unique IBL model, how students perceive and navigate the learning challenges and opportunities in this form of IBL (SDI), and how students reflect upon the whole of this journey, personally and academically. The phenomenological method allows an in-depth look into the student lived experience through gathering and analyzing data alongside the learner. The research question for

this study is: **What is the essence of the student experience in a Student Driven Inquiry framework?**

Following is a review of the literature related to the phenomenological study of the lived experienced of SDI and the pilot study findings for this work that include data collection with two students. According to Max van Manen [1] a small number of participants is deemed appropriate for this in-depth qualitative method.

2   Literature Review

Educators are shifting their focus from race-to-the-top teaching strategies designed to produce high standardized test scores to other methods that engage students in authentic, meaningful work honing both process and content skills considered important for successful participation in our modern global culture. Inquiry based learning (IBL) is offered as an effective model for producing positive shifts in learning processes and strategies [2–9]. IBL allows students to make determinations about the problems, challenges and issues they investigate, helping move students toward meaningful engagement and deeper learning. Student Driven Inquiry (SDI), a term introduced in this research, is a form of Inquiry Based Learning (IBL) that offers pronounced student autonomy. SDI puts the responsibility for determining problem, product and presentation in student hands, an experience thought to develop interested, independent learners.

When considering SDI there are three research areas of interest: Inquiry Based Learning, Student Motivation, and Information Literacy. Barron and Darling-Hammond [2] among many other researchers [3, 6, 8, 10, 11] have found that IBL provides autonomy supportive, authentic and creative student experiences. These qualities lead to the development of intrinsic motivation, precipitating task commitment, self-regulated learning, positive student attitudes, and the development of skills and knowledge [11]. IBL improves student attitudes about school, self-esteem, confidence, and curiosity [3, 8, 10]. IBL is constructivist rather than instructivist and is notably related to issues of autonomy. Student Motivation is embedded in the IBL learning process. According to Crow [12], Heinstrom [13], Patall [14] and Seifert [15] research on Student Motivation shows a clear measure of consensus on the notion that relevance, choice, and personal interest lead to deeper student engagement. There is a repeated call for research on the constructivist learning approach of IBL and how it fosters intrinsic motivation specifically [16].

IBL is built on processes of research and inquiry and is student directed. Therefore, Information Literacy (IL) research by Bruce [17, 18], Elmborg [19, 20] and Kulhthau [21, 22] related to the student experience of engaging information to learn informs our understanding of IBL, and in particular SDI. These Information Literacy researchers position the student or learner at the center of the IL experience. Kuhlthau's Information Search Process [22] details the six stages of the information seeking experience. The exploration of the student-educator relationship by Elmborg [19] focuses on the teacher, information specialist or librarian as co-inquirer, asking questions and delving deep into inquiry and knowledge building as they operate as facilitator alongside the student. Additionally there is the evolving recognition of strategies and dispositions that provide

for effective student guidance, coupled with attention to Bruce's call [18] for developing guidelines and policies needed to support productive information use and the development of lifelong learning skills. These ideas and explorations will support examination of how students experience the use of information for building knowledge, solving problems, learning how to learn and contributing to learning communities.

The SDI framework is an IBL model which foregrounds student-centeredness by privileging student governance of the project work. The teacher remains apprised of student progress, stepping in when solicited, as questions, concerns or problems arise. SDI is interested in leveraging student choice, autonomy, skills, and knowledge building, and is designed in larger part for the purpose of improving student motivation and engagement in addition to cognitive competencies. Investigating SDI through the student perspective with the lens of Student Motivation will deepen our understanding of how and why students experience motivation in SDI. Applying the Information Literacy lens to this study will support our understanding of IL practices, how they are employed and experienced by students. The IBL lens will sharpen the view of SDI experience in the larger educational landscape.

Viewing the learner experience in SDI through our growing knowledge of Inquiry Based Learning, Student Motivation and Information Literacy practices will support our understanding of the effectiveness of SDI. Following is an explanation of the research method and the pilot study findings.

3   Research Method

This study uses the qualitative research method of interpretive phenomenology. Phenomenology proposes the development of understanding those things in the lifeworld that come through human consciousness. Lifeworld is defined as the ever-shifting time and space in which we live holistically with each other and all things in the world. The challenge is to discern the essential features of consciousness in a particular experience, to show how and why a phenomenon is experienced, and to unify the two into a meaningful whole. The concern here is not the isolated facts of the experience, but rather the essence, gleaned through the facts of experience as relayed *personally* by the individual who directly experienced the phenomenon of interest.

Following the hermeneutic phenomenological method of Max van Manen [1] in a pilot study, I collected stories of the SDI experience from two students in individual open-ended interview sessions. The research method includes: bracketing preconceived biases of the phenomenal experience under investigation; implementing the phenomenal reduction (i.e., keeping a clear unbiased and open-minded approach to gathering and working with the research data); iterative examination of the interview transcripts, researcher field notes, and journal entries. The two student participants reviewed their interview transcripts and made necessary revisions to ensure completeness and accuracy. I tagged and labeled the meaning units (ideas related to the research question at hand) in the revised transcripts and horizontalized the data to determine the common themes of experiences shared by the students discussed in the findings below. The pilot work ended here with the discovery of common themes also discussed below.

4   Findings

The 2015 pilot study included: open-ended interviews with two eighth grade students over two sessions for each student; transcription of the recorded interviews; participant review and revision of transcripts for accuracy and completeness; researcher identification of meaning units or themes in each transcript; identification of participant common themes. In the interviews, students relayed their stories of SDI experience in previous years at their middle school (children ages 9–14 years) by answering the interview prompt: tell the story of your experience in the Independent Project (the name of the SDI framework implemented in the school attended by these students).

Six common themes of experience emerged clearly between the two independent stories:

- Appreciation for Autonomy
- Joy in Study Immersion
- Satisfaction with Self-selected Topic
- Enthusiasm for Learning
- Considerations in Time Management
- Stress with Project Completion

Following are just a few examples of the many interview excerpts that determined the thematic categorization of six invariant themes in the student experience of SDI in this pilot research.

The **Appreciation for Autonomy** theme arose in several places in the stories from the two students. Here is a conversation passage from Student 1 (S1) showing her feelings of freedom in dictating her own learning and work strategies:

> *"I think it's the fact that we were going to our own time and that we'd go to a library and we'd just stay there for hours getting books and reading them. Taking notes and doing our own methods. We might make PowerPoints and we might look at YouTube things on it. We can do anything we want. We can just … we can do anything we want to find it out….It was cool that way because you can … again, I go into this a lot but it's the fact that we love what we're learning and that it's not burial sites like we learned last year … last year … last month in social studies. It's something that matters to us and because we're directing it, it seems much more important to us."*

Student 2 (S2) shares relief and appreciation that teachers allow students to create their own study and work schedule.

> *"… you get to pick your own partners and you get to choose your own due dates when you want to turn in a project. So you have a whole calendar of when something is due. You get to make it up. I think it's way more flexible than like, if you have some, some tournament or like something over a weekend and you can't do it … … then you can like turn it in a few days later and, like, make your own schedule. And your teacher approves."*

Participants each show positive attitudes here as they talk about the freedoms they experience in engagement with the Independent Project. S1 says in this work students can "do anything we want" around research and that "we love what we're learning." S2 repeats the phrase "we get to," showing his feelings of being respected and privileged to make his own decisions.

Examples of **Joy in Study Immersion** peppered both student interviews. In the following brief quote S1 is direct and clear in conveying powerful heartfelt feelings of motivation and contentment:

> *"There were days where I would just sit down in solitude and thinking, get an iPad and look up facts. Be so into it, read these articles for hours and forget about time. It was so cool. I loved it."*

S2, a math-loving boy, expresses his motivation to sustain active interest and "dive deep" into his selected topic of study:

> *"… like being able to choose your own project is part of what makes me want to do it the whole term because it's really what you're interested about, not what the teacher chooses what they think you're interested about. So it's … You can really dive deep in what you want to learn more and you get to engage it in different subjects or topics like math."*

Both participants share feelings of immersion and engagement in their SDI learning experience; the infectious tone in each is apparent.

Evidence of **Satisfaction with a Self-selected Topic** arose throughout the interview and is implicit in the aforementioned excerpts. Here are two more explicit examples of student gratification with exercising topic choice:

> *"I could go into … I could do so much. I wouldn't have to do one certain thing. I could go into … see … the cool thing about dreams is that you can expand to so much. You can do sleeping, sleep deprivation. I know a lot about that…."* – S1

> *"… you get to choose your topic…. I think that's the best part….because if I was starting a topic that I didn't want to do, I'd feel mad about it and I wouldn't want to study for a whole term. And if I wanted to study it the whole time and I wanted to know the whole time, … then I could really study more of that."* – S2

S1 feels freedom and interest in the varied directions she might choose within her topic of lucid dreaming. Studying a topic of personal interest rather than a teacher-selected topic is the difference between contentment and frustration for S2. Both students share enthusiasm and pleasure in their respective topics of study.

There was palpable excitement about learning from each of the students when sharing their experience in the Independent Project. Both exuded undeniable **Enthusiasm for Learning** in this SDI model. First, we see S1 describe how the year flew by as a result of learning about what she loves:

> *"I really love how we do independent projects because it makes us so much more informed about the things that we love the most. It teaches us so much too, academically. Not to procrastinate and to be engaged in what you're learning….That year went by very fast because I loved my IP. I remember everything."* –S1

S2 talks about his ability to sustain focus and dig into his Independent Project over time because the topic is something of particular interest to him:

> *"… like being able to choose your own project is part of what makes me want to do it the whole term. Because it's really what you're interested in, not what the teacher thinks you are interested in. So you can really dive deep into what you want to learn more, and you get to engage in different subject or topics like math…. I think what is interesting is learning the new stuff rather than the stuff you already knew about."* –S2

The students independently shared their excitement and enthusiasm for work that mattered to them. Each was able to stay connected to the work and singled out the word "learning" as a seminal act in an engrossing and enjoyable academic experience.

While appearing less often in the interviews when compared with the other themes noted here, there was still marked reference to **Considerations of Time Management** by both students. S1 conceded her penchant for procrastination and need to plan ahead in order to manage her Independent Project work while also juggling other after school commitments.

"I had about four projects that were due on one Friday and it was a really hard week for me. I had my ballet exams and my play was that week too. I hadn't planned ahead. I'm a person that forgets to plan ahead and when the time comes, it's like it'll blow into my face. I don't have time to do anything." –S1

By contrast, S2, who also independently raised the issue of scheduling, talked about the freedom of setting one's own due dates in the Independent Project:

"You get to choose your own due dates when you want to turn in your mini-projects. So you have a whole calendar of when something is due. You get to make it up." –S2

The students talked about **Considerations of Time Management** in different ways. However, they each noted a significant experience and attitude about managing time and their own schedules. You can hear the regret in her voice when S2 admitted, "I hadn't planned ahead." S1 feels empowered when he says, "You get to choose…" as if he were gifted something extra special.

Also limited in frequency of appearance in both interviews, like the theme of **Considerations of Time Management**, is the theme of **Stress in Project Completion**. Students shared clear and profound feelings of **Stress in Project Completion** as they engaged in the Independent Project. Here S1 shares that the challenge of the work was high and therefore stressful:

"To be completely honest.…when you look back on things it doesn't seem as intense because you're like, "Wow, that was so fun." But in the moment it was horrible.….It's an extremely stressful experience because we're not all completely adjusted to this kind of work.….It's a good experience and it trains you for high school and for college and all that. But it's hard, and it's stressful." –S1

S1 acknowledges the value of the challenging experience, pointing out how it prepares students for future academic work. S2 talks similarly about the challenge, saying:

"It's the hardest part of the year. Emotionally it's hard because you're working so hard. And academically, you're trying to not procrastinate, get things done, and work independently." –S2

Again, we hear the use of "hard." Similar in spirit to the excerpt from S1, S2 states that working as hard as he did on the Independent Project impacted him emotionally and academically as he juggled active engagement and independent completion of work. Both students openly acknowledge palpable feelings of stress in the SDI experience.

Together the six themes of Appreciation for Autonomy, Joy in Study Immersion, Satisfaction with Self-selected Topic, Enthusiasm for Learning, Stress in Project

Completion and Time Management presented here demonstrate a notable degree of overall positive, healthy academic engagement as students share feelings and anecdotes of choice, control, study focus, interest, learning, and challenge. The detailed content and upbeat tone of the excerpts suggest certain degrees of intrinsic motivation, considered the highest most powerful form of motivation according to Deci & Ryan's self-determination theory [23] and considered desirable and important for deeper more meaningful, long lasting and transferable learning found in Inquiry Based Learning models [2, 3, 6, 8, 10, 11]. We hear a refrain of student commitment and engagement echoed through the excerpts shared here – the animated anecdotes shared by the students point to their high value of the Independent Project model. We see Information Literacy skills and knowledge embedded in this Student Driven Inquiry process and product exercised and developed with the student driving the work and learning [17–22].

5   Implications and Conclusion

The six emerging themes from the pilot study enumerated above individually and collectively connect to ideas inherent in concerns within the fields of Student Motivation, Information Literacy, and Inquiry Based Learning. The autonomy-supportive SDI experience investigated in this pilot study shows students motivated by authentic, relevant academic work [12–15]. Embedded in the Independent Project. The data suggests the effectiveness of leveraging and mindfully supporting student agency through focus on student purpose and interest [20] to use information to learn [24] The student experience reported here substantiates existing qualitative IBL research and practice interested in the positive effects of student engagement that lead to deeper, sustained learning [2, 8]. The growing focus on the learner experience in the research on Student Motivation, Information Literacy and Inquiry Based Learning validates the privileging of student-centered learning as well as the student learning perspective.

It is anticipated that substantive findings in the main study of this phenomenological research will add rich information about the student perspective of experience working with the SDI model. The qualitative data will enhance interpretation of the growing collection of quantitative data on other forms Information Literacy-based IBL models. Because SDI is distinguished from other IBL models for its high degree of student autonomy there will necessarily emerge implications for the challenges and opportunities afforded by the focused student-directedness of this learning model. While the pilot study shows positive outcomes in motivation and engagement there were also shared concerns for time and stress management. How can educators effectively create environments of both freedom and support for the effective use of information to learn and create new knowledge? Where is the ideal balance between autonomy and guidance found in this work? Concerns about levels of Information Literacy skills and knowledge development in SDI will need to be addressed as well. Are students making satisfactory academic gains as they use information to learn in SDI? Researchers, educators and policymakers will be interested to understand the nuances of student autonomy in SDI, its attendant opportunities and challenges, and to apply it to the growing knowledge in the fields of Information Literacy, Inquiry Based Learning, and Student Motivation.

References

1. van Manen, M.: Researching Lived Experience: Human Science for an Action Sensitive Pedagogy. State University of New York Press, Albany (1990)
2. Barron, B., Darling-Hammond, L.: Teaching for meaningful learning. In: Darling-Hammond, L., Barron, B., Pearson, P.D., Schoenfeld, A.H., Stage, E.K., Zimmerman, T.D., Cervetti, G.N., Tilson, J. (eds.) Powerful Learning: What We Know About Teaching for Understanding. Jossey-Bass, San Francisco (2008)
3. Bell, S.: Project-based learning for the 21st century: skills for the future. Clearing House **83**(2), 39–43 (2010). doi:10.1080/00098650903505415
4. Buck Institute of Education: Why Project Based Learning? (2014). http://bie.org/about/why_pbl
5. Duffy, T.M., Raymer, P.L.: A practical guide and a constructivist rationale for inquiry-based learning. Educ. Technol. **50**(4), 3–15 (2010)
6. Krajcik, J.S., Blumenfeld, P.: Project-based learning. In: Sawyer, R.K. (ed.) The Cambridge Handbook of the Learning Sciences. Cambridge, New York (2006)
7. Small, T.: Assessing enquiry-based learning: developing objective criteria from personal knowledge. Curriculum J. **20**(3), 253–270 (2009)
8. Thomas, J.: A Review of Research on Project-based Learning. Autodesk Foundation, San Rafael (2000). http://www.autodesk.com/foundation
9. Wolk, S.: School as inquiry. Kappan **90**(2), 115–122 (2008)
10. Saunders-Stewart, K.S.: Students' perceptions of the important outcomes of inquiry based teaching and learning. Doctoral Dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 762532588) (2008)
11. Saunders-Stewart, K.S., Gyles, P.D.T., Shore, B.M.: Student outcomes in inquiry instruction: a literature-derived inventory. J. Adv. Acad. **23**, 5–31 (2012)
12. Crow, S.: Exploring the experiences of upper elementary school children who are intrinsically motivated to seek information. Sch. Libr. Res. **14** (2011)
13. Heinstrom, J.: Fast surfing for availability or deep diving into quality: motivation and information seeking among middle and high school students. Inf. Res. **11**(4), 7 (2006)
14. Patall, E.A.: Constructing motivation through choice, interest, and interestingness. J. Educ. Psychol. **105**(2), 522–534 (2013). 10.1037/a0030307, 10.1037/a0030307.supp
15. Seifert, T.: Understanding student motivation. Educ. Res. **46**(2), 137–149 (2004)
16. Blumenfeld, P.C., Kempler, T.M., Krajcik, J.S., Blumenfeld, P.: Motivation and cognitive engagement in learning environments. In: Sawyer, R.K. (ed.) The Cambridge Handbook of the Learning Sciences. Cambridge, New York (2006)
17. Bruce, C.: The Relational Approach: A New Model for Information Literacy. New Rev. Libr. Inf. Res. **3**, 1–22 (1997)
18. Bruce, C.: Information literacy as a catalyst for educational change: a background paper. In: Danaher, P. (ed.) Lifelong Learning: Whose Responsibility and What is Your Contribution? The 3rd International Lifelong Learning Conference, Yeppoon, Queensland (2004)
19. Elmborg, J.K.: Teaching at the desk: toward a reference pedagogy. Portal **2**(3), 455–464 (2002)

20. Elmborg, J.K.: Libraries as the spaces between us: recognizing and valuing the third space. Ref. User Serv. Q. **50**(4), 338–350 (2011)
21. Kuhlthau, C.C.: Inside the search process: information seeking from the user's perspective. J. Am. Soc. Inf. Sci. **42**(5), 361 (1991)
22. Kuhlthau, C.: Teaching the Library Research Process, 2nd edn. Scarecrow Press, Metuchen (1994)
23. Deci, E.L., Ryan, R.M.: Intrinsic Motivation and Self-determination in Human Behavior. Plenum, New York (1985)
24. Bruce, C., Hughes, H.: Informed learning: a pedagogical construct attending simultaneously to information use and learning. Libr. Inf. Sci. Res. **32**(4), A2–A8 (2010)

Teaching and Learning Information Literacy in Upper Secondary Schools in Vietnam

Huyen Thi Ngo[1(✉)], Geoffrey Lee Walton[2], and Alison Jane Pickard[1]

[1] Department of Mathematics and Information Sciences, Faculty of Engineering
and Environment, Northumbria University, Newcastle upon Tyne, UK
{huyen.ngo,alison.pickard}@northumbria.ac.uk
[2] Department of Languages, Information & Communications, Faculty of Arts & Humanities,
Manchester Metropolitan University, Manchester, UK
G.Walton@mmu.ac.uk

Abstract. Information literacy (IL) received much attention from researchers and practitioners in recent years. However, an understanding of IL in the educational context of Vietnam is limited. Therefore, this project employs a mixed-method approach to investigate the practice of IL teaching and learning in Vietnamese upper secondary schools. The study uses an expanded version of Standards for the 21st-Century Learner devised by the American Association of School Librarians (AASL) as a tool for measuring current IL capabilities amongst students, as well as examining IL teaching and learning activities in two upper secondary schools in the country. The IL assessment indicates that improving students' IL capability is necessary. Additionally, reasons for different IL results and the practice of IL teaching and learning were explored.

Keywords: Information literacy · Secondary school · Information literacy assessment · Vietnam

1 Introduction

Information literacy (IL) is regarded as one of the capabilities that students need to engage with information effectively in the digital age [1]. Vietnam's schools are not out of this trend. However, the amount of studies on IL in the educational context of Vietnam is still limited. Hence, this study aims to investigate the practice of IL teaching and learning in upper secondary schools in the country. This paper, which is part of an ongoing PhD research, will mainly present methodology and report on preliminary findings of the study.

2 Literature Review

Hepworth and Walton [2] indicate that the term "information literacy" can be studied under different perspectives. One of the definitions that is widely known and is considered the groundwork for later IL definitions was introduced by the American Library

Association (ALA) [1]. According to ALA, IL is a set of abilities of individuals to "*recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information*" [3, p. 1].

This research redresses the research gap by examining IL in the Vietnamese educational arena. Therefore, reviewing previous literature related to this context is needed. In Vietnam, there are several studies which focus on IL in academic and school libraries but none has analysed IL delivery as part of a teaching programme. There is a case study which explored the perceptions of stakeholders about the development and delivery of IL instruction in Vietnam's academic libraries [4]. IL in Vietnam can be found in the research conducted by Truong [5]. This study mainly concentrates on IL at the higher education level. The other is a sub-regional project that brought together seven countries, including Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand and Vietnam on the development of IL education through school libraries in Southeast Asia. The project aimed to examine the current state of IL education in Southeast Asia, and to put forward appropriate recommendations and action plans for the greater involvement of school libraries in the development of an information literate citizenry. The project was approved for financial assistance under the Special Funds of UNESCO's Information for All Programme in 2004 [6]. However, the focus is on IL training programmes and IL educators, not students' IL learning.

3   Background

According to the latest statistics from the Ministry of Education and Training (MOET), Vietnam has 2,425 upper secondary schools (grade 10 to 12) [7] including public and private schools. Schools enrol students based on pupils' academic capability. Normally, students who have a better academic level have more chances to study in public schools.

Enhancing the capability of using foreign languages, as it concerns English, receives much attention from MOET, educators and learners in Vietnam, in recent years [8]. This
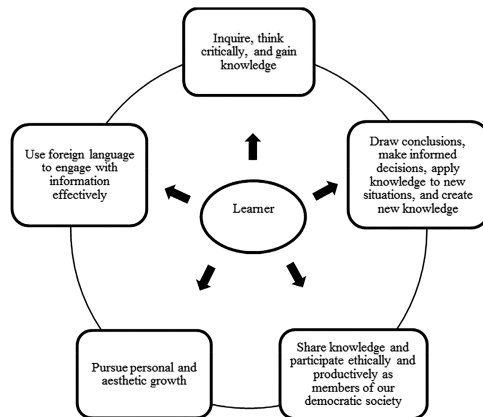

Fig. 1. Expanded AASL's information literacy model

can be found in the educational projects and policies introduced by MOET, for example, "Teaching and learning foreign languages in the national education system 2008–2020".

As the focus of this research is upper secondary school, the study uses Standards for the 21st-Century Learner devised by the American Association of School Librarians (AASL) [9] as a tool for measuring current IL capabilities amongst students as well as exploring IL teaching and learning activities in schools. Nevertheless, the research expanded the original AASL model by adding one more standard that is "Using foreign languages to engage with information effectively" because of the special characteristics of the study programme in the country (Fig. 1).

4   Methodology

4.1   Research Design

The research employed a mixed-method approach including three phases of data collection.

Phase 1.   A 35-question survey was apportioned into three parts as follows:

Part A – About you: obtained demographic data of the participants such as name, gender, school, and level of study.

Part B – Your information literacy: a set of 25 multiple choice questions was used to investigate students' IL level in terms of the ability to develop search strategies, evaluate information sources, use information ethically, and use foreign language to engage with information effectively. Students were given one point for each accurate answer. IL assessment was based on the 12th grade version of an IL competency level assessment toolkit of high schools in the USA known as TRAILS – Tool for Real-time Assessment of Information Literacy Skills, a project which was developed by Kent State University Libraries [10]. TRAILS was selected as it is designed based on the AASL Standards for the 21st Century Learner. Nonetheless, the questions were altered to suit Vietnamese upper secondary students under the suggestion of a group of professionals, including an expert in Information Science, an upper secondary school teacher, and a school librarian. According to Rosman et al. [11], measurement of all IL aspects in a test is a very big challenge. Thus, the questionnaire used indicators under standards one and five which are "*Inquire, think critically, and gain knowledge*" and "*Use language to engage with information effectively*" out of five standards, to measure four IL components.

Part C – Awareness and self-rating: aimed to identify students' awareness of the concept of IL as well as their IL self-assessment. The Likert scale (5 for highest rating and 1 for lowest rating) was used to help students reflect on their IL.

Phase 2.   Six semi-structured student interviews were conducted to explore their experiences in learning IL. They were nominated from the survey.

Phase 3.   The research conducted 10 semi-structured professional interviews including librarians, teaching staff and administrative staff in order to investigate more issues that

were raised from previous phases. Also, a document review schedule was created to collect qualitative data from reports, policies, guidelines, study programme, textbooks and teachers' resources.

4.2 Sampling

Two upper secondary schools comprising one public school and one private school (labelled School B and C) took part in the project as a representative sample. In each school, the researcher randomly selected students to take the questionnaire survey (N = 183). Students from the survey participants were then selected for the interview based on their willingness and IL test scores. Librarians, teachers and managers were then involved in the project.

4.3 Data Analysis

The quantitative data was imported into SPSS 22 for analysis. Data were analysed in two levels including descriptive and inferential statistics. For qualitative data, this research made use of thematic analysis.

5   Findings

5.1 Information Literacy Assessment

Information Literacy Test Scores. The raw scores were converted into percentages including less than or equal to 30%, more than 30% and less than 70%, and more than or equal to 70%. They were then recoded into values such as low, average, and high, correspondingly.
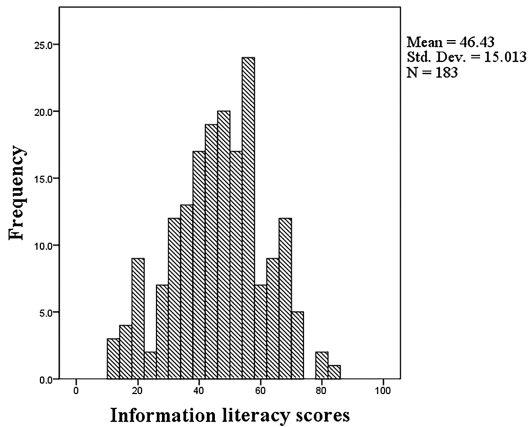

Fig. 2.   Overall information literacy scores

As shown in Fig. 2, the students' IL test scores ranged from 12 to 84 out of a maximum score of 100 (mean score: 46.43/100). Additionally, 82% of the students achieved average scores, 13.7% of them reached low scores, and only 4.4% of them had high score performance. The results reveal that a large number of students had basic knowledge and skills to engage with information. Nevertheless, their IL skills had not been developed comprehensively.

Information Literacy Component Testing Scores. The findings show that out of the four IL testing areas, the best-scored aspect was using information ethically (mean score: 60.11). Meanwhile, the least-scored side was evaluating information sources (mean score: 38.36). Furthermore, the performance mean scores of the ability to develop search strategies and use foreign language to engage with information effectively were 43.28 and 49.40 respectively. The results demonstrate that students were better in using and finding information than evaluating sources.

Information Literacy Scores between Schools. The proportion of the participants achieving high scores in School B was 6.52%. This ratio was higher than School C's with 2.2% (Fig. 3). Overall, students of School B had better IL performance than School C. Therefore, this may suggest that students who have better academic performance also have better IL level.
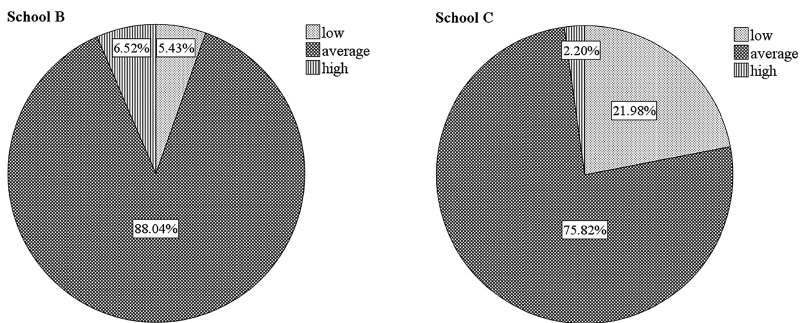
Fig. 3. Overall information literacy scores of two schools

Self-assessment of Information Literacy Level. The Likert scale, specifically 1 to 2, 3, and 4 to 5 were then recoded into values including low, average and high level in that order. 26.78% of the participants rated their IL level at a high level. Meanwhile, 52.46% ranked their IL level at an average level and 20.77% thought their IL level is low. It can be said that a large number of participants thought positively of their IL level.

Comparison of Information Literacy between Female and Male Students. It is apparent that females scored slightly higher than males did (mean score: 47.92 vs. 44.67). However, boys inclined to think more positively of their IL level than girls did. Specifically, 29.76% of the male students, as against 24.24% of the female students, rated their IL at a high level.

Correlation between Demographic Variables and Information Literacy Testing Areas Variables. Pearson Correlation Coefficient was employed to explore further the relationship between the above variables. It was found that the type of schools and the level of study made a difference in overall IL scores and in most IL testing aspects (Table 1).

Table 1. Correlation between demographic data and information literacy level

Testing areas	School	Gender	Level of study
Developing search strategies	**−.364**[**]	−.062	**.158**[*]
Evaluating information sources	**−.361**[**]	−.033	−.024
Using information ethically	**−.236**[**]	**−.179**[*]	**.165**[*]
Using foreign language to engage with information effectively	−.144	−.058	.096
Overall information literacy scores	**−.415**[**]	−.108	**.157**[*]

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Correlation of Information Literacy Scores and Self-assessment. Spearman Correlation Coefficient was used to examine whether there is a relationship that exists between self-rating and IL scores. It was found that there was a positive linear relationship between overall IL scores and self-assessment. However, it roughly appears that there was just a weak correlation ($r < 0.2$).

5.2 Factors Affecting Students' Information Literacy

There are a number of factors that affect students' IL including internal and external reasons.

Internal reasons comprise students' awareness of IL, academic capability and their IL self-learning. It was found that students who have higher awareness of IL also have better IL performance. Generally, there is a difference among three groups of students relating to the awareness of the importance level of IL. High and average scoring students thought that IL is very important to students in general. However, low scoring students believed that IL is unnecessary.

Furthermore, the interview results confirm that students who are better in academic capability are also better in IL.

It was found that students primarily learn IL by themselves. Therefore, students' IL self-learning might be the reason that resulted in different IL scores. Students primarily take the chance to develop their IL through the activities as presented in Table 2.

Table 2. Learning information literacy between three groups of students

Activities	Low	Average	High
Homework		X	X
Textbook use	X	X	X
Activities outside of the class			X

Activities	Low	Average	High
Support from family		X	X
Library use			X
Teachers' instructions	X	X	X
Support from friends	X	X	X

It can be seen that, high scoring students are better in taking full advantages from activities both within the school and outside of the school in developing IL. It may help them develop their IL capability.

At the same time, some external reasons were explored. Specifically, teachers' behaviour, support from family and study environment may affect students in engaging with information. Although several reasons are given to explain the difference in students' IL scores, it is assumed that the use of technology has no impact on pupils' IL capability.

5.3   Teaching Information Literacy

As for teaching IL, the schools have not delivered any formal IL programme. It was expected that the library will deliver instructions related to IL through their activities such as library use guidance and 'ask a librarian'. However, it seems the practice was not as expected.

According to interviewees, there are three main reasons leading to no IL programmes including:

- Time pressure: The problem results from two reasons including private class attendance and strict learning timetable. All interviewees agree that a busy learning schedule means schools cannot deliver an IL programme as well as limit the development of IL of students. Furthermore, students do not have time to engage with information outside of the class. Therefore, they do not have needs related to IL.
- Teaching method: The current transmission approach to teaching and learning does not encourage students to develop IL. Additionally, although the schools tried to switch to a new teaching and learning method, they mostly use the traditional approach in assessing learning outcome that requires students to learn by heart what they are taught. Thus, it does not encourage students to develop IL skills in order to improve their academic performance.
- Resource issue: The schools also face challenges in relation to resources including finance, human resources, and learning material.

6   Conclusion

The IL assessment findings reveal that improving IL capability of students in the two schools is required. Particularly, some action needs to be taken to improve the weaknesses in pupils' information evaluation, the imbalance in the IL level among students of the public school and the private school as well as between males and females. Also, the schools have not concentrated on providing IL instruction for their students. This

may result in non-comprehensive development of pupils' IL and their IL self-learning. Therefore, an IL model that suits the educational context of Vietnam needs to be developed.

References

1. Eisenberg, M., Lowe, C.A., Spitzer, K.L.: Information Literacy: Essential Skills for the Information Age. Libraries Unlimited, Westport (2004)
2. Hepworth, M., Walton, G.: Teaching Information Literacy for Inquiry-Based Learning. Chandos, Oxford (2009)
3. American Library Association: American Library Association Presidential Committee on Information Literacy. Final report (1989). http://www.ala.org/acrl/publications/whitepapers/presidential
4. Diep, K.: A conceptual framework for best practices in information literacy instruction based on stakeholders' perceptions: a case study of four Vietnamese academic libraries. Ph.D. thesis, University of Hawaii at Manoa, Manoa (2011)
5. Truong, L.: Real state of information literacy training in some Universities of Vietnam, Thực Trạng Đào Tạo Kiến Thức Thông Tin Tại Một Số Thư Viện Đại Học Của Việt Nam. J. Inf. Documentation **1**, 24–35 (2014)
6. Choovong, L., Singh, D.: Summary report on UNESCO/IFLA workshop on information literacy education and school library services (2005). http://www.unescobkk.org/communication-and-information/knowledge-societies/apin/information-for-all-programme/information-pol/information-literacy/
7. Ministry of Education and Training: Education statistics, Thống Kê Giáo Dục (2013). http://www.moet.gov.vn/?page=11.10&view=5251
8. Vietnamese Government: Education development strategy 2011–2020, Chiến Lược Phát Triển Giáo Dục 2011–2020 (2012). http://www.moet.edu.vn/?page=1.10&view=21316
9. American Association of School Librarians: AASL Standards for the 21st Century Learner. American Library Association, Chicago (2007)
10. Kent State University Libraries: TRAILS – Tool for Real-Time Assessment of Information Literacy Skills (2015). http://www.trails-9.org/about2.php?page=about
11. Rosman, T., Mayer, A.K., Krampen, G.: Combining self-assessments and achievement tests in information literacy assessment: empirical results and recommendations for practice. Assess. Eval. High. Educ. **40**, 740–754 (2015)

Civic Action-Driven Information Literacy Instruction in Taiwan

Lin Ching Chen[1(✉)] and Yaw-Huei Chen[2]

[1] Department of E-learning Design and Management, National Chiayi University, 85 Wenlong, Mingsuin, Chiayi, Taiwan
lingin@mail.ncyu.edu.tw
[2] Department of Computer Science and Information Engineering, National Chiayi University, 300 Syuefu Road, Chiayi City, Taiwan
ychen@mail.ncyu.edu.tw

Abstract. The purpose of this study was to investigate the feasibility for implementing a civic action-oriented information literacy plan across disciplines within an elementary school, including analysis, design, development and evaluation of the plan. The topic of the plan was the US-Taiwan Eco-Campus Partnership Program. A collaborative action research approach was used for this study. The researchers collaborated with a librarian who taught information literacy, as well as a science teacher and an English teacher. The civic action instruction lasted for ten months with two cycles. This study was conducted in an elementary school in the area of Chiayi, Taiwan. The data was gathered through participant observations, tests, surveys, interviews, and document analysis. The results showed that it is feasible to promote the civic action-oriented information literacy curriculum in sixth grade class. Students' problem solving skills, rational participation in public actions, and intercultural understanding improved through several strategies. They were progressive information literacy curriculum, collaboration among teachers, the support of school administration, and integration of information technology.

Keywords: Civic action · Information literacy instruction · Intercultural understanding · Eco-Campus · Taiwan

1 Introduction

It is common to use the terms "computer skills" and "net literacy" as synonyms for information literacy in Taiwan. However, in addition to diverse inquiry skills, social responsibility is also a concern of information literacy. How to make wise decisions and be informed citizens in today's chaotic society is a goal which information literacy instruction wishes to pursue [1–3]. However, information literacy curriculum rarely addresses the topic of civic actions in real instruction settings.

In recent years, the fields of social studies, science and English in Taiwan suggest teachers depart from their scripted textbooks. Instead, teachers should get students to analyze problems in a real world, to gather information and to take actions based on

an inquiry process [4–7]. However, it is still questionable whether such an interdisciplinary instructional design can help students assume the responsibilities of democratic citizenship.

1.1 Purpose of Study

The main purpose of this study was to examine the feasibility for implementing a civic action-oriented plan in sixth-grade information literacy curriculum. The focuses of this investigation included the analysis, design and development, and evaluation of the entire plan. Students' information literacy, civic action skills, and intercultural understanding were the specific attentions of evaluation.

2 Literature Review

2.1 Essence and Teaching of Information Literacy

Social responsibility is one the three categories listed in the book *Information Literacy Standards for Student Learning* [8]. It stresses that information literate students practice ethical behavior and participate effectively in groups to contribute positively to the whole society. Following similar concepts, the new standards, entitled *Standards for the 21st-Century Learner*, also expect all K-12 students to be responsible digital citizens who can access information from diverse perspectives, cooperate with others and participate ethically in democratic society [1].

Furthermore, Bruce [2] believes that information literacy is using information creatively and reflectively, so that learners' learning experiences can be expanded. Thus, Bruce proposed Six Frames for informed learning, which school curricula should depend on. Social impact is one of the frames. Using this frame for instructional design, students would focus on controversial issues within social contexts, and understand how information literacy impacts society. Lloyd [3] also suggests that researchers should not stress personal information seeking behavior out of context; instead it is more important to examine information practice from a sociocultural perspective.

2.2 Essence and Teaching of Civic Action

Instruction that requires students to memorize information cannot help them become participating citizens. Instead, as John Dewey suggested, students should learn how to integrate skills and knowledge into their daily lives as members of a social community [9].

Citizen participation is one of the emphases of many curricula in Taiwan. It is a process of empowerment. Students first are aware of and identify the real problem. After collecting diverse information and considering different perspectives, students brainstorm feasible policies for the problem. Finally, students cooperatively transform the chosen policy into an actual action, implement it, and at last, reflect on the results. Serriere [10] described how six fifth-grade girls rationally negotiated with school

administration so that the school's existing lunch plan was changed. This study verified that youth's civic efficacy can be enhanced through authentic actions. It also identified the role of a teacher in supporting the development of civic efficacy. The four supports included building curriculum from life, asking inquiry questions, working in a diverse group for valuing diversity, and practicing skills of civic activism.

Thus, many researchers agree that civic education at the elementary level is crucial because it can prepare youth for civic engagement throughout their lifetime [11, 12]. Young citizens can go beyond knowing and move toward action.

2.3 Essence and Teaching of Intercultural Understanding

Intercultural understanding is one of the most important curriculum goal listed in the Grade1-12 curriculum in Taiwan [7]. In practice, it suggests teachers create opportunities for students letting them experience different cultures and challenge accustomed ideas. In fact, language, culture and learning are fundamentally interrelated. They can be fused into a meaningful instructional environment where students face different languages and cultures.

Newton et al. [13] stated that comparing cultures is a practical focus for language teaching which allows learners to develop more sophisticated concepts of culture, so that they can respect each other and communicate effectively across cultural boundaries.

However, English language teaching in Taiwan has always focused on grammatical and phonological teaching, rather than an intercultural communicative approach. Therefore, students lacked intercultural language competency, and could not understand their own identity in relation to others. The teaching activities suggested by Lee [5] may solve this problem. They were inviting native speakers, role playing, participating civic actions and providing virtual learning environments via the Internet, because learners could engage in genuine social interaction.

3 Methodology

3.1 Research Design

A collaborative action approach was used as the framework for this study [14]. The researchers worked with Teachers Jessica, Mary, and Sandra, who taught information literacy, science and English respectively. We collaboratively designed and implemented a civic action project across disciplines, based on the Big6 model [15]. The project, titled "US-Taiwan Eco-Campus Partnership Program", lasted for ten months.

3.2 Research Site and Participants

The study was conducted in Chia Elementary School in Taiwan. This school has adopted the information literacy curriculum since 2005, designed by the researchers and school teachers. The information literacy curriculum was integrated into various subject matters via the framework of inquiry-based learning, such as the Super3 and Big6 models. A

series of inquiry projects has been implemented each semester, starting at the second semester of first grade. Furthermore, English teacher Sandra has integrated various exchange activities with the U.S. and Japan since 2011, to promote students' intercultural understanding and communication in language education.

The main research site was a sixth-grade class which had a total of 30 students (15 boys and 15 girls). They were all familiar with inquiry-based learning, and their English reading abilities were much better than their spoken English due to the lack of an authentic English language environment. Moreover, what the students understood of American culture mostly came from the media, such as movies and television programs.

Mary, the science teacher, applied for the Eco-Campus Partnership program sponsored by the Taiwan government. She hoped to improve students' environmental awareness. Jessica, a teacher librarian was responsible for teaching the civic action-oriented project in information literacy instruction. Therefore, Jessica invited Mary and Sandra to execute this project collaboratively. The information literacy instruction was taught once a week over two semesters.

3.3   Research Process

Preparation Stage (7/2014~8/31/2014). Since the learning materials mostly came from the National Wildlife Federation, Teacher Jessica invited several external experts to translate and to revise the materials (e.g. videos, checklists), so that the materials corresponded to situations in Taiwan, and could be understood by sixth graders. Through several discussions, the researchers and Jessica integrated the steps of Eco-Campus as well as the Big6 models and designed the Action booklet. This booklet served as the guideline for action implementation. The researchers and teachers also clarified that the purpose of civic action was not to protest against the school or government. Instead, civic action was to solve problems and improve society starting from ourselves. To increase the interaction among students, the researchers developed an Eco-Campus website (http://echoschool.etech.ncyu.edu.tw) (Fig. 1).

Fig. 1. Eco-Campus website

Collaborative Action Stage (9/1/2014~5/2015). Since it needed more time to set up and keep partnership between the U.S. and Taiwan, the researchers and teachers designed the civic action instruction with two cycles.

- Civic action cycle I (9/1/2014~1/27/2015)
  The whole research team guided students to understand the essence of civic action and the importance of environment improvement in information literacy, science and English curricula. Then, based on the steps of Big6 and Eco-Campus, each group implemented civic actions regarding saving energy within school. Then they reflected on the results.
- Civic action cycle II (1/28/2015~5/29/2015)
  According to the action results in the cycle one, Jessica and Sandra continued to guide students to improve their civic actions, and communicated with the U.S. partners through video conferences. They shared with each other about the process and results of civic actions, in order to increase intercultural understanding.

3.4 Instrument

The Eco-Campus Test, designed by researchers and teachers, was used for a pretest and posttest. It measured students' abilities to implement a civic action and information literacy competency. It was composed of 13 questions which included one multiple-choice question and twelve open-ended items. The Cronbach's α reliability coefficient of the test was 0.804. Open-ended questions were scored 0–3 on the basis of their correctness and completeness by the first author and an independent judge. The inter-rater reliability as indicated by percentage agreement was 0.937.

3.5 Data Collection and Analysis

Data collected included interviews, participant observations, tests, and document analyses. The researchers interviewed the teachers and several students about their opinions of the instruction by asking open-ended questions such as "What are your experiences before, during, and after implementing your civic action?" The researchers also observed the teaching and learning activity each week and helped teachers collect instructional materials. The documents collected included the environmental review checklists, Eco-Campus action plans, and the information on the Eco-Campus website. All qualitative data were organized, coded, reviewed and analyzed multiple times. The quantitative test data were analyzed using a paired sample t test, which examined the differences between participants' pretest and posttest scores.

4   Results

4.1   Civic Action Cycle I

Analysis, Design and Development of Civic Action Cycle I. Sixth-grade students in Chia Elementary School have experienced nine inquiry projects using the Super3 and

Big6 models since first grade [15, 16]. They were all familiar with the inquiry process and skills. However, all of the projects involved cognitive aspects only, seldom relating to real actions. Therefore, it was rare for students to implement a civic action in an authentic situation. Students started to learn to use computers and the internet from third grade. However, teachers will not give students many assignments which required computer use, because parents worried that their children might become addicted to the Internet.

Based on the analysis above, Jessica first communicated with parents about the Eco-Campus website in a PTA meeting. Then students were allowed to use the Internet under a parent's monitoring. Students worked in groups of ten and discussed their assignments on the website. After each group established consensus, Jessica asked each group to investigate energy use within the school and identified inefficiency with the energy checklist. This was the Task Definition stage of Big6.

In science classes, Teacher Mary taught advantages and disadvantages of each types of energy and clarified Group 4's question: "*Does the solar panel manufacturing processes bring risks to our environment?*" by saying that every type of energy may cause some environmental pollution (Record 20141126). After reading related materials from the library and the Internet, the four civic action plans proposed by the four groups were the following:

Plan A: Put a small poster beside a light switch in every classroom and office, reminding people to turn off lights. After four weeks, group members would interview students and teachers about this reminder.

Plan B: Inspect each classroom to see if lights and fans were turned off during school morning assemblies. The results would be recorded on a big poster displayed on the hallway. Group members would carry out this plan for eight weeks.

Plan C: Adapt the lyrics based on the song sung by Jay Chou for energy saving, then sang to the whole school in the assembly hall and broadcasted it before students left school.

Plan D: Understand the school solar power system, and analyze its power generation efficiency. At last, group members would write a booklet of school solar panel as a narration guide for junior schoolmates.

Evaluation of Civic Action I.   According to the Eco-Campus Test results in Table 1, the paired sample t-test was significant ($t = 3.085$, $p = 0.004 < 0.05$). It meant that sixth graders acquired the overall information literacy and civic action skills after learning the civic action-driven information literacy instruction.

Table 1.   Summary of T test in Eco-Campus test

Number	Pretest		Posttest		t	p
	M	SD	M	SD		
30	25.17	10.48	28.70	8.62	3.085	.004

$\alpha = .05$

In addition to the overall statistical data, more qualitative information was analyzed below. Among four civic action plans, Plan B was the most effective one. Group leader

Wendy respected the ideas of other members and encouraged them to discuss their problems on the website to form consensus (Dis. B 20141031~1110). In the beginning, they inspected each classroom apathetically and left warnings to those who forgot to turn off the light. Then they found that middle elementary students improved their habits enormously, so they felt a sense of accomplishment, "*I feel great because it can help everyone save energy together.*" (Sheet S10). In the interview, Wendy talked about her reflection, "*Teacher usually organizes well for us in the prior project, but this time we have to do everything by ourselves. We notice more details.*" (Interview S21).

Plan C did a great job too. Through many times of trial and error, group C members finally cooperatively adapted the song "Paddle Fragrance" to "Energy Saving" and recorded it on a computer using Audacity software. After broadcasting the song to whole school, S5 wrote his feelings, "*In the beginning, I think it is a piece of cake. Then I found it is not easy at all. We need to consider so many things to get a job done. For example, do the lyrics rhyme? How can we reduce the noise when recording the song?*" (Sheet S5).

Many students expressed that they understood the importance of saving energy after implementing the action personally, "*If our action can save school electricity fee, what we save may buy more useful facilities.*" "*I remind my dad and mom to turn off lights, and remind myself not to play with water.*" (Interview 9, 5).

In sum, through the civic action, students' environmental awareness increased. They cared more about the environments around themselves. At the end of the semester, the Chia Elementary School was honored with a Silver award which meant students improved the school's environment collaboratively and effectively.

As for the intercultural understanding aspect, since the partnership between the U.S. and Taiwan was built until the end of semester, many students did not have the feeling of intercultural partnership in this cycle.

4.2   Civic Action Cycle II

Analysis, Design and Development of Civic Action Cycle II. The Energy Saving song was broadcast twice a week, but most students did not remember the lyrics, so they could not understand the meaning of saving energy. Therefore, group C members continued their action in this cycle which was to teach 30 classes of school the song in the morning. Although Group D started its action very late in cycle I, it collected much information about the solar power system in this cycle, and discussed the booklet's contents with Teacher Jessica for several times.

Teacher Sandra finally contacted Teacher Mark in U.S. via email, and set up two video conferences for introduction, sharing each other's actions, and posing questions about each other's culture. In English classes, Sandra taught students how to write action reports and self-introductions in English.

Evaluation of Civic Action II.   Ten members in Group C worked in groups of two and taught 30 classes to sing the Energy Saving song with PowerPoint for two weeks. Then they formally reviewed the song with all teachers and students in the school assembly hall. In the interview, Jessica said, "*From the students' perspective, their time and energy are limited, and they have so many other assignments needed to be done. So I am pretty*

satisfied with their performance." (Jessica inter20150205) In addition, in the lecture for action report to their U.S. partners, Group C listed two important things they learned during the action process, "*1. We have learned how to use different ways to raise people's awareness on turning off the lights. 2. When we worked together to save the earth, it was better than got 100 points on a test.*" (Lecture GC) The results supported Checkley's [11] claim that comprehensive cross-disciplinary civic-action curriculum can increase students' sense of mission, and prepare them to be participating citizens.

As for intercultural understanding, the students introduced themselves to their U.S. partners in the video conferences. They found, "*It is a great experience to talk to foreigners in English.*" "*Although our partners are younger than us, they are so outgoing and not shy at all*." (S27, S10 reflect) Group C reported its civic action and sang the *Energy Saving* song. To their surprise, the U.S. partners recognized the tune right away and asked, "*Is it Jay Chou's song?*" Several students expressed their feelings: "*We are so surprised. In the beginning, we are afraid our partners will not understand what we say and what we sing. But I worry it too much.*" "*They keep complimenting what we do. It makes me so happy. I hope next video conferencing will be more interesting than this time.*" (S19, S16 reflect) Teacher Helen also recognized that students' motivation to learn English increased, "*When they have real people to communicate with, English course becomes alive.*" (Helen inter20150508) In fact, language learning should emphasize learning how to communicate effectively rather than being able to speak like a native speaker [13]. Although both students and teachers found cultural differences among two schools, all of them agreed Helen's saying, "*The best thing to do is to share the strengths of each culture and then see what you can learn and improve from there*." (Video trans) These results verified the statement by Newton et al. [13] that intercultural communicative teaching can develop a deeper awareness of different cultures and languages.

5   Discussion and Conclusions

Based on the finding of this paper, it is feasible to promote civic action-oriented information literacy curriculum in sixth grade class. Students' problem solving skills, rational participation in public actions, and intercultural understanding improved. During the ten-month process, students first investigated the existing environmental problems of the school; then via teachers' teaching and independent information-seeking, students' related knowledge increased. Next, students developed, implemented and evaluated the civic action. In addition, students experienced intercultural communication with U.S. partners through video conferences. As Lee [5] and Newton et al. [13] state, learners' intercultural communication competency in knowledge, affection and skills can be realized in a meaningful learning environment.

However, these results could not be reached without the following key elements. They were a progressive information literacy curriculum, collaboration among teachers, the support of school administration, and integration of information technology. In conclusion, facing the needs of digital citizens in the 21st century, via real civic actions, information literacy can be practiced in interdisciplinary fields. Students then are empowered and would like to take on social responsibilities.

References

1. American Association of School Librarians: Standards for the 21st-Century Learner. American Association of School Librarians, Chicago (2007)
2. Bruce, C.: Informed Learning. Association of College and Research Libraries, Chicago (2008)
3. Lloyd, A.: Framing information literacy as information practice: site ontology and practice theory. J. Documentation **66**(2), 245–258 (2010)
4. Green, C., Medina-Jerez, W.: Project citizen: promoting action-oriented citizen science in the classroom. Sci. Teach. **79**(9), 58–63 (2012)
5. Lee, K.-Y.: Teaching intercultural English learning/teaching in world Englishes: some classroom activities in South Korea. Engl. Teach. Pract. Critique **11**(4), 190–205 (2012)
6. National Council for the Social Studies (NCSS): The College, Career, and Civic Life (C3) Framework for Social Studies State Standards: Guidance for Enhancing the Rigor of K-12 Civics, Economics, Geography, and History. NCSS, Silver Spring (2013)
7. Ministry of Education: Grade 1-12 curriculum guidelines in Taiwan. MOE, Taipei (2014)
8. American Association of School Librarians & Association for Educational Communications and Technology: Information Literacy Standards for Student Learning. American Library Association, Chicago (1998)
9. Dewey, J.: Democracy and Education. Macmillan, New York (1916)
10. Serriere, S.: The role of the elementary teacher in fostering civic efficacy. Soc. Stud. **105**, 45–56 (2014)
11. Checkley, K.: The Essentials of Social Studies, Grades K-8: Effective Curriculum, Instruction, and Assessment. ASCD, Alexandria (2008)
12. Serriere, S., Mitra, D., Reed, K.: Student voice in the elementary years: fostering youth-adult partnerships in elementary service-learning. Theory Res. Soc. Educ. **39**(4), 541–575 (2011)
13. Newton, J., Yates, E., Shearn, S., Nowitzki, W.: Intercultural Communicative Language Teaching: Implications for Effective Teaching and Learning. Victoria University of Wellington, Wellington (2009)
14. Reason, P., Bradbury, H.: The SAGE Handbook of Action Research: Participative Inquiry and Practice. SAGE Publications, Los Angeles (2008)
15. Eisenberg, M.B., Berkowitz, R.: Teaching Information & Technology Skills: The Big6 in Elementary Schools. Linworth, Worthington (1999)
16. Eisenberg, M.B., Robinson, L.E.: The Super 3: Information Skills for Young Learners. Linworth, Worthington (2007)

Country Based Studies

Information Competencies of Historians as Archive Users: A Slovenia/UK Comparison

Polona Vilar[1]([✉]), Alenka Šauperl[1], Zdenka Semlič Rajh[2], Lyn Robinson[3], and David Bawden[3]

[1] Department of Library and Information Science and Book Studies, University of Ljubljana, Ljubljana, Slovenia
{polona.vilar,alenka.sauperl}@ff.uni-lj.si
[2] Regional Archives Maribor, Maribor, Slovenia
zdenka.semlic@pokarh-mb.si
[3] Centre for Information Science, City University London, London, UK
{l.robinson,d.bawden}@city.ac.uk

Abstract. This paper reports a study of the characteristics, skills and competencies of historians, both amateur and professional, as users of archives. It makes two main comparisons: between professional historians and amateurs, typically genealogists and family historians; and between participants in Slovenia and in the United Kingdom. The study is in two parts. First, a detailed and comprehensive literature analysis, including information competencies of archivists where relevant, as well as those of users, to identify the main issues to be examined. Second, a Delphi study with a small panel of archivists from both countries, to establish consensus or divergence of opinion, and to explore the differences, if any, between amateur and professional historians, and will also investigate any national differences. The results show a high degree of consensus, and point to common issues in the skills and competencies needed by both groups, which should be explored in a larger study.

Keywords: Archives · Archivists · Historians · Information competencies · Delphi method

1 Introduction

Better understanding of the characteristics, skills and competencies of archives users is particularly important at a time when archives are increasingly becoming digital, are providing services to remote users, and also as they begin to store data collections as well as more familiar archival documents. In this paper we focus on historians, both amateur and professional, as users of archives.

2 Literature Review and Synthesis

Historians (professional and amateur) are the most investigated among users of archives [1]. Studies have generally focused on professionals, while sometimes including

amateurs; for example, a recent study by Washburn, Eckert, and Proffitt [2] on how archives users adopt social media included faculty, students and genealogists. Studies often aim at finding out the information practices of historians, their preferences regarding types and formats of materials, their attitude towards archivists and archives, and the varied purposes and impacts of archival research. As Case [3] put it, "Historical research in the archives is a multistage, iterative process. Historians may use a broad, "path-breaking" approach to research, proposing new ways of looking at old problems, or they may opt for a narrow, "microhistoric" approach, examining or documenting a specific community of interest or problem." Huvila [4] found that the empirical approach to studying archival users, in many cases historians, has strengthened in the new millennium, coincident with an increase in digital material in archives. These studies have generally used mixed qualitative and quantitative methods, including paper-based and web-based surveys, interviews, focus groups, observations, diaries, log analysis, and experiments [5–8].

Such studies have fallen into three groups [9]: materials/institution centred, focusing on materials used; product-centred, focusing on archival research results; and user-centred. This last group of studies, considering the characteristics, behaviour, competencies, etc. of archives users is of most relevance to our study. There are relatively few such studies, and these were the focus of this literature review, which resulted in a qualitative synthesis [10], identifying the themes for our subsequent empirical study.

Poole, in a major review of the literature of the area [5], gave an overview of studies of the interaction between historians and archivists over eight decades. Although studies show historians increasingly adopting digital tools, there is still a reliance on traditional means of following footnotes and references. Both primary and secondary materials are widely used: for all types of materials extent of use and perceived usefulness are not necessarily correlated. Several studies indicated that historians' information seeking strategies were less than optimal, and that it would be helpful if archivists were consulted to a greater extent, and earlier in the process. Poole concluded that the influence of digital technology, together with a better understanding of historians' information practices, will allow for more effective collaboration between historians and archivists in the future. He cited several studies calling for increased archival training and archival literacy, in the context of education of professional historians; see, in particular, Morris, Mykytiuk and Weiner [11]. More recently, Carini has proposed a framework for standards of information literacy in archives and special collections [12]. Poole's review also noted the significance for the future of the amateur historian and the citizen archivist.

Early studies found that historians use informal and personal sources, as well as formal sources to locate and retrieve information [13–16]. Beattie found that predominant sources used by Canadian historians for locating information were archivists, footnotes, and colleagues, not formal tools [17]. However, though informal sources were more frequently *used* by these historians "they are not more *useful* than the formal descriptive tools available." Cole found that history doctoral students had different ways of processing information which affect their knowledge formulation: holistic and serialistic [18]. Another finding of Cole's study is that besides using textual materials these historians were increasingly using non-textual forms such as photographs and oral histories. A study by Stieg Dalton and Charnigo found that some information practices

of historians have remained the same, such as finding information in book reviews, browsing, and carrying out comprehensive searches [19]. Although there was still a preference for printed sources, historians had begun to use digital databases, catalogues and indexes.

These patterns appear not to have changed much in a decade, as Sinn and Soares noted that historians show similar information behaviors with digital collections [9]. Chassanoff claimed that it is not possible to identify from the literature which would be historians' preferred search and retrieval strategies in archival settings [8], However, she also found that historians' preferred ways of locating primary sources are finding aids, archivists and citation linking; the methods deemed most useful are not necessarily the most frequently used, due to experience, availability, etc. She also argued that "rather than focusing solely on frequency of use, or facilitating better search and retrieval methods, archivists should consider how information needs adapt and change as new knowledge is acquired."

Duff identified patterns of user behaviour from the literature, finding that too little information was provided for effective archival reference service, and that finding aids were heavily consulted and highly valued, as were system help features [20], which substituted for the help of an archivist. Duff and Johnson explored the information behaviour of professional genealogists, finding researchers predominantly searching for personal names, sometimes place names, dates, and genres, only occasionally seeking advice from archivists and colleagues, and rarely consulting formal sources such as finding aids [21]. They identified barriers in the search process: the provenance-based organization of finding aids is not user friendly, especially to novice researchers, while distributed systems without a central search portal, and time constraints, were problematic. Freund and Toms carried out a lab-based study of ways in which historians and genealogists used printed and digital archive finding aids [22]. The participants used a variety of strategies for interacting with the finding aids; although they were generally successful in completing the tasks, there was some evidence that they were confused by an "archival world view" instantiated in the finding aids; see also [23] on findings aids as a distinct genre of document.

Lybeck found that in digital archives researchers are beginning to show non-traditional behaviours which has probably to do with their general experiences with using tools such as online databases and digital libraries [24]. Digital archives are increasingly seen as just another digital library [5]. Seadle made the point that the most basic information activity of historians - reading and scanning - is considerably altered as visits to physical libraries and archives are increasingly replaced by remote engagement with digital texts [25].

Tibbo found that US historians utilized a wide range of primary materials and also of sources and tools, from paper materials to online databases, web searching and repositories, but lacked knowledge of the content of digital sources, and even of the existence of electronic finding aids [26]. Recommendations were that archivists should become more proactive in user education and that they should dedicate more attention to archival finding aids tailoring them to the users' needs; more recently Cook made a similar call for greater attention to the relative characteristics, knowledge and skills of historians and archivists, which would reflect in an enriched archival practice [27]. A similar study

in the UK found that although historians work in different ways, there are still some common patterns of behavior and preferences; the main factor explaining historians' information-retrieval behaviour is the type, or genre, of the information source [28].

Duff, Craig and Cherry carried out questionnaire studies of Canadian academic historians, finding that historians use what is available to them, but wish for more sources, particularly digital, use a variety of document types and formats, want better and faster access to finding aids, and value archives for the completeness of their collections [29, 30]. Among the most valued sources were finding aids, footnotes, and archivists; most preferred to use the original format of materials, but also valued electronic access and digital reproduction. Chasanoff also investigated academic historians, using a web survey, finding an awareness of, and interest in, new technological developments, the quality of digitized materials, and recognition of the archivists' expertise in the digital environment [8]. Sinn and Soares found that historians' sources of information about the existence of digital archival collections were mainly informal and personal [9].

Sinn surveyed historians' experience and perception of digital archives, finding that they behave similarly to other users of digital libraries, generally finding out about databases through informal means, and, if interested in the content, being prepared to learn to make best use of even an unfriendly interface [31]. They saw drawbacks and benefits in technology: drawbacks are mentioned in connection to poor quality of images, lack of diversity, non-searchability; benefits include mainly in easing searching and access, saving time, and having items universally available. This, and other studies, show an increasing reliance on general web search engines, to find resources, rather than archive-specific systems [9, 26, 32–35]. Sinn and Soares [9] therefore conclude that digital project developers should try to make their entire collection database indexable by search engines.

Some studies also show that perceptions of historians towards digital materials is that they are not as reliable as traditional sources [36–38], and that digital technologies change patterns of behaviour [39]. Elena et al. found that historians exhibit quite sophisticated retrieval competences, concluding that the perceptions of historians that digital resources are less useful and less reliable may be related to the limitations in the functionalities of archival information retrieval systems [37].

From this literature synthesis, the following themes emerge as needing further investigation with respect to historians' use of archives: the differences between amateurs and professionals; the changing relation between use of physical and digital materials; the user skills and competences needed, particularly in the digital environment; and the changing role of the archivist in supporting historians, as archives become increasingly digital.

3   Research

3.1   Research Problem and Research Questions

That there are significantly different issues in information literacies and competencies in the archival context is well established [40], and is confirmed by the literature analysis. This study made two comparisons of specific user groups: between professional

historians and amateurs, the latter often skilled and sophisticated in their 'serious leisure' information practices; and between participants in Slovenia and the United Kingdom, variations here perhaps resulting from differing national histories, cultures and political systems. The research questions were:

1. What are the main types of archival materials used by historians?; are there differences between professionals and amateurs?
2. What are the attitudes of historians towards physical archive materials, compared to digital materials?; are there differences between professionals and amateurs?
3. What are the main skills and competences needed for effective use of archives?; are these competences and skills changing, and if so, how?
4. Are there notable differences in skills and competences of archives use between amateur and professional users?; if so, how do these manifest?
5. How, if at all, does the role of the archivist differ in supporting amateur and professional users?

3.2   Methodology

A Delphi study was used in this phase, being particularly valuable in identifying consensus or divergence of opinion, and increasingly used in information behaviour research [41]. The expert participants were archivists; the validity of using expert opinion of this sort to investigate archive users behaviour has been demonstrated [40, 42]. In Slovenia there were five participants, in the UK four, in both cases coming from national and regional archives. Although this number is relatively small for a Delphi study, it was sufficient to provide the necessary information for this initial study. The Slovenian participants were all professional archivists, with qualifications in history, and also had experience working with users. In fact, the majority of archivists in Slovenia are historians, although in most Slovenian archives the reading room staff are not professional archivists, but rather "technical staff", usually with only high school qualifications. Data was gathered in April and May 2016 using email for communication.

There were two rounds, identical in both countries. In the first round the participants provided answers to the five research questions above. In the second round the participants were shown a summary of answers from both countries, grouped around the same five thematic units, and invited to add or revise opinions, additional thoughts, and comments. Although the number of participants was small, there seemed to be a distinct difference in the second round responses, in that Slovenian participants were less comfortable expressing dissent or criticism. This may be due to a difference in the cultural traditions of the two countries, and may raise methodological issues; namely, it would be worth investigating further for its effect on use of Delphi and similar methods in culturally mixed settings.

4   Results and Discussion

4.1   The Main Archival Sources Used by Historians

There was consensus in both countries that a very wide variety of sources are used, which confirms findings of most older and newer studies. UK participants felt that archivists are not necessarily aware of those which are most important for, and used by, particular user groups. Some Slovenian archivists mentioned "more popular" fonds[1], some of them specific for the particular archive.

There was a lack of consensus in both countries as to whether this applied equally to all users. Some respondents felt it did, others thought it reasonable to distinguish professionals (likely to be more aware of the background of the documents being examined, and potentially prefer to focus on less well known sources) and amateurs (who may prefer well-known 'easy'-to-use sources, such as printed rather than possibly difficult to read handwritten sources, and rely on secondary sources for background).

4.2   Attitudes of Historians to Physical and Digital Materials

There was consensus in the UK, and general though not unanimous consensus in Slovenia, that there was no distinction between professionals and amateurs in this respect; but there was no consensus as to the nature of the preference. When asking this question we did not differentiate between digitized and born digital material. Neither did these differences appear from the participants' responses. One viewpoint, more pronounced in Slovenia, was that both groups preferred digital materials for convenience and ease of use; a UK participant was surprised by this, and speculated that it might reflect different national practices in respect of digitisation, indexing and metadata. It should be noted that in Slovenia there are few digital collections of archival material or finding aids available online. It is possible that such user preference may be more pronounced when users do not realize exactly what 'online availability' means. This finding is also interesting in light of other studies [36–38] which found some user reluctance towards digital materials. An alternative viewpoint, more pronounced in the UK, and later agreed with by one Slovenian participant, was that both groups preferred physical materials, although this situation is changing. Those Slovenian participants who believed that there was a difference in the preferences of professional and amateur users did not agree which preferred the digital and which the physical. UK participants, and one Slovenian, noted that amateurs sometimes had problems with interpretation of digital materials, not fully understanding the context of the page they were viewing. One participant noted high user expectations regarding technology ("They are looking forward to digitization."). Another saw the value of digitisation of materials and metadata to facilitate access, while one also noted that digital surrogates are useful from a preservation point of view.

---

[1] The entire body of records of an organization, family, or individual that have been created and accumulated as the result of an organic process reflecting the functions of the creator. (Source: *A Glossary of Archival and Records Terminology*. Chicago, Ill.: Society of American Archivists, http://www2.archivists.org/glossary/terms/f/fonds).

There was no consensus about the influence of age on this preference: while there was a residual liking for physical material among older users, and typically an automatic enthusiasm for digital among younger users, there was also an excitement among some younger users in accessing original physical items.

4.3   Skills and Competences of Historians for the Use of Archives

There was consensus in both countries that traditional archival skills and competencies had not lost their importance, but that they had been complemented by requirements for newer technology-related competencies. This is consistent with earlier findings [5, 24–26].

In both countries, archival skills (such as understanding archive structure and processes, descriptions and finding aids, dealing with archivists, paleography, ability to read relevant old languages and scripts) and technical skills (including understanding metadata, searching, handling digital images) were identified as important. One UK participant noted that the decline in knowledge of Latin among archivists as well as researchers of both kinds, "renders vast sections of medieval and early modern archives increasingly inaccessible". This point does not seem to have been recognised before, and has implications for education and training of archivists.

UK participants also identified general research skills (including time management, note-taking, reference citing), and the need of some users (both amateur and professional) for very basic help in computer use, information searching, reading documents, and making photographic records. Some Slovenian archivists could not identify with these points, while some agreed.

Slovenian participants identified as important a background knowledge of the geographical area, and of the social structure, significant individuals, administration history, and organisation of administration in general. One UK participant also identified with this need, as respects the complexities of the evolution of the Greater London area.

4.4   The Differences Between Professional and Amateur Historians

For UK participants, there was a general, though not universal, consensus, that experience in archival research matters more than the professional/amateur distinction in all aspects, including technical skills, archive materials and structure, search techniques, dealing with archivists. This view was also expressed by a minority of Slovenian participants. Another view was that there may be differences between UK and Slovenian users as a consequence of different archives structures in each country, and also as a consequence of cultural differences which causes Slovenian users to come with very vague research ideas – the latter may be due to being less trained for higher-order thinking (such as critical attitude, creativity) during schooling and in everyday life (but this rather sociological view would certainly need further thorough and interdisciplinary investigation).

For the Slovenian participants, there was no consensus as to whether there was any significant difference between amateurs and professionals; those who identified differences focused on the nature of the queries put to the archivist, professionals stating their needs more precisely and understanding better what is likely to be found. One participant

remarked that the two groups generally address different kinds of research topics; similarly, one UK participant noted that the purpose and scope of the research outweighed other considerations. Two Slovenian participants noted that even among amateurs there are big differences: some are very skilled and thorough, but some are not.

There was a general consensus in both countries that amateurs needed, and accepted, more assistance with selection and use of sources, with the research process, and with specific skills such as reading old languages and difficult handwriting. However, there was also consensus that professionals, even if experienced, would sometimes benefit from the advice of an archivist, while some amateurs had considerable research skills. This is similar to earlier findings [5, 21].

4.5 The Role of the Archivist in Supporting Historians

There was consensus that there is a need to support both groups of users, and to have the same general attitude toward them.

There was consensus in Slovenia, and near consensus in the UK, that there should be an explicit recognition that different types of users need different support: for example, amateurs may ask for more assistance and explanation throughout the whole process, but professionals, especially if inexperienced, may believe themselves more competent than they are, and not ask for archivists' help when they need it. A minority viewpoint, from the UK, is that there is not, and should not be, any difference in the assistance offered to different user groups; rather archivists should respond to individual needs.

There was also some indication of consensus that archivists felt differently towards different types of users. UK participants commented that professional historians can be intimidating for archives staff, particularly because historians assume that all archivists have a high level of knowledge of all the collections. Since Slovenian archivists are typically historians, this issue does not arise to the same extent, although it was recognised by one Slovenian participant. As noted earlier, Slovenian reading room staff are typically neither archivists nor historians, and when help is needed, users have to address their questions not to them but to the archivists in charge of the specific collections or fonds.

Another issue raised by one Slovenian participant was that archivists' help is not acknowledged when historians use parts of information from descriptions (for instance, element 3.2.2 Administrative/Biographical history from ISAD(g) prepared by archivists) and include them into their work without proper citing; this finding is in contrast to other studies [8, 29, 30], which all noted that the archivist's help was appreciated.

It was also said that work with users is often gratifying and that archivists learn a lot from them. The Slovenian participants agreed that working with amateurs was particularly satisfying, perhaps because they appreciate archivist assistance more than professionals: "Working with an amateur historian is gratifying, since I can help 'the enthusiastic swimmer in the ocean'".

5   Conclusions

The main findings of our pilot Delphi study regarding archivists' opinions on amateur and professional historians can be summarised as follows:

- There was high degree of consensus between the archivists in both countries in virtually all topics, with differing opinions only in detail.
- The archivists believe that the two users groups are generally similar, and outweighed by personal characteristics and research needs. Differences are due to the historical and geographical context, legislative background and availability of material.
- Both user groups need assistance, but in rather different ways. The needs of the amateur are more evident, perhaps because they are more readily expressed, but are not necessarily greater.
- Both user groups use a wide variety of sources, with professionals focusing more on primary sources for which specialized knowledge and skills are needed.
- Traditional skills are still needed; some are being lost. New digital skills are needed; basic computer/information literacy skills are sometimes lacking regardless of user group.
- The archivist/historian relation may be difficult for various reasons.

Certain methodological issues regarding how the Delphi study was conducted were also raised, stemming from cultural differences of the participants from the two countries. In the case of working with respondents who are reluctant to share critical opinions, one should carefully consider the methods of eliciting these. We are also aware that users should not be studied indirectly via opinions of practitioners who work with them. However, due to the archival community not being as accustomed to doing user studies as other information providers (especially the case in Slovenia), the Delphi study was chosen as a starting point.

These findings suggest points for further investigation, since this Delphi study was only an initial step in our research, and as such does not allow generalizations. A detailed study of archival information practices in the two groups – if indeed it is valid to think of these groups, rather than individual practitioners – is necessary, focusing particularly on generational changes in attitudes, and on the changing role of the digital and the physical. In terms of competencies, further study is needed on how best to impart both archival and research skills including basic computer/information literacy, and background knowledge, including language knowledge (especially of the languages needed for study of older materials), and the historical/geographical context necessary for adequate interpretation of the materials. There is also the issue of how best to support archivists in their role of supporting users.

References

1. Pugh, M.J.: Providing Reference Services for Archives and Manuscripts (Archival Fundamentals Series II). Society of American Archivists, Chicago (2005)

2. Washburn, B., Eckert, E., Proffitt, M.: Social Media and Archives: A Survey of Archive Users. OCLC Research, Dublin, Ohio. http://www.oclc.org/content/dam/research/publications/library/2013/2013-06.pdf/ (2013)

3. Case, D.: The collection and use of information by some American historians: a study of motives and methods. Lib. Q. **61**(1), 61–82 (1991)

4. Huvila, I.: Participatory archive: towards decentralised curation, radicaluser orientation and broader contextualisation of records management. Arch. Sci. **8**(1), 15–36 (2008)

5. Poole, A.H.: Archival divides and foreign countries. historians, archivists, information-seeking, and technology: retrospect and prospect. Am. Archivist **78**(2), 375–433 (2015)

6. Toms, E., Duff, W.: I Spent 1 1/2 hours sifting through one large box: diaries as information behavior of the archives user: lessons learned. J. Am. Soc. Inf. Sci. Technol. **53**(14), 1232–1238 (2002)

7. Anderson, J.E.: Using professional forums to assess historians' e-resource needs. Collection Build. **28**(1), 4–8 (2009)

8. Chassanoff, A.: Historians and the use of primary source materials in the digital age. Am. Archivist **76**(2), 458–480 (2013)

9. Sinn, D., Soares, N.: Historians' use of digital archival collections: the web historical scholarship, and archival research. J. Assoc. Inf. Sci. Technol. **65**(9), 1794–1809 (2014)

10. Bawden, D.: On the gaining of understanding; syntheses, themes and information analysis. Lib. Inf. Res. **36**(112), 147–162 (2012). http://www.lirgjournal.org.uk/lir/ojs/index.php/lir/article/view/483

11. Morris, S., Mykytiuk, L.J., Weiner, S.A.: Archival literacy for history students: identifying faculty expectations of archival research skills. Am. Archivist **77**(2), 395–398 (2014)

12. Carini, P.: Information literacy for archives and special collections: defining outcomes. Portal: Libraries and the Academy **16**(1), 191–206 (2016)

13. Conway, P.: Research in presidential libraries: a user survey. Midwestern Archivist **11**(1), 33–56 (1986)

14. Maher, W.J.: The use of user studies. Midwest. Archivist **11**(1), 15–26 (1986)

15. Stevens, M.: The historian and archival finding aids. Georgia Archives **5**, 64–74 (1977)

16. Uva, P.A.: Information Gathering Habits of Academic Historians: Report of the Pilot Study (Syracuse) (1997)

17. Beattie, D.L.: An archival user study: researchers in the field of women's history. Archivaria **29**, 33–50 (1990)

18. Cole, C.: Information acquisition in history PhD students: inferencing and the formation of knowledge structures. Lib. Q. **68**(1), 42 (1998)

19. Stieg Dalton, M., Charnigo, L.: Historians and their information sources. Coll. Res. Libraries **65**(5), 400–425 (2004)

20. Duff, W.: Understanding the information-seeking behaviour of archival researchers in a digital age. In: Proceedings of the DLM-Forum 2002: @ccess and Preservation of Electronic Information: Best Practices and Solutions: Barcelona, 6–8 May 2002, pp. 331–335. Office for Official Publications of the European Communities, Luxembourg (2002)

21. Duff, W., Johnson, C.A.: Accidentally found on purpose: information seeking behavior of historians in archives. Lib. Q. **72**(4), 472–496 (2002). http://www.jstor.org/stable/40039793

22. Fruend, L., Toms, E.G.: Interacting with archival finding aids. J. Am. Assoc. Inf. Sci. Technol. **67**(4), 994–1008 (2016)

23. Trace, C.B., Dillon, A.: The evolution of the FA in the Unites States: from physical to digital document genre. Arch. Sci. **12**(4), 501–519 (2012)

24. Lybeck, J.: Archival education in Scandinavia. Arch. Sci. **3**(2), 97–116 (2003)

25. Seadle, M.: Managing and mining historical research data. Lib. Hi Tech. **34**(1), 172–179 (2016)
26. Tibbo, H.R.: Primarily history: historians and the search for primary source materials. In: JCDL 02: Proceedings of the 2nd ACM/IEEE-CS Joint Conference on Digital Libraries, pp. 1–10. ACM, New York (2002)
27. Cook, T.: The archive(s) is a foreign country: historians, archivists, and the changing archival landscape. Am. Archivist **74**, 600–632 (2011)
28. Anderson, I.G.: Are you being served? Historians and the search for primary sources. Archivaria **58**, 81–129 (2004)
29. Duff, W., Craig, B., Cherry, J.: Finding and using archival resources: a cross-canada survey of historians studying canadian history. Archivaria **58**, 51–80 (2004)
30. Duff, W., Craig, B., Cherry, J.: Historians' use of archival sources: promises and pitfalls of the digital age. Pub. Hist. **26**(2), 9–22 (2004)
31. Sinn, D.: The use context of digital archival collections: mapping with historical research topics and the content of digital archival collections. Preservation Digital Technol. Culture **42**(2), 73–86 (2013)
32. Jordanova, L.: History in Practice. Hodder Arnold, London (2006)
33. Southwell, K.L.: How researchers learn of manuscript resources at the western history collections. Archival Issues **26**(2), 91–109 (2002)
34. Hill, A.: Serving the invisible researcher: meeting the needs of online users. J. Soc. Archivists **25**(2), 139–148 (2004)
35. Prom, C.J.: User interactions with electronic finding aids in a controlled setting. Am. Archivist **67**(2), 234–268 (2004)
36. Maxwell, A.: Digital archives and history research: feedback from an end-user. Lib. Rev. **59**(1), 24–39 (2010)
37. Elena, T., Katifori, A., Vassilakis, C., Lepouras, G., Halatsis, C.: Historical research in archives: user methodology and supporting tools. J. Digital Lib. **11**, 25–36 (2010)
38. Graham, S.: Historians and electronic resources: patterns and use. J. Assoc. History Comput. **5**(2) (2002). http://hdl.handle.net/2027/spo.3310410.0005.201
39. Rumer, J., Schonfeld, R.C.: Supporting the Changing Research Practices of Historians: Final Report from ITHAKA S+R, p. 11 (2012). http://www.sr.ithaka.org/sites/default/files/reports/supporting-the-changing-research-practices-of-historians.pdf
40. Vilar, P., Šauperl, A.: Archival literacy: different users, different information needs, behaviour and skills. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 149–159. Springer, Heidelberg (2014). doi:10.1007/978-3-319-14136-7_16
41. Poirier, E., Robinson, L.: Slow delphi: an investigation into information behaviour and the slow movement. J. Inf. Sci. **40**(1), 88–96 (2014)
42. Vilar, P., Šauperl, A.: Archives, Quo Vadis et Cum Quibus? Archivists' self-perceptions and perceptions of users of contemporary archives. Int. J. Inf. Manag. **35**(5), 551–560 (2015)

Developing Information Literacy Skills Lesson Plans Integrated into the 6th Iranian Primary Science Curriculum Based on the Big6 Model

Fatima Baji[1(✉)], Carole Haeusler[2], Zahed Bigdeli[3], and Abdullah Parsa[3]

[1] Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
Baji-f@ajums.ac.ir
[2] University of Southern Queensland, Brisbane, Australia
Carole.Haeusler@usq.edu.au
[3] Shahid Chamran University of Ahvaz, Ahvaz, Iran
bigdelizahed20@gmail.com, Abdparsa@gmail.com

Abstract. Since there is a lack of IL skills instruction in the education system of Iran, especially in primary schools, this research developed IL skills lesson plans integrated into the 6th grade Iranian primary science curriculum. This study was conducted using a Delphi method included in the instructional design. Using a snowball sampling method, a sample of 12 6th grade teachers from public primary schools in Ahwaz was chosen for the expert panel. The Delphi process stopped after achievement of consensus and stability of results in the third round. In sum, the developed and confirmed the *Unit Plan for 11th and 12th Units of the Iranian 6th grade science curriculum integrated into the Big6 model* and 5 *Lessons in context* can used as the initial framework for developing the IL skills lesson plans in other curricula and subjects in order to upgrade and improve the IL level of the Iranian primary school students.

Keywords: Information literacy instruction · Information literacy curriculum · Primary science lesson plans

1 Introduction

The term "information literacy" (IL) was introduced by Zurkowski in 1974 [1]. Information literate people are those who have been trained in how to access and incorporate information resources in their field of work and can use information tools to solve problems [1]. Literacy researchers [2–4] believe that an education system should equip students with all types of new literacies including computer literacy, digital literacy and information literacy. In other words, education systems should have programs to teach necessary skills for searching and organizing the information and effective use of it. Accordingly, the link between information literacy and learning had led educational institutions and systems to integrate IL skills with their curricula [3, 5]. Eisenberg [6] believes that education is fundamentally information-based and each aspect of learning and education needs information searching, collecting, synthesizing and exchange. Other researchers [2, 4, 7–11] also see the

importance of IL for its potential to encourage deep learning rather than shallow learning as of one the critical skills for lifelong learning.

With the release of IL standards by the American Library Association (ALA) in 2000, bibliographic instruction in libraries gradually transformed to IL and critical thinking skills instruction. Since then, academic and school librarians and IL experts have shaped the concept of IL instruction and integrated it into curricula [12]. The importance of IL skills instruction in primary and secondary schools and its relation to lifelong learning has led to dramatic shifts in education system of many countries like United States, United Kingdom, France, Australia, etc. [13]. There is a large body of international research on IL skills instruction and the integration of these skills into curricula [2, 4, 14–18]. Leading studies in IL instruction have been carried out in various countries around the world, for example; the United States [19–21], Botswana [22], Malaysia [23], Thailand [24] and Taiwan [25]. These studies show how effective lesson plans can be developed by integrating IL into the school curriculum.

2   Problem Statement

In Iran recently, the Ministry of Education recognised a need for education system reformation and as part of its agenda, began developing national programs and documents in order to make fundamental changes in the educational system. The *National Document of Educational Development in the Twenty Years Perspective [26],* the *Document of Fundamental Revolution in Education [27]* - and the *Document of National Curriculum [28]* are some of these documents.

IL field research in Iran began in the late 1990s and one of the first articles in IL area argued for the necessity of IL instruction in schools [29]. Until 2004 the number of IL studies was less than 5 per a year with most of the IL research in Iran being done during the 2000's decade. A closer investigation of IL research undertaken since this decade, shows that only a small number of studies have focused on IL instruction in the K-12 setting and the development of lesson plans which are integrated it into the curriculum [30–33]. In a review of the IL literature in Iran, Yari [34] concluded that most of IL research was done at the academic level and has had no impact on Iranian education policy and national documents [35]. Also, other research in Iran shows that IL skills, school libraries and librarians have not had an important place in the primary curricula, documents, and textbooks [36–38]. Moreover, despite the emphasis of the national education documents on the need for transformation in teaching methods and approaches and the use of active and research based teaching methods, traditional teaching methods are still common in Iranian schools. Consequently, the school library does not have an important role in the school curriculum; the school library and classroom are two distinct worlds [39]. This problem is more evident in Iranian primary schools than secondary schools. In Iran, the system of education is text-based and school teaching for most of the curricula involves lecturing, repeating and practice. This means that students and teachers do not feel a serious need to use the school library. This has led to the weakening and in some instances, the removal of primary school libraries from the educational process.

Since there is a lack of IL skills instruction in the education system of Iran, especially in primary schools, integrating IL skills instruction into school curriculum could be the way of achieving an active education system and transforming teaching and learning methods. This research used the Big6 model to develop information literacy skills lesson plans integrated with the Iranian primary science curriculum. This research is part of a wider study that will evaluate the efficacy of these IL skills lesson plans in the Iranian 6th grade classroom context.

3   Theoretical Framework

IL skills instruction and models are related to lifelong learning concept. Limberg, Sundin and Talja [11] investigated the approaches in IL research from three different perspectives, namely, phenomenography, socio-cultural and Foucauldian discourse analysis. In the phenomenological approach, the emphasis is on the use of information rather than seeking and finding, which are often insisted on in practices of IL education. Bruce [2] claims that providing information and its technology is not sufficient because an education system requires powerful and competent learners who are learning constantly and are able to find their place in the emerging information society. Bundy [4] also considers IL as subset of the lifelong learning process. The sociocultural perspective emphasises the relationship between individuals and various forms of collective practices and acknowledges that information seeking is carried out for a specific purpose in a specific practice [11]. In contrast, the discourse analysis perspective on IL captures the socially and culturally shaped ways of understanding IL and its practices.

IL research and models also have strong link with constructivism theory in education. Most IL literature is formed by constructivists who emphasise individuals as the active and independent creators of the meaning in the information seeking process [16]. Sundin [5] believes that IL, set in a pedagogical framework based on constructivism and cognitive oriented learning theory, focusses on the user developing an understanding the information seeking process. This means that it is not the user's behaviour that is treated but rather how the user should think about this behaviour. To become information literate is thereby partly a question of becoming aware of the different elements of the process. Savolainen [17] explains that, unlike the former view of IL as just a set of skills in which information users were inactive parts of the information processing system, in the constructivist approach, information users are the creators of their learning environment and have an active role in the information processing system [40].

In developing IL models, especially the process models, most IL specialists are inspired by Bloom's Taxonomy [41]. This taxonomy, formed in 1950s, organizes a set of learning objectives that are displayed as a hierarchy of educational processes. Bloom's educational goals are divided in three domains: cognitive, affective and psychomotor. In 2001, Anderson, Krathwohl and Bloom [42] revised the terms in Bloom's Taxonomy from a passive to active form of thinking and this revised taxonomy is often used to align IL skills and curriculum learning objectives. The Big6 instructional model of Eisenberg and Berkowitz [43], the IL model of Keene, Colvin and Sissons [41], and the integrated IL instruction framework of Kessinger [44] are built based on the revised

Bloom's taxonomy. There are several information process models for teaching and reinforcing the research and problem-solving processes. Chen et al. [45] report five major models which have been developed for IL processes. These are Kuhlthau's information-seeking behaviour model, Eisenberg/Berkowitz's The Big6 information problem-solving model; Irving's information skills model; Pitts/Stripling's research process; and New South Wales' information process.

The Big6 model is the most widely used model of IL education in schools worldwide [6] and was chosen in this research as the tool to integrate IL with the Iranian primary science curriculum. This model is used as a framework to examine the effectiveness of an inquiry-based approach in developing IL skills lesson plans and integrating them into the Iranian primary science curriculum. The Big6 model is a systematic approach which has 6 components: *Task Definition, Information Seeking Strategies, Location & Access, Use of Information, Synthesis and Evaluation*. Each main component is then subdivided into two sub-skills, the "Little12", which are questions the learner needs to answer to become better engaged in the process of gathering appropriate, necessary and relevant information [46]. Although the Big6 is a systematic process, it does not have to be used in a linear manner. It does not require students to use a set of procedure but caters for students' differing learning styles by offering a choice of activities. Eisenberg and Berkowitz [46] claim the Big6 Skills are best learned when integrated with classroom curriculum and library skills instruction as it allows teachers to apply these skills to real-world problems with every step. Additionally, the process includes an evaluation step, which some other models omit. IL includes inquiry, research and problem solving skills [20], and its instruction needs cooperation of a training team that is composed of librarians and instructors in various contexts such as universities and schools. In other words, the nature of IL instruction requires it to be integrated into the curriculum as well as the classroom. The Big6 process is applicable for all subject areas and across the full range of grade levels [46] and as a set of basic, essential life skills can be applied across situations to school, personal and work settings.

In summary, the current body of literature reveals a wide use of The Big6 model in K-12 classrooms [19, 20, 47, 48] and shows positive results of training in library and problem-solving skills and the integration of IL instruction into the curriculum. In addition, IL instruction has improved other skills like critical thinking and problem solving and has changed students' attitudes towards librarians and their role in saving the time and reducing the effort for finding the information seeking process. Students are learning IL skills with process models, such as Kuhlthau's ISPA model and Eisenberg's and Berkowitz's The Big6 model, which connect students to real-world use of information. The entire framework of IL using such process models is embedded in constructivist learning theory. Furthermore, there is a large body of IL studies that claim IL instruction should be integrated across all content areas through inquiry-based or problem-solving learning [25, 49, 50].

4   Purpose/Aim

The main objective of this study is to develop and evaluate IL skills lesson plans by:

- Using the Big6 model to integrate the 6th grade Iranian primary science curriculum, the classroom and the school library
- Using the iterative Delphi process to use feedback from year 6 classroom teachers to modify the original lesson plans.

This study is one of the first studies in the field of integrating IL skills in the primary school level in Iran and, it will be a unique study from the perspective of IL instruction in Iran.

5   Methodology

This study was conducted using a Delphi method and according to the process of lesson plan development, pre-Delphi activities and study done based on the Big6 skills principals as follows.

5.1   Pre-Delphi Activities – Writing Lesson Plans

Eisenberg and Berkowitz [46] do not promote new curriculum content, units, and topics. In their opinion, one of the current problems in education is "curriculum information overload" meaning there is too many topics and too much content to cover in a limited time during the school year. Thus, from the perspective of the Big6 model the challenge is to determine good opportunities for learning and teaching Big6 skills within the existing curriculum. This involves the following steps:

1. Analyzing the curriculum to select units and assignments that are well suited to Big6 skills instruction
2. Determining which of the Big6 skills are particularly relevant to the selected curriculum units and assignments
3. Developing a broad plan that links the Big6 to various curriculum units
4. Designing integrated unit and lesson plans to teach the Big6 in the context of the subject area curriculum [46, p. 34].

In search of the appropriate curriculum for integration with the Big6 skills model, initial investigation in Iranian primary school text-books showed that the science curriculum is more research-based than other curricula and is the best match of the Big6 model and curriculum content. Following the three steps listed above, the Iranian 6th grade science textbook [51] and the 6th grade science textbook teacher's guide [52] were analysed. The 11th *(Wonders of the leaf)* and 12th (*For whom is the jungle?*) units were selected as the best well suited for developing the lesson plans. Draft lesson plans items were extracted from the 11th and 12th units according to the basic curriculum design essentials. Next, these items were integrated into the Big6 model by using the following: the *Teaching Information & Technology Skills: The Big 6 in elementary schools* book (Eisenberg & Berkowitz, 1999), *The Big6 Instructional Unit Design [53] and Lesson in context [54] Templates* accessed through The Big6 website: www.big6.com.

5.2 Delphi Process

The Delphi technique is used to reach consensus in a field where a lack of agreement or incomplete knowledge is evident [55] and is a widely used and accepted method for gathering data from respondents within their domain of expertise [56]. Theoretically, the Delphi process can be continuously iterated until consensus is achieved and respectively, it is characterized for iteration, controlled feedback and statistical response [55]. In the Delphi technique a consensus between 51%–100% is desirable.

The Expert Panel. The validity of a Delphi study depends on the panellists and the size of the panel. The size of the panel is determined by the homogeneity of the group from which the panellists will be chosen. In the case of homogeneity, a sample of between 10 to 15 people can yield sufficient results [55]. The investigators selected the public primary schools in Ahwaz city in south western of Iran for doing the research because the community of the teachers is homogenous, enabling a panel size of 10–15 to be selected for the Delphi process. Using a snowball sampling method, a sample of 12 6th grade teachers from public primary schools in Ahwaz was chosen for the expert panel. All participating teachers were volunteers and had at least 8 years of experience in teaching in the primary school level. Formal permission to conduct this research was granted by the department of education in Ahwaz city.

Table 1. Example of the open-ended questionnaire

Lesson plan item: unit goal or rationale of the lesson
Investigator's explanation: In this item we determine the objectives that we want students to know, do and be like when they finish this lesson of study
Suggested item content for the 11th and 12th units of the 6th grade Science curriculum: Express the importance of the natural environment and ecosystem and its effects on the animals life Suggest ways to preserve the natural environment around them Write a class report about the nutritional relationship between the creatures living on their local environment
So, do you think that this item is necessary? If No: Please explain why? If yes: How do you evaluate the content of this item? ☐Incomplete and needs revision ☐excellent Please add your comments and suggestions here:

Round 1. In the first round, the Delphi process usually begins with an open ended questionnaire which serves as the basis for requesting specific information from the Delphi subjects about a content area [56]. In the current study, items from the extracted lessons plans, together with some explanation of the content of the lessons, were distributed among the panel of experts. The panel members were asked to comment on which items would be necessary for developing the Information Literacy Skills within science lesson plans for the two selected curriculum units. Table 1 shows part of the open-ended questionnaire. In summing up the panellists' points of view about the lesson plans items and the Big6 model guidelines and initiatives for integration in the curriculum the

researchers were able to develop a revised Unit Plan for 11th and 12th Units of the Iranian 6th grade science curriculum integrated with the Big6 model. In this study the revised unit will be called *Science Unit plan*, comprising five *Lessons Plans* based on the Big6 information skills.

As a result of the teachers' feedback, the following items in Table 2 were used as a basis for developing the science unit plan. The following items were used for lesson plans: *General goals; The Big6 model objectives: Cognitive, affective, and behavioural; Learning activities; and Assessment*.

Table 2. The science unit plan items

#	Science unit plan items	
1	Unit goals	
2	Unit overview	
3	Big questions	
4	Content objectives	
5	The Big6 objectives	A: Task definition
6		B: Information seeking strategies
7		C: Location & access
8		D: Use of information
9		E: Synthesis
10		F: Evaluation
11	The expression of what learned	
12	Evaluation	
13	Teaching media	
14	Learning activities	

Round 2. In the second round, each Delphi panellist received a second questionnaire and was asked to review the items summarized by the investigators based on the information provided in the first round. Accordingly, Delphi panellists were required to rate or "rank order" items to establish preliminary priorities among items. As a result of round two, areas of disagreement and agreement can be identified [56]. In the second round of the current study draft *Lesson Plans* were developed by the researchers based on the resultant items in the first round. These *Lesson Plans* were sent to the panellists along with evaluation forms. They were asked to read the description of each item in the content of the lesson plans and rate it on a Likert scale from 1 to 5, where 1 = completely disagree, 2 = disagree, 3 = neither agree or disagree, 4 = agree, 5 = completely agree If a panellist rated an item as 1 (completely disagree) they were asked to write the reason for their disagreement. After analysing the responses by calculating the median and interquartile range for each item, the content of items that had a median value of 3 or less and an interquartile range of higher than 1.5 were edited based on the panellist's feedbacks and prepared for the 3rd round.

Round 3. This round gives Delphi panellists an opportunity to make further clarifications of both the information and their judgments of the relative importance of the items

[56]. In this round the panellists of this study received the questionnaire that includes the items and ratings summarized by the researchers in the previous round and asked to revise their judgments and rate the items again from 1 to 5. After analysing the responses received, items that had a median value of 4 or higher and an interquartile range of 1.5 or less selected as the main items of the *Science Unit Plan* and the five *Lesson Plans*. Finally, the Delphi process stopped after achievement of consensus and stability of results in the third round.

Data Analysis. According to Giannarou and Zervas [55] although the principal aim of Delphi technique is to reach consensus among the participants, still a common practice to measure it does not exist. Hence, there are studies that measure the agreement through frequency distributions and others using the standard deviation or the interquartile range and median. In this study interquartile range and median were used for analyzing the panelist's ratings. In the studies which use the interquartile range as measure to assess consensus, this measure's value must be less than 2.5 or 1 [55]. So, in the current study items that had a median value of 4 or higher and an interquartile range of 1.5 or less selected as the main items.

6 Findings

The results of the second and the third rounds of Delphi for the *Science Unit Plan* are reported in Table 3. In the first round there was no consensus among the panellists about the items number 1, 3, 4, and 14. After editing these items a consensus has reached in the third round of Delphi.

Table 3. Findings of agreement-disagreement in the 1st and 2nd round for the *Science Unit Plan*

#	Science unit plan items		Second round		Third round	
			Median	Interquartile	Median	Interquartile
1	Unit goals		4	2	4	1
2	Unit overview		4	1	4.5	1
3	Big questions		3.5	1.5	5	1
4	Content objectives		4	2	5	1
5	The Big6 objectives	A: Task definition	4	1	5	1
6		B: Information seeking strategies	4	1	4.5	0.5
7		C: Location & access	4	1.5	5	0.75
8		D: Use of information	4	1	4	0.75
9		E: Synthesis	4	1	4.5	1
10		F: Evaluation	4	0.57	5	0.5
11	The expression of what learned		4	1	5	1
12	Evaluation		5	1	5	0
13	Teaching media		4.5	1	5	0
14	Learning activities		3	2	5	1

The second round data of agreement-disagreement findings of the five *Lesson Plans* is reported in Table 4.

Table 4. Agreement-disagreement findings of the second round for the five *Lesson Plans*

#	Lesson plan items		Lesson Plan 1: Task definition	Lesson Plan 2 Information seeking strategies	Lesson Plan 3: Location & access	Lesson Plan 4: Use of information	Lesson Plan 5: Synthesis & evaluation
1	General goal	Median	3	2.5	4	4	4
		Interquartile	2	2	1	1	1
2	Cognitive	Median	3	3	3.5	3	3
		Interquartile	1	1	1	1	1.25
3	Behavioural	Median	4	3.5	4	3	3
		Interquartile	1	1	1	1.75	2
4	Affective	Median	3.5	4	4	3	3
		Interquartile	1	1	1	0.75	1
5	Learning activities	Median	3.5	3.5	4	3	3
		Interquartile	1	1	1	1	1.5
6	Evaluation	Median	4	4	3	3	3
		Interquartile	1.5	1	1	1	1

As shown in Table 4, there was no consensus in item number 1 for *Task definition* and *Information seeking strategies* lesson plans. As a whole, in item number 1 the median was in low level in almost all lesson plans. Table 5 shows the third round agreement-disagreement findings of the five *Lesson Plans.* After revising the lesson plans based on the panelists' ratings, consensus was reached in the third round in all items.

Table 5. Agreement-disagreement findings of the third round for the five *Lesson Plans*

Lesson plan items		Lesson Plan 1: Task definition	Lesson Plan 2 Information seeking strategies	Lesson Plan 3: Location & access	Lesson Plan 4: Use of information	Lesson Plan 5: Synthesis & evaluation
General goal	Median	4	4	5	5	5
	Interquartile	0.5	0	0	0	1
Cognitive	Median	4.5	6	5	5	4.5
	Interquartile	1	0	1	0	1
Behavioural	Median	5	4	5	5	5
	Interquartile	0	1	1	0	0
Affective	Median	5	5	5	5	5
	Interquartile	0.5	1	0	0	1
Learning activities	Median	5	5	5	5	5
	Interquartile	1	0	0	1	0
Evaluation	Median	5	4	5	5	5
	Interquartile	1	0	0	0	0

7   Conclusion

In this research, a comprehensive design for the *Science Unit plan* and its five daily *Lesson Plans* was developed by integration of the Big6 skills model with the 6th grade Iranian primary science curriculum and validated for use by Iranian primary teachers using the Delphi process with teacher panellists selected from primary schools in Ahwaz, Iran. Although there are a few studies [19, 22, 24] that have considered lesson plan development and instructional design for IL instruction, none have researched an integrated approach like this study. Some researchers [22] considered factors impacting on IL instructional design, such as the school culture, the role of the librarian in IL instruction and the nature of the library-based IL curriculum. Only a few Iranian studies [33, 57] have focused on IL lesson plan development, but none have considered the integration of IL instruction into the school curriculum. Analysis of the Iranian curriculum reveals that there is little emphasis on IL skills. This study shows how integrating IL skills into the 6th grade science curriculum can address this deficiency.

The five *Lesson Plans* in context developed in this research could be used as an initial framework for developing IL skills in other curricula and subject areas, and have the potential to be applied across the Iranian K-12 curriculum. This study is the first part of a wider study that evaluates the efficacy of these IL skills *Lesson Plans* in the Iranian 6th grade classroom context.

References

1. Bawden, D.: Information and digital literacies: a review of concepts.   J. Doc. **57**(2), 218–259 (2001)
2. Bruce, C.S.: Information literacy as a catalyst for educational change. A background paper. In: Danaher, P.A., (ed.) Proceedings "Lifelong Learning: Whose responsibility and What is Your Contribution?" The 3rd International Lifelong Learning Conference, pp. 8–19. Yeppoon, Queensland (2004)
3. Candy, P.: Lifelong learning and information literacy (2002). http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.119.5676&rep=rep1&type=pdf
4. Bundy, A.: Australian and New Zealand information literacy framework: principles, standards and practice. Adelaide: Australian and New Zealand institution for information literacy (2004). http://www.anziil.org/index.htm
5. Sundin, O.: Negotiations on information-seeking expertise. J. Doc. **64**(1), 24–44 (2008). doi: 10.1108/00220410810844141
6. Eisenberg, M.B.: Information literacy: essential skills for the information age. DESIDOC J. Libr. Inf. Technol. **28**(2), 39–47 (2008)
7. Bruce, C.S.: Informed Learning. Association of College and Research Libraries, Chicago (2008)
8. Lau, J.: Guidelines on information literacy for lifelong learning (2006). http://www.jesuslau.com/docs/publicaciones/doc2/Iflaguidelines.pdf
9. Byerly, G., Brodie, C.: Information literacy skills models: defining the choices. In: Stripling, B.K. (ed.) Learning and Libraries in an Information Age: Principles and Practice. Libraries Unlimited, Littleton (1999)
10. Horton, F.W.J.: Understanding Information Literacy: A Primer. United Nations Educational, Scientific and Cultural Organization, Paris (2007)

11. Limberg, L., Sundin, O., Talja, S.: Three theoretical perspectives on information literacy. Hum. IT **11**(2), 93–130 (2012)

12. Rader, H.B.: Information literacy 1973–2002: a selected literature review. Libr. Trends **51**(2), 242–259 (2002). http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.514.6869&rep=rep1&type=pdf

13. Ferreiro, E.: Librarians and basic education teachers in the context of 'digital literacy'. IFLA J. **31**, 35–44 (2005). doi:10.1177/0340035205052642

14. Bruce, C.S.: The Seven Faces of Information Literacy. Auslib Press, Adelaide (1997)

15. Bruce, C.S., Edwards, S.L., Lupton, M.: Six frames for information literacy education: a conceptual framework for interpreting the relationships between theory and practice. Italics **5**(1), 1–8 (2006)

16. Tuominen, K., Savolainen, R., Talja, S.: Information literacy as a socio-technical practice. Libr. Q. **75**(3), 329–345 (2005)

17. Savolainen, R.: Information use and information processing. J. Doc. **65**(2), 187–207 (2009). doi:10.1108/00220410910937570

18. Lloyd, A.: Information literacy as a socially enacted practice: sensitising themes for an emerging perspective of people-in-practice. J. Doc. **68**(6), 772–783 (2002). doi:10.1108/00220411211277037

19. Wolf, S.A.: The Big6 Information Skills as Metacognitive Scaffold in Solving Information Based Problems. (Doctoral Dissertation) (2000)

20. Gibson, M.R.: A Qualitative Investigation for Designing Intermediate (Grades 4–6) Information Literacy Instruction: Integrating Inquiry, Mentoring, and On-line Resources. (Doctoral dissertation) (2002)

21. Newell, T.S.: Learning in simulations examining the effectiveness of information literacy instruction using middle school students' portfolio products. Evid. Libr. Inf. Pract. **5**(3), 20–38 (2010). www.socialstudies.com

22. Jorosi, B.N., Isaac, G.G.: Teaching information literacy skills in community junior secondary schools in Gaborone, Botswana. Inf. Dev. **24**, 123 (2008). doi:10.1177/0266666908091126

23. Abdullah, A.: Building an information literate school community: approaches to inculcate information literacy in secondary school students. J. Inf. Lit. **2**(2) (2008). http://jil.lboro.ac.uk/ojs/index.php/JIL/article/view/RA-V2-I2-2008-3

24. Therdsak, M., Kulthida, T., Yupin, T.: Development of the instructional model by integrating information literacy in the class learning and teaching processes. Educ. Inf. **28**(2), 137–150 (2011)

25. Chen, L.C.: The effects of integrated information literacy in science curriculum on first-grade students' memory and comprehension using the super3 model. Knowl. Manage. E Learn. Int. J. **3**(3), 399–411 (2011). https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCUQFjABahUKEwj6oeGvhsrIAhWKtBQKHd9BA5g&url=http%3A%2F%2Fwww.kmel-journal.org%2Fojs%2Findex.php%2Fonlinepublication%2Farticle%2FviewFile%2F127%2F105&usg=AFQjCNHYWUhiOZ9i0sOk0ZYB1olahZBl1g

26. Ministry of education of Iran: the national document of educational development in the twenty years perspective (2005) www.medu.ir. (in Persian)

27. Ministry of education of Iran: the document of fundamental revolution in education (2011). www.medu.ir. (in Persian)

28. Ministry of education of Iran: the document of national curriculum (2012). www.medu.ir. (in Persian)

29. Khosravi, F.: Information literacy instruction in schools. Book Q. **7**(1), 19–26 (1996). (in Persian)

30. Eini, A.: SALMAN project (information literacy for iranian students): a framework for information literacy instruction. In: Pariroukh, M., (ed.) School Libraries: Activation of Education System and Contribution in Teaching-Learning Process, pp. 581–598. Mashahd, Ketabdar (2009). (in Persian)

31. Naderi, M.R., Zahedi, M.: School library and information literacy skills instruction. In: Pariroukh, M., (ed.) School Libraries: Activation of Education System and Contribution in Teaching-Learning Process, pp. 615–638. Mashahd, Ketabdar (2009). (in Persian)

32. Hakimi, R., Tabasi, M.A.: Activation of school libraries of Zahedan and improving reading habits. Libr. Inf. Sci. **13**(1), 111–132 (2010)

33. Poursalehi, N., Zandian, F., Fahimnia, F.: Study of effect of information literacy instruction by teacher and librarian on improving information literacy skills of secondary students of Tehran. Acad. Libr. Inf. Sci. Res. **58**, 13–32 (2011). (in Persian)

34. Yari, S.H.: A review on information literacy literature in Iran. J. Libr. Inf. Sci. **1**(53) (2011). www.aqlibrary.ir. (in Persian)

35. Baji, F.: Investigating the amount of attention to information literacy skills in national documents of education in Iran. In: National Conference on Change in National Curricula in Education System in Iran. University of Birjand, Iran (2013). (in Persian)

36. Haidari-hemmatabadi, Z., Mousapour, N., Horri, A.: Identifying the Information Literacy Content in Primary Science Curriculum. Master Thesis. University of Shahid Bahonar of Kerman, School of Literature & Humanities (2006). (in Persian)

37. Lotfi-maher, N., Dortaj, F.: Information literacy in primary reading and writing curriculum. J. Iran. Stud. Curric. **692030**, 110–131 (2011). (in Persian)

38. Baji, F., Bigdeli, Z., Jowkar, T., Zardary, S.: Content analysis of Iranian primary school science books according to big6 information problem-solving skills. In: European Conference on Information Literacy (ECIL), October 22–25, 2013, Istanbul, Turkey: Abstracts. Editors: Serap Kurbanoglu et al. (181). Hacettepe University Department of Information Management, Ankara (2013)

39. Parirokh, M., Mirhosseini, N.: Role of the school libraries in supporting the descriptive evaluation in primary education in Iran. In: Proceedings of the Innovation in Primary Curriculum Conference, pp. 187–221. University of Shiraz, Shiraz (2008). (in Persian)

40. Spiranec, S., Zorica, M.B.: Information literacy 2.0: hype or discourse refinement? J. Doc. **66**(1), 140–153 (2010). doi:10.1108/00220411011016407

41. Keene, J., Colvin, J., Sissons, J.: Mapping student information literacy activity against Bloom's Taxonomy of cognitive skills. J. Inf. Lit. **4**(1), 4–20 (2010). http://jil.lboro.ac.uk/ojs/index.php/JIL/article/viewArticle/PRA-V4-I1-2010-1

42. Anderson, L.W., Krathwohl, D.R., Bloom, B.S.: A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. Allyn & Bacon, New York (2001)

43. Eisenberg, M.B., Berkowitz, R.E.: Information Problem Solving: The Big Six Approach to Library and Information Skills Instruction. Ablex, Norwood (1990)

44. Kessinger, P.: Integrated instruction framework for information literacy. J. Inf. Lit. **7**(2), 33–59 (2013). doi:10.11645/7.2.1807

45. Chen, C.L., Yan, R., Huang, T.: The effect of inquiry based integrated information literacy instruction: four year trends. J. Educ. Media Libr. Sci. **51**(4), 561–595 (2014). http://jomls.tku.edu.tw

46. Eisenberg, M.B., Berkowitz, R.E.: Teaching Information & Technology Skills: The Big6 in Elementary Schools. Linworth, Washington (1999)

47. Moreire, I.V.: Information literacy in elementary schools. Royal School of Information Science (2010). http://pure.iva.dk/files/30875376/Information_Literacy_in_elementary_schools_3_.pdf

48. Chen, C.H., Ma, W.: The effects of integrating information literacy into science instruction on seventh-grade students problem-solving and academic achievement (2012). In: IEEE 12th International Conference on Advanced Learning Technologies (ICALT), July 4–6, 2012, Rome, Italy. IEEE (2012). doi:10.1109/ICALT.2012.23

49. Heider, K.L.: Information literacy: the missing link in early childhood education. Early Child. Educ. J. **36**(6), 513–518 (2009)

50. Eisenberg, M.B., Lowe, C.A., Spitzer, K.L.: Information Literacy: Essential Skills for the Information Age, 2nd edn. Libraries Unlimited, Westport (2004)

51. Ministry of education of Iran: The 6th grade science text-book (2014). www.medu.ir. (in Persian)
52. Ministry of education of Iran: teacher's guide to the 6th grade science text-book (2014). www.medu.ir. (in Persian)
53. Berkowitz, R.E.: Big6 and instructional design. Webinar, 10/12/2010 (2010). www.big6.com
54. Robinson, L.: Lesson in context (2010). http://www.big6.com
55. Giannarou, L., Zervas, E.: Using delphi technique to build consensus in practice. Int. J. Bus. Sci. Appl. Manage. **9**(2), 65–82 (2014)
56. Hsu, C.C., Sandford, B.: The delphi technique making sense of consensus. Pract. Assess. Res. Eval. **12**(10), 1–8 (2007)
57. Nazari, M.: Plan, examination, implementation, and evaluation of information literacy for higher education. Libr. Inf. Sci. **2**(34), 39–66 (2006). (in Persian)

Integrating the Personal Information Culture Concept and the Idea of Media and Information Literacy Offered in the UNESCO Curriculum for Teachers: Experiences of Russia and Uzbekistan

Natalia Gendina[✉]

Kemerovo State University of Culture and Arts, Kemerovo, Russia
`nii@kemguki.ru`

Abstract. The idea of integration of media literacy and information literacy, proposed by UNESCO and IFLA is discussed here. Advantages and disadvantages of Media and Information Literacy Curriculum for Teachers (prepared by UNESCO) are analyzed. The concept of personal information culture and the training course "Principles of personal information culture" developed in Russia are characterized. The mechanism of replenishment of the training course at the expense of the idea of Media and Information Literacy Curriculum for Teachers is described. The experience of adapting the Media and Information Literacy Curriculum for Teachers to the national peculiarities of Russia and Uzbekistan. The purpose and methods of adapting textual and visual information of the Russian curriculum information culture and media and information literacy to the characteristics of the education system in Uzbekistan are revealed.

Keywords: Personal information culture · Media and information literacy · UNESCO curriculum for teachers · Russia · Uzbekistan

1 Introduction

Modern humanity lives in a very rich information environment. Information exposure affects a human either the old way (newspapers, radio, television, film, video, audio) or the new media (Internet, blogosphere, social networks, mobile telephony) at the same time. Each of these information influences can be directed both to the benefit and to the detriment of the individual.

Modern media have a powerful influence on children and youth. This effect is due to the structure of media impact (a combination of verbal, textual, auditory and visual information), age characteristics (credulity in the perception of information, lack of life experience, inability to distinguish information from misinformation). The global network, along with the unique positive features (efficiency, comfort, and freedom of access to information), is fraught with great danger. The danger lies in the negative information that is hosted on the Web, access to which is free for anyone. Psychologists and educators around the world are concerned that these types of media like television and the Internet, as well as popular culture have a powerful negative impact on the psyche

of people, especially children and youth. The need for orientation in huge volumes of heterogeneous (text, auditory, visual, mixed information) and often conflicting information, the need for the ability to distinguish information from misinformation, expose information critical analysis - all this led to the need for specific types of literacy for people in the information society - information literacy and media literacy.

In Russia, the well-known in English literature term "information literacy" is recognized but not widely used. In Russian, the word "literacy" means the ability to read and write, and is associated only with the most simple and initial level of education. Therefore, the term "information literacy" unwittingly gives the elementary, primitive, and limited tone in interaction of a man and information. The alternative term is "person's information culture." In Russia, the term "information culture" is more commonly used. Besides Russia and the CIS it is also used in many non-English speaking countries such as France and Hungary.

The leading international organizations initiating the discussion and study of the human problems of preparation for life in the information society are the International Federation of Library Associations and Institutions (IFLA) and UNESCO. In 2010–2013, UNESCO and IFLA proposed to merge into a single entity two areas, information literacy and media literacy, which until then developed in parallel. In 2011, "IFLA Media and Information Literacy Recommendations" was published [11], as well as the UNESCO Curriculum "Media and Information Literacy: Curriculum for Teachers" in English [13], which was translated and published in Russia in 2012.

As a result of these initiatives of UNESCO and IFLA, the definition of a new integrative concept was proposed: "Media and Information Literacy" (MIL) is a prerequisite for the sustainable development of open, plural, inclusive and participatory knowledge societies, and the civic institutions, organizations, communities and individuals which comprise these societies. MIL is defined as a combination of knowledge, attitudes, skills, and practices required to access, analyse, evaluate, use, produce, and communicate information and knowledge in creative, legal and ethical ways that respect human rights. Media and information literate individuals can use diverse media, information sources and channels in their private, professional and public lives" [12].

The proposed UNESCO and IFLA idea of integrating media and information literacy cannot be realized "mechanically." UNESCO curriculum claims "the catalytic process which should reach and build capacities of millions of young people and contribute to the development of their abilities" must be launched [13]. For this process it needs theoretical understanding of the question 'What should be done?'

The research objectives: (1) the analysis of relations of information literacy and media literacy in the UNESCO Curriculum on MIL for teachers; (2) look for ways to integrate the personal information culture concept and the MIL idea from the UNESCO Curriculum for teachers; (3) the development of adaptation mechanisms of the UNESCO Curriculum on MIL to specific of information training the pupils in Russia and Uzbekistan.

Methodology: A combination of methodological approaches was used: system, technological, active and culturological. Particular attention was paid to the adaptation theory as the interdisciplinary field of scientific research.

2 Advantages and Disadvantages of UNESCO's Media and Information Literacy Curriculum for Teachers

The curriculum goal is to equip teachers with the competences in the field of media and information literacy, to give knowledge of the technology of their transfer among the trainees.

The Curriculum has important advantages. It was created by the leading specialists in media and information literacy from around the world. It was prepared in the spirit of continuity of the Grünwald Declaration on Media Education (1982) and the Alexandria Declaration (2005). The Curriculum is based on a systems approach to understanding the different types of literacy: media literacy, information literacy, and civic literacy. This approach is most clearly represented in the first module: "Citizenship, freedom of expression and information, access to information, democratic discourse and life-long learning."

It is characterized by versatility. It is designed for various levels and forms of education. The Curriculum stresses that a lifelong development of media and information literacy is necessary, but not just in the years of studentship.

It has a clear structure and presents the basic competence of teachers, describes the objectives, methods and teaching results for each thematic module.

As noted in the introduction by J. Karklins, Assistant Director-General Communication and Information UNESCO, "It is pioneering for two reasons. First, it is forward looking, drawing on present trends toward the convergence of radio, television, Internet, newspapers, books, digital archives and libraries into one platform – thereby, for the first time, presenting MIL in a holistic manner. Second, it is specifically designed with teachers in mind and for integration into the formal teacher education system, thus launching a catalytic process which should reach and build capacities of millions of young people" [13].

An important advantage of the program is its focus on the further development and adaptation to the conditions and specific countries.

However, as the research has shown, along with the advantages inherent in the Curriculum, it has some disadvantages. The main problem is the imbalance of sections of media literacy and information literacy.

Results of the analysis suggest the following:

1. Information literacy program is discussed in only one of the eleven modules - unit No. 8 "Citizenship, freedom of expression and information, access to information, democratic discourse and life-long learning";
2. Common to the two sections (media and information literacy) are three modules: Module No. 1 "Citizenship, freedom of expression and information, access to information, democratic discourse and life-long learning"; Module No. 1 "Internet opportunities and challenges," Module No. 9 "Communication, MIL and learning – a capstone module";
3. Out of 107 terms in the glossary of terms only 7 represent information literacy.

Thus, we can conclude the predominance of the "Media Literacy" section at the expense of the information literacy material. In my view, such a disproportion is

disagreeable. Two sections of the Curriculum: "Media literacy" and "Information literacy" should be presented in comparable proportions.

3 The Doctrine of Formation of Person's Information Culture

In 2000, the Scientific Research Institute of Information Technologies in Social Sphere was based in Kemerovo State University of Culture and Arts (SRIITSS KemSUCA) to conduct researches within the international UNESCO "Information for All" programme. The research stimulated the development of the doctrine of person's information culture. This doctrine accumulated the results of previous studies and was supplemented by new provisions. This doctrine has been worked out and developed over the years, including 2003 [1], 2006 [2] and 2008 [3].

The essence of the doctrine is reduced to the approval of the thesis that increasing of the level of society's information culture is possible only within the organization of special education for information consumers, that is, the organization of information education. The presence of a special information training, and a required minimum level of personal information culture are important as much as the availability of computers and communication channels: indispensable attributes of the information society.

The doctrine of formation of personal information culture includes the definition of "person's information culture" and characteristic culturological approach to information education.

Person's Information Culture is one of the components of the general culture of man; the unity of information outlook and the system of knowledge and skills, providing the focused independent activity for the optimal satisfaction of individual information requirements using the traditional and new information technologies. It is the most important factor of successful professional activity as well as social protection of an individual in the information society.

The doctrine is based on culturological approach. The culturological approach considers the phenomenon of culture as a pivotal concept in understanding and explaining the man, his consciousness and activity. The culturological approach is based on the idea of anthropocentrism, recognition of the rights to freedom of personal development, self-expression and manifestation of creativity. Distinctive features of the use of culturological approach in education are the unity of axiological, active and personality-oriented components, and focus on the development of humanitarian thought and creative activity [8].

Thus, due to the Russian tradition – the inextricable link of culture and education – as a term to describe a new phenomenon we have not selected, the term "information literacy" but the term "person's information culture."

The concept has been implemented in practice. The curricula to teach pupils the basics of information culture as well as students, teachers and librarians were developed on the basis of this concept. It allowed the implementation in Russia and in other countries such as Uzbekistan, seminars, workshops, and training on how to work with information effectively at schools, colleges and libraries. Detailed information about the

concepts and results of its implementation is available on the SRI ITSS of KemSUC website (http://www.nii.kemguki.ru/).

4   The Mechanism of Integration of Media Literacy in the Content of the Course "Principles of Person's Information Culture"

To ensure the integrity and consistency of character of the modern information and media environment, a mechanism for integration of media literacy and information culture in teaching has been studied and developed [9].

The integration of media literacy in the content of the course "Principles of Person's Information Culture" is an organic and sequential addition of each section of the course by media component elements.

Media component we consider to be entity of the following elements:

- media text (media text, media construct) – the message contained in any form or genre of the media (newspaper article, television program, video, film). New media (Internet, social networks, mobile telephony) significantly expanded the media texts: websites, blogs, e-zines, and other platforms;
- search algorithm of media texts. It includes a series of actions to find effectively and quickly media information (music, images (pictures), videos, movies, cartoons);
- critical analysis of media texts. It provides a set of special types of media text analysis: such as plot, autobiographical, iconographic, semiotic, identification, ideological, philosophical, aesthetic, ethic, hermeneutical analysis, analysis of media stereotypes, characters of media texts. The appointment of these methods is the formation of a critical evaluation and critical attitude of people (trainees) to media text;
- technology of creation by students of their own media products. A media product is the result of an independent intellectual activity aimed at the creation of new or existing semantic processing of media information presented in the form of a media text. Examples of media products can serve as a multimedia presentation, a note in the paper, essay, video, and animation. The assignment of a student, in the preparation of media products is not just to find and copy the finished media text, but to show independence and creativity and to create on the basis of the available media information something original. It cannot be done if the student does not know the technology of creation of videos, photos, news, and reportage.

The results of the integration of the media component of the curriculum of the course "Principles of Person's Information Culture," are presented in Table 1.

Integrating the media component into the content of the course "Principles of Person's Information Culture" was experimentally tested in Russian schools in the educational process of secondary school students (7–13 years). The experience has repeatedly been presented at conferences and seminars of the Russian School Library Association (RSLA) for school librarians in Russia.

Under the initiative of RSLA (Moscow) two textbooks were published in 2014 to teach primary and secondary school students, prepared on the basis of the experimental results [4, 5].

Table 1. Including media component into the sections of the course "Principles of Person's Information Culture"

Sections of the course "principles of person's information culture"	Elements of media components
I. "Information resources of society and information culture"	Media text as information resource. Structure of the website and web page. Types of websites. Purpose of different types of websites. Web portals: structure and aims. Rules of information security
	Social networks: structure and aims. Types of social networks and their aims: mass, professional, social networks on hobbies. Information search in social networks. Rules of information security in social networks
II. Main types of information retrieval tasks and algorithms of their decision	Search algorithm of media texts. Idea of structure and principle of search work. Search in difficult search queries in the Internet. Use of synonyms, operators "AND", "OR" and "NOT" and advanced search of information
	Search of images, music and videos. Search of reference information in the Internet
	Search security in the Internet
III. Analytical and synthetic processing of information sources	Mass media: types and aims. Media text and its properties: media features, mass features, integrative features
	Types of media texts: according to the author, a form, a distribution channel, subject, or genre
	Analysis of the media text. Media text means of expression: media language, the text and implication in the media text. A role of symbols in understanding of media texts. Properties of symbols. Value of color and a font in different types of the media text. Algorithm of decoding of media information
	Technique of the critical analysis of the media text. The comparative analysis of several animated films on the same plot
	Concepts "manipulation", "critical thinking". Advertizing as type of the media text. Types of advertizing: according to purpose, a way of distribution. Structure of commercial TV advertizing. Methods of manipulation in advertizing. Critical analysis of the advertizing video
IV. Technology of information products' preparation	Technology of creation of media products. Methods of visualization of information. The transition of text information into visual. Preparation of the poster, video card, video, multimedia presentation. A role of audio information, selection of music for a media product. Electronic correspondence. E-mail activity

Each of these editions included: the curriculum, full text of the lessons, glossary, quizzes, reading lists on the course "Principles of Person's Information Culture." This training course has been visualized and all printed manuals were accompanied with CDs of multimedia presentations for each lesson.

Thus, the inclusion of a media component has enriched the content of the course "Principles of Person's Information Culture" including the new, previously unavailable themes. The enrichment considers:

- expansion of the studied sources of information. Students began to study the characteristics of not only traditional (paper) and electronic information resources, but also media information resources;

- development of new media information search algorithms, in addition to the study of algorithms for searching information at the library and on the Internet;
- addition of the studied methods of information processing with special methods of analysis of media texts, including the critical analysis of media information;
- expansion of the traditional information products, performed by students (essays, reports, essays) by creating media products (multimedia presentation, essay, video, video card, cartoon).

5 The Inclusion of Media Literacy into the Content of the Course "Principles of Person's Information Culture": Problems and Prospects

The experiment on the integration of the media component of the curriculum on the basics of person's information culture has revealed a number of difficulties:

- a need to integrate knowledge from different domains (librarianship, bibliography, informatics, media education, journalism, linguistics, philology);
- difficulty of achieving holistic unity in the integration of knowledge from different subject areas;
- a need to adapt training materials according to the age appropriateness of students;
- difficulty of selecting the media texts suitable for teaching students of all ages. First, the media information is characterized by rapid aging, loss of novelty and relevance. Secondly, the media texts should be interesting, attractive, and understandable for students. Third, the media texts should be instructional and free from negative information. Selection of media texts (search, analysis, selection) for the case studies is characterized as important and needs time for consumption.

And there is another problem. This is the danger of substitution of the UNESCO and IFLA idea about integration of media and information literacy into a single unit by any one of these components.

The analysis of Russian curricula shows that there are numerous attempts in media education to reduce all of it to the history of media, or to specific areas of media (like "Musical Journalism," "News Journalism," or "School TV").

Similarly, within the information training titled "Fundamentals of Information Culture" are some highly specialized information ("History of book," "The famous libraries of the world," "The history of libraries," "Computer literacy").

As a result, instead of forming the media and information literacy, units titled: "young journalist," "young reporter," "small broadcaster," "little librarian," "young programmer," are taught.

Such an approach is possible as a means of exploring the future profession as a way of vocational guidance for schoolchildren. However, it should not replace the idea of increasing media information literacy of young citizens. The purpose of training in media information literacy and basic person's information culture is radically different from vocational guidance purposes. In the UNESCO program on media information literacy for teachers of media education, media competence is consistently linked with

the development of critical thinking, and the development of civil responsibility of a person using the media and information literacy for the realization of their rights and freedoms. The aim of UNESCO and IFLA initiatives is to prepare people for life in the information society in conditions of large volumes of diverse and contradictory information that requires critical analysis. As a result, people should be able to use a variety of sources and channels of information in their personal, professional and social life in accordance with legal and ethical standards.

The conducted studies and experiments enabled an outline of the prospects for the integration of media and information literacy in the structure of information culture of schoolchildren:

1. Further development of theoretical bases of integration media components and person's information culture, interdisciplinary research in the field of library science, information science, journalism, philology, and media education are necessary.
2. Improving media information literacy and information culture of the population requires a dialogue of representatives of different professions: teachers, librarians, journalists, managers in the field of education and culture, IT-specialists.
3. Programs and curricula for librarians and teachers in the format of "Training the trainers of media information literacy and information culture" should be developed.

6 Media and Information Literacy Curriculum for Teachers Adaptation Mechanisms for Russia

The Media and Information Literacy Curriculum for Teachers stimulated research to develop methods of a logical complex of these two types of literacy and adaptation of the results of this integration to the specific national training programs in different countries.

The most important adaptation conditions are: consideration of socio-political and economic level of development of the country; national specifics of history, culture and education; reliance on national information and media resources.

The research of information and media education status in Russia over the past 20 years [7, 10], suggests that the program may be adapted in relation to conditions of the Russian Federation. The reason for this is the presence of Russian traditional information and media education; engagement of scientific and educational institutions in research on information and media education; rich experience of libraries and educational institutions in information and media education.

However, the adaptation of the Curriculum to Russian realities demanded the following tasks:

- Eliminate the imbalance in Media and Information Literacy Sections
- Introduction of a Module on Information Culture
- Selection of local and regional information resources relevant to Russian realities
- Creating a Russian language literature list
- Editing the Glossary and compliment it with new terms and definitions.

All these tasks have been consistently solved and have found reflection in scientific publications about the mechanism of adaptation of the program to the Russian realities [7, 9, 10], and in the manuals reflecting integration of idea of media and information literacy from the Curriculum with the concept of information culture of the personality [4, 5].

7 Experience of Adapting the UNESCO MIL Curriculum for National Characteristics of Uzbekistan

In 2015–2016 on the initiative of UNESCO Office in Uzbekistan in Tashkent and the National Library of Uzbekistan named after A. Navoi, the project "Developing the media and information culture of specialists of information and library institutions of Uzbekistan in a period of deepening the reforms in the field of information and library."

The project purposes: (1) training specialists of information and library institutions of Uzbekistan to promote the ideas of UNESCO and IFLA on the MIL by means of a training course of "A basis of information culture of the school student"; (2) training by adaptation of materials on MIL to facilitate Uzbekistan students perception.

In October 2015 in Tashkent at the National Library of Uzbekistan named after A. Navoi within the project "Developing media and information culture of the specialists of information and library institutions of Uzbekistan", our training the trainers was conducted for media information literacy and basic person's information culture for library and information professionals from various regions of Uzbekistan.

The purpose of the training was training the professionals of information and library centers of Uzbekistan the method promoting the UNESCO's ideas about media information literacy through the course "Principles of Pupil's Information Culture." During training the trainers, the participants got acquainted with the UNESCO Curriculum on media information literacy for teachers.

The separate task was to study the methods of the adaptation of Russian educational materials in accordance with the distinct characteristics of historical and cultural traditions of Uzbekistan. I developed this technique to all training materials on media information literacy and person's information culture that it should be well understood by junior pupils of Uzbekistan.

The purpose of adapting the content of the course "Principles of Pupil's Information Culture" was to replace text and visual information, which reflects the specifics of the history, culture, and education of Russian into information which reflects the specifics of the history, culture, and education of Uzbekistan in order to optimize the perception of a teaching material by junior pupils of Uzbekistan [8].

From November 2015 to April 2016, the National Library of Uzbekistan named after A. Navoi translated into the Uzbek language and adapted the content of 24 lessons on the basics of information culture of junior pupils developed by ITRISS KemSUC on the basis of Media and Information Literacy Curriculum for Teachers [−45].

In addition to the translating lesson texts into the Uzbek language, the study material of training the pupils of 1–4 grades was adapted to the historical and cultural context of the Republic of Uzbekistan.

Translations and adaptations of training materials were carried out under the supervision of V. Polyakova, head of Scientific Methodical and Research Service of the National Library of Uzbekistan named after A. Navoi.

The analysis showed that the adaptation of teaching materials was realized in two directions: the adaptation of the text information and adaptation of visual range.

The main ways of adapting the textual information were:

- replacement of the courseware required for the lesson: textbooks, encyclopedias and dictionaries, scientific and educational books, short stories and fairy tales, the online resource for children with graduation for other purposes (for study or leisure); and media assets (TV shows, cartoons, commercials, billboards). All these types of information resources in Russian were to be replaced by similar Uzbek information resources;
- replacing examples related to the history, culture, education, politics of the Soviet Union and Russia for Uzbek counterparts;
- replacing Russian folklore material (fairy tales, proverbs, sayings, riddles) with the Uzbek counterparts;
- replacing the popular Russian media persons to their counterparts in Uzbekistan;
- replacing the popular Russian children's writers with their counterparts in Uzbekistan.

The main visual series adaptations were:

- Replacement of covers of Russian children's books (educational, reference, fiction, scientific and educational, recreational and advertising) with their Uzbek counterparts.
- Replacement of pictures which create a visual image of Russian realities:
- geography (Moscow, Volga, Lake Baikal, Siberia)
- weather, climate (winter, frost, snow, frost, icicles);
- ethnographic (typical names of students and teachers, customs and traditions, national holidays, characters of fairy tales, legends, ethnic dishes);
- flora (spruce, pine, pine nuts);
- fauna (bear, squirrel).

As a result of this replacement textual lessons and multimedia presentations acquired an "Uzbek flavor" which made the material more understandable and dear to children. The text of the lessons have kept examples that demonstrate the best of world and Russian classic literature, folklore, and references to the best children's website in English and Russian languages.

Thus Uzbek colleagues in the course of adapting successfully combined the idea of media information literacy from UNESCO, the Russian experience of personal information culture and national traditions of education.

8   Conclusion

The globalization of information, growth of the scope of information, rapid changes of social and industrial technologies, which create the information society it became necessary to provide special information training and information education for people. Instead of simple concepts like "computer literacy," "digital literacy," "information literacy", more complex concepts like "media information literacy," "transliteracy," "multimedia literacy," appear. In Russia, such an integrative concept is "person's information culture."

The concept of information culture allows the inclusion of person's information training in the sphere of culture. It makes it possible to provide a synthesis and integrity of the traditional, book (library), and the new (computer) information culture, to avoid confrontation of two contrasting cultures in the information society: technocratic and humanitarian.

Formation of information culture of the people is inextricably linked to their information security. Human security on the Internet is in some way not a technological problem, but a pedagogical, humanitarian problem. The best "mechanisms" against negative content on the Internet are the intellectual and moral inner "mechanisms" of a person.

The existing curricula on the information culture and information literacy, which are being implemented at schools, colleges, universities and libraries, are more effective in people's motivation to work with a positive content, critical evaluation of information than a system of prohibited and unwanted content and technical filters of information.

Formation of information literacy, information culture and media literacy in Russia, as in other countries around the world, has been conducted independently in parallel for many years. The proposed UNESCO Curriculum on media and information literacy for teachers on the one hand, opened a new path to the information education, and on the other hand, it has created the need to find a mechanism of whole integration of diverse information and skills, and find ways to adapt the content of the programs to the realities of a particular country, region. The adaptation requires that training through this Curriculum must be based on national information and media resources, examples, and practical exercises, as close as possible to the conditions of life in a particular country, region.

It is necessary to unite the efforts of scientists and experts in different fields (teachers, librarians, psychologists, media educators, IT-specialists, and possibly other specialists) around the world. Only the representatives of the various sciences and fields of knowledge will be able to create scientifically based recommendations on how to teach the basics of information culture and media and information literacy. Therefore, the complexity and scale of the problem require coordinated actions, not only on the national level but on the international level as well.

References

1. Gendina, N.I., Kolkova, N.I., Starodubova, G.A., Skipor, I.L.: Formation of personal information culture in libraries and educational institutions. School Library, Moscow (2003)

2. Gendina, N.I., Kolkova, N.I., Starodubova, G.A., Ulenko, Y.V.: Formation of Personal Information Culture: Theoretical Basis and Modeling the Discipline Content. International Center of Library Cooperation, Moscow (2006)
3. Gendina, N.I., Kolkova, N.I., Starodubova, G.A., Ulenko, Y.V.: School Library as A Center of Personal Information Culture: A Training-Methodological Manual. Russian School Library Association, Moscow (2008)
4. Gendina, N.I., Kosolapova, E.V.: Principles of Pupil's Information Culture: Methodical Complex for Pupils of the 1–2 Grades of General Educational Institutions. Russian School Library Association, Moscow (2014)
5. Gendina, N.I., Kosolapova, E.V.: Principles of Pupil's Information Culture: Methodical Complex for Pupils of the 3–4 Grades of General Educational Institutions. Russian School Library Association, Moscow (2014)
6. Gendina, N.I.: The integration of media and information literacy in the structure of information culture of pupils: opportunities and restrictions in accomplishing the MIL ideas. Kutubxona.UZ Inf. Libr. Technol. **2**(26), 6–12 (2015)
7. Gendina, N.I.: Information Training and Media Education in Russia and the CIS. Problems of Forming the Personal Information Culture and Promoting the Ideas of Information and Media Literacy. Lambert Academic Publishing, Saarbrucken (2012)
8. Grigoryev, C.I., Guslyakova, L.G.: Cultural Centricity and Competency in Modern Social Education. Publishing House of RSSU, Moscow (2009)
9. Gendina, N.I., Kosolapova E.V.: Media literacy in information culture of elementary school students. Rus. Am. Educ. Forum Online J. **6**(1) (2014). http://www.rus-ameeduforum.com/content/en/?task=page&iid=18&article=1000596&page=About+the+Project
10. Gendina, N.: Media and information literacy in russia and the countries of the commonwealth of independent states (CIS): a survey undertaken on behalf of UNESCO's communication and information sector. http://information-literacy.blogspot.ru/2013/03/conceptual-relationship-of-information.html
11. IFLA media and information literacy recommendations. http://www.ifla.org/files/assets/information-literacy/publications/media-info-lit-recommend-en.pdf
12. The Moscow declaration on media and information literacy. http://www.ifla.org/files/assets/information-literacy/publications/moscow-declaration-on-mil-en.pdf
13. Wilson, C., Grizzle, A., Tuazon, R., Akyempong, K., Cheung, C.K.: Media and information literacy curriculum for teachers. UNESCO, Paris (2011), http://unesdoc.unesco.org/images/0019/001929/192971e.pdf

Information Literacy Instruction: An Overview of Research and Professional Development in Pakistan

Kanwal Ameen[1(✉)] and Midrar Ullah[2]

[1] Department of Information Management, University of the Punjab, Lahore, Pakistan
Kanwal.im@pu.edu.pk
[2] School of Social Sciences and Humanities,
National University of Sciences and Technology, Islamabad, Pakistan
dr.midrar@s3h.nust.edu.pk

Abstract. This paper aims to present an overview of information literacy (IL) instruction in Pakistan from the following perspectives: research literature produced; IL instruction as a credit course at LIS schools; and continuing professional development (CPD) activities for information professionals. This study was based on a review of the literature on IL, a survey of LIS schools, searching through the electronic messages archives of the professional groups, and exchange of information with peers. The findings revealed that 13 research papers were published on IL from Pakistan. Out of 12 LIS schools, four offered a 3-credit hour course on IL instruction at the Masters level. Continuing professional development opportunities were limited in Pakistan. A few university libraries just started formal IL programs. We recommended that IL be included in the curriculum at all LIS schools. Research studies on different aspects of IL must be conducted. LIS schools and associations must prepare the professionals to run IL instruction programs.

Keywords: Information literacy · Information literacy education · Information literacy research · Pakistan

1 Introduction

Due to the exponential growth in the amount of information available through Internet, libraries are faced with the challenge of playing a dynamic role in instructing their users about searching, evaluating, and using information ethically available in various forms. Lifelong learning is essential for information users in the emerging knowledge societies for their constant growth in all spheres of life. Libraries worldwide have responded to this challenge by offering instruction in information literacy (IL). IL has been defined as "the ability to identify, locate, evaluate, organize, and effectively create, use and communicate information to address an issue or a problem" [1, p. 31].

The area of IL has drawn the attention of Pakistani academicians, practitioners and researchers during recent years. There are visible developments in education, research and some examples of IL practices. At present, 12 public and private sector universities offer LIS

education. Out of these, seven offer MPhil or PhD programs in LIS comprised of course work and dissertations.

1.1   Objectives of the Study

In this paper we aim to present an overview of IL instruction in Pakistan from the following perspectives: literature produced on IL; IL instruction as a credit course at LIS schools; continuing education for professional development of information professionals. We follow the findings with some suggestions.

2   Methodology

We based this study on a review of the relevant literature; a survey of LIS schools; and identifying continuing education activities for information professionals by searching and analyzing contents of the electronic messages archives of two professional groups.

We identified a list of IL publications after searching the literature through Google scholar and Library, Information Science and Technology Abstracts (LISTA) using the search terms "information literacy" AND "Pakistan". We distributed a short questionnaire to all heads of LIS schools in Pakistan about the status of IL instruction as a course in the Masters level curriculum. We searched the messages archives of the two most common professional groups, viz., Plagpk@yahoogroups.com and Librarianwelfare@yahoogroups.com, to identify IL continuing professional development activities in Pakistan. Such activities are usually shared on these groups from all over Pakistan. We presented the data collected through the questionnaire only as frequencies. We analyzed the data gathered through searching messages in the archives of mailing groups using a content analysis method.

3   Findings

3.1   Literature on IL Produced in Pakistan

One of our objectives for this study was to identify and review the literature on IL from Pakistan. The findings revealed that the concept of IL is just budding. It has gained the attention of researchers in the recent past and studies have been conducted on the topic of IL at the MPhil and PhD levels. Two PhD theses were completed on IL [2, 3]. Midrar Ullah's doctoral thesis addressed "The status of information literacy instruction in medical libraries of Pakistan: An appraisal". Syeda Hina Batool researched "Exploring information literacy practices in primary schools: A case of Pakistan". Authors presented two papers based on findings of the above mentioned PhD theses at a centennial "International Conference on Information Management and Libraries" held in November 2015 in Pakistan. Ullah and Ameen [4] revealed that lack of IL training opportunities for librarians and lack of policy regarding IL instruction in medical institutions were the two main barriers in IL instruction programs in medical institutions of Pakistan. Batool highlighted the provisions for IL practices among selected primary school curriculum

[5]. Moreover, five MPhil theses have been carried out on IL: two at the University of the Punjab, Lahore; two at the Minhaj University, Lahore; and one at the Islamia University, Bahawalpur [6–10].

However, only 13 research papers [11–23] have been published on the subject from Pakistan spanning 2009–2015. This shows that the concept of IL is emerging and gaining attention of the Pakistani scholars. Three studies were conducted on the importance of IL skills in the local scenario [11–13]. Ameen and Gorman [11] published the first paper from Pakistan addressing the dire need of imparting IL instruction in the country and emphasized that lack of IL skills among educated people was a barrier in the development of a knowledge society and economic growth. It won the Best Paper Award of the Journal for that year. Another study by Bhatti [12] also highlighted that IL is essential for enhancing the quality of higher education and research in Pakistan. Ullah and Ameen' [13] found that medical librarians perceived IL skills as very important for medical library users. Five papers [14–18] focused on assessing the IL skills of either students or faculty members; three [16–18] assessed the IL skills of engineering students, while one [14] assessed the IL skills of university faculty members. These studies found that IL skills of students as well as faculty were unsatisfactory and needed to be improved through IL instruction programs at academic institutions. Batool [15] explored the conception of primary school teachers about IL skills of their students and found that teachers' perceived IL skills of primary students were weak due to absence of IL instruction at the school level. Mahmood [19] found out the relationship of student perceived IL skills with personal and academic variables. Naveed and Sharif [20] measured the impact of an IL session of a university students and found it useful for them. Ullah and Ameen [21] presented the status of IL instruction in medical libraries and revealed that IL instruction activities in most of the medical libraries were in their infancy. Ullah and Ameen [22] also suggested the strategies for the effective implementation of IL instruction programs in medical libraries. They opined that regular IL workshops might be conducted for medical faculty and IL instruction might be incorporated in the curriculum for medical students. Hammad, Shehzad and Iqbal [23] evaluated the IL services of the Riphah International University, Islamabad.

Voluminous literature is available on theories models, issues and practices of IL in different geographical areas and in specific institutions in the advanced countries. However, IL is a new field in Pakistan with only a handful of studies published on this topic. An overview of the research and publication is of practical use for researchers and LIS practitioners who are evolving IL practices and research.

3.2   IL Instruction as a Credit Course at LIS Schools

The University of the Punjab was the first to include a 3-credit hour compulsory course on IL instruction in the LIS curriculum at the Masters level in 2008. In 2009, the Higher Education Commission (HEC) of Pakistan also included it as an optional course in the curriculum of LIS for the four year BS program. Through the survey we conducted for this study we found that out of all 12 schools, only four schools offered a 3-credit hour course on IL instruction at the Masters level; three schools offered it as a compulsory course and one as an optional course. The survey revealed that IL is still not considered as a core course except at the University of the Punjab. Hence, a vast majority of the

new entrants in the market were still not trained with the required IL instruction skills through formal education.

3.3   Continuing Professional Development (CPD) Activities

CPD opportunities are generally meager for the LIS professionals in Pakistan. My search results of professional mailing e-groups' archives revealed that the elected professional associations such as Pakistan Library Association (PLA), Alumni Associations of the University of the Punjab, University of Peshawar, University of Karachi and other "self-selected" professional groups had not paid due attention to the CPD in the desired manner. My analysis of messages archives revealed that these associations and groups had occasionally arranged CPD short trainings workshops and seminars. This section gives a brief description of the activities designed for creating awareness and training.

Professional Associations, Groups, LIS School and Individual Efforts. Khalid Mahmood, a senior faculty member at the Department of LIS, delivered an introductory lecture on IL in Pakistan on May 26, 2008 at the International Islamic University, Islamabad. Riphah International University, Islamabad celebrated an information week in April 2010 to create awareness regarding IL among academia. The Department of LIS organized seminar on "Information Literacy in Academic Libraries" on May 27, 2011 jointly with PAKLAG. Kanwal Ameen and Khalid Mahmood were the resource persons. Another one-day workshop on IL skills for LIS professionals held at International Islamic University (IIU), Islamabad on March 26, 2011. Lahore University of Management Sciences (LUMS), Lahore organized a seminar on IL and research skills on October 21, 2010. Pakistan Academy for Rural Development, Peshawar organized a five-day training course on "Information Management Techniques for Librarians" that also covered the IL skills from December 6–10, 2010.

   A few professionals formed the "Information Literacy Association of Pakistan (ILAP)" in May 2011 to promote IL in Pakistan. ILAP remained dormant and organized only one seminar on "Research and IL expertise for LIS professionals" that took place on December 15, 2012 in Islamabad. On April 23, 2014, another group of LIS professionals launched "Pakistan Information Literacy and Library Movement (PAK-IILM)" but is still inactive. Sajid Mirza created a blog in February 2010 for promotion of IL activities in Pakistan but it also did not attract participation from the professionals. The University of Peshawar Library and Information Science Alumni Association, Federal Branch, organized a one-day seminar on "Advances in Library and Information Science" including IL skills for professionals. The Pakistan Librarians Welfare Organization organized a "IL awareness program/IL week" in collaboration with National Book Foundation (NBF) on September 8–12, 2014. The PLA (Punjab branch) conducted a workshop on IL skills on April 16, 2015. Dr. Ann Morlow Riedling from the USA visited Pakistan in September 2015 and gave a series of presentations on IL in the National Library of Pakistan and in a couple of universities. The above mentioned seminars and workshops mostly covered searching skills, plagiarism, reference management software endnote, and use of HEC digital libraries.

Faculty and Library Schools. Department of LIS (renamed as the Department of Information Management in 2014), University of the Punjab in collaboration with the Pakistan Library Automation Group (PakLAG) organized a seminar and delivered the first IL orientation talk to working professionals in late 2009. The department also organized a two-day workshop on "searching, recording and reviewing literature or writing for research" at the Faculty of Economics and Management Sciences on November 4, 2009. Later, the Department organized the first extensive workshop on "Developing master trainers for HEC National Digital Library" jointly sponsored by the HEC, Learning & Innovation Division and the University of the Punjab on April 4–5, 2012. It was specifically designed for the librarians working in various independent departmental libraries to enable them to make extensive use of the National Digital Library (NDL) resources and facilities for their faculty members and researchers as well as to transfer these IL skills to their users. The department has been arranging on regular basis workshops and lectures for librarians, faculty members and students mostly covering the areas of searching skills, plagiarism, reference management software, and use of online resources including HEC digital library. These kinds of training are getting popular in growing research culture in Pakistan.

4   Discussion

The rapid development of information and communications technology (ICT) has made a visible impact on management of library and information services as well as on clients' information behavior in Pakistan. Various formal surveys [24, 25] of students and faculty showed that they prefer to access information through Google and journals through open access sources instead of subscribed databases of journals. Hence, user orientation or education programs, which are not common, needs to be expanded to formal information literacy instruction programs at every academic level for developing lifelong learning skills. Effective IL instruction is the key to make library users efficient, responsible, and independent learner. Users should be able to synthesize and generate knowledge following ethical and quality parameters. Information professionals have to play an active role in this regard. The need for awareness, resources, services, education and offering of IL instruction is much more needed than ever.

Voluminous literature has been published on the involvement of library and information professionals (LIP) in the provision of IL instruction, collaboration, assessment and application of ICT to instruction efforts and less on IL instruction CPD needs of LIP [26]. Our findings reveal that only 13 papers on IL have been published in Pakistan so far. In this regard our findings are in line with the results of Sproles et al. [26] who found that most of the papers on library/IL instruction are published from developed countries and developing countries contributed few papers to the IL literature. Research studies on different aspects of IL must be conducted in the developing countries to address varied issues.

Instructing IL skills to information users has emerged as a core role of professionals to enhance their own worth and visibility. CPD of librarians for IL instruction is required to continually expand and enhance their knowledge and application of involvement pedagogies in learning, teaching and research. Therefore, IL needs to be included in the curriculum at all LIS schools. CPD activities are mostly focused on library automation using open

source software. Professional associations need to expand their horizons and initiate IL instruction trainings in order to equip information professionals with the needed knowledge and skills. First, they need to be IL experts before imparting it to user. Endeavors like creating a blog or making an IL association by a few individuals have made no impact. CPD opportunities in the field of IL instruction are limited in the developing countries [27] and the situation is not very different in Pakistan.

Nevertheless, the seasoned as well as enthusiastic young information professionals have started giving such kinds of instructions at their universities. Also formal IL instruction has been initiated at some universities such as Riphah International University, Forman Christian College University, Institute of Space Technology, and Aga Khan University.

5   Conclusion and Recommendations

The rapid development of ICT has made a considerable impact on library services and user education programs. Now user education program have expanded from library instruction to information literacy instruction and lifelong learning. Effective information literacy instruction programs are the key to make library users efficient, effective, and independent information users. Librarians have to play a leading role in this regard. The need for resources, services and education is greater than ever. Teaching IL to library users is an important role of LIS professionals. Therefore, IL needs to be included in the curriculum at all LIS schools. Research studies on different aspects of IL must be conducted. LIS schools and associations need to prepare the LIS professionals to run IL instruction programs in order to equip their library users with the skills they need in their career.

6   Delimitation of the Study

The study has not empirically investigated the real practices of IL instruction programs prevailed currently in various types of libraries.

7   Significance of the Study

This paper explored and presented a holistic overview of the education, research in CPD on IL in Pakistan. The study should be of interest to the LIS researchers, professionals, and academicians of the region while introducing the international audience with the scenario of IL progression in a South Asian developing country.

References

1. Wijetunge, P., Alahakoon, U.P.: Empowering 8: the information literacy model developed in Sri Lanka to underpin changing education paradigms of Sri Lanka. Sri Lankan J. Lib. Inf. Manag. **1**, 31–41 (2005)
2. Ullah, M.: The status of information literacy instruction in medical libraries of Pakistan: an appraisal. Unpublished Ph.D. thesis, University of the Punjab, Lahore (2015)

3. Batool, S.H.: Exploring Information Literacy (IL) practices in primary schools: a case of Pakistan. Unpublished Ph.D. thesis, University of Sheffield, Sheffield (2016)
4. Ullah, M., Ameen, K.: Barriers when advocating or providing information literacy instruction in medical institutions of Pakistan. In: Ameen, K., Warraich, N.F. (eds.) International Conference on Information Management and Libraries, Department of Information Management, University of the Punjab, Lahore, pp. 365–375 (2015)
5. Batool, S.H., Webber, S.: Provisions for information literacy practices across primary curriculum: an assessment. In: Ameen, K., Warraich, N.F. (eds.) International Conference on Information Management and Libraries. Department of Information Management, University of the Punjab, Lahore, pp. 609–610 (2015)
6. Kousar, M.: Perceptions of faculty about the information literacy skills of postgraduate engineering students. Unpublished M.Phil. thesis, University of the Punjab, Lahore (2011)
7. Anwar, U.: College librarians as information literacy instructors: training gap analysis. Unpublished M.Phil, thesis, University of the Punjab, Lahore (2014)
8. Safdar, M.: Students' perception about Information Literacy (IL) skills and need of IL program: a case study of NUST Islamabad. Unpublished M.Phil. thesis, Department of Library and Information Science, Minhaj University, Lahore (2014)
9. Rafique, A.: information literacy skills of engineering students: a comparison between University of Engineering and Technology and University of the Punjab. Unpublished M. Phil. thesis, Department of Library and Information Science, Minhaj University, Lahore (2014)
10. Ahmad, B.: information literacy skills among LIS students at public sector Universities of Pakistan: an assessment. Unpublished M.Phil, thesis, Department of Library and Information Science, Islamia University, Bahawalpur (2015)
11. Ameen, K., Gorman, G.E.: Information and digital literacy: a stumbling block to development? Pakistani Perspect. Lib. Manag. **30**, 99–112 (2009)
12. Bhatti, R.: Information literacy: furthering the cause of higher education commission in Pakistan. Pak. Lib. Inf. Sci. J. **43**, 3–11 (2012)
13. Ullah, M., Ameen, K.: Perceptions of medical librarians towards the importance of information literacy skills. Pak. J. Inf. Manag. Lib. **16**, 1–7 (2015)
14. Rafique, G.M.: Information literacy skills of faculty members: a study of the University of Lahore, Pakistan. Lib. Philos. Pract. Paper **1072** (2014)
15. Batool, S.H., Mahmood, K.: Teachers' conceptions about information literacy skills of school children. Pak. J. Lib. Inf. Sci. **13** (2012)
16. Rafique, A., Mahmood, K.: Information literacy skills of engineering students: a survey. Pak. Lib. Inf. Sci. J. **46**, 34–41 (2015)
17. Kousar, M., Mahmood, K.: Information literacy skills assessment of undergraduate engineering students. In: Kurbanoglu, S., et al. (eds.) European Conference on Information Literacy, ECIL, Istanbul, Turkey, pp. 471–477. Springer, Switzerland (2013)
18. Kousar, M., Mahmood, K.: Perception of faculty about information literacy skills of postgraduate engineering students. Intl. Inf. Lib. Rev. **47**, 52–57 (2015)
19. Mahmood, K.: Relationship of students' perceived information literacy skills with personal and academic variables. Libri: Int. J. Lib. Inf. Serv. **63**, 232–239 (2013)
20. Naveed, Q., Sharif, A.: Assessing the needs and measuring the impact of the information literacy sessions at the Aga Khan university's institute for educational development. Pakistan. Asian Rev. Soc. Sci. **4**, 20–29 (2015)
21. Ullah, M., Ameen, K.: Current status of information literacy instruction practices in medical libraries of Pakistan. J. Med. Lib. Assoc. **102**, 281–287 (2014)

22. Ullah, M., Ameen, K.: Strategies for the effective implementation of information literacy instruction in medical libraries of Pakistan. In: Kurbanoglu, S., Spiranec, S., Grassian, E., Mizrahi, D., Catts, R. (eds.) Information literacy: Lifelong Learning and Digital Citizenship in the 21st Century. CCIS, vol. 492, pp. 494–503. Springer, Switzerland (2014)
23. Hamid, A., Shehzad, K., Iqbal, Q.: Information literacy program: an evaluation for expansion. Am. Res. Thoughts **1**, 2780–2788 (2015)
24. Arshad, A., Ameen, K.: Usage pattern of Punjab university library website: a transitional log analysis study. Electron. Libr. **33**, 65–74 (2015)
25. Arshad, A., Ameen, K.: Scholarly communication in the age of Google: exploring academics' use pattern of e-journals at the university of the Punjab. Electron. Libr. (In press)
26. Sproles, C., Detmering, R., Johnson, A.M.: Trends in the literature on library instruction and information literacy. Ref. Serv. Rev. **41**, 395–412 (2013)
27. Spiranec, S., Pejova, Z.: Information literacy in South-East Europe: formulating strategic initiatives, making reforms and introducing best practices. Int. Inf. Libr. Rev. **42**, 75–83 (2010)

Public Policies for Information Literacy in Portugal: An Agenda in the Making

Tatiana Sanches[✉]

Institute of Education, Lisbon University, Lisbon, Portugal
tsanches@fpie.ulisboa.pt

Abstract. This theoretical study seeks to contribute to the reflection on public policies in the field of information literacy in Portugal. For this purpose, we look at the status quo of how information literacy has been addressed in Portugal, discussing the aspects concerning public policies, which include an interconnection between scientific knowledge and public action. So, the main objective is to describe Public Policies for Information Literacy in Portugal. Public policies usually result from a sustained effort which places a certain topic on the social agenda. This public action agenda seeks to draw the attention of society and obtain the support of influential groups or people and politics of different levels of the government. At the same time, we look at the way scientific knowledge gives rise to legislation, guidelines or policy recommendations. Finally, we propose a series of lines for reflection and debate on this matter.

Keywords: Public policies · Scientific knowledge · Information literacy · Portugal

1 Introduction: Information Literacy as a Changing Concept

Information Literacy [IL] is the set of competencies, skills and capacities individuals apply in handling information, namely in searching, locating, selecting and using information for personal use, in an ethical and legal manner. It may be considered an essential capacity for the 21st century. However, this notion is changing. The conceptual basis that is generally accepted is rooted in the definition established by ALA [1] and mentioned in the *Presidential Committee on Information Literacy: Final Report*, which explains that:

To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. Producing such a citizenry will require that schools and colleges appreciate and integrate the concept of information literacy into their learning programs and that they play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society. Ultimately, information literate people are those who have learned how to learn.

This proposal presents a deep connection between acquired informational skills and capacities to learn throughout life. It is the key to understanding the importance of information literacy and the way it has been looked at for the past two decades. Nevertheless, the

changes that have been taking place in parallel, namely on a social and technological level, raise other needs that are added to the concept of IL, as I shall explain further on.

Besides the above mentioned document, the American Library Association's Division, the Association of College & Research Libraries, explains that a person who is empowered with information competencies [2, pp. 2–3] should be able to: determine the extent of information needed in an efficient and effective way, critically evaluate the information and its sources, incorporate information chosen according to one's knowledge base, use the information effectively to fulfil a specific purpose, understand the economic, legal and social aspects involved in the use of information, and access and use the information ethically and legally.

These features were transformed into indicators which serve as a base to define five competency standards. In the same document, these were explored, examined and developed into performance indicators which give rise to measurable outcomes. The idea of establishing *Information Literacy Competency Standards for Higher Education* has to do with the need felt by the librarian and teacher community to compare, measure and evaluate performance levels achieved in university libraries as regards information literacy. This intention stems from the idea stated in the same document that the development of competencies in IL makes people more capable of dealing with information in different spheres of performance throughout life [2, p. 4].

However, fifteen years after these reflections, these concepts, tools and guidelines have adapted to the new reality. Currently, there seems to be a convergence regarding the expansion of the conceptual framework of IL. Two significant milestones are those established by the Association of College & Research Libraries (ACRL) and by UNESCO. Both organizations recently spoke out with respect to IL and its concept, its social influence and the way the educational and technological context affect learning and have impact on this concept. Both stressed the importance of mastering information to really be able to learn throughout life.

Following the above mentioned guidance document [2], the ACRL thought of re-conceptualizing information literacy, giving a new background to the guidelines. Thus it is based on a new referential framework, which also relies on a new definition of IL [3, p. 3]:

Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning.

In this new document, *Framework for Information Literacy for Higher Education,* the main changes are in the structure of the document: instead of being designed as guidelines, it is now a theoretical and conceptual framework, focused on establishing coherent, but flexible lines of direction, thought to contain the key concepts to understand and apply information literacy, adapted to each reality. Based on six statements, it explains what seems to be a more global and simultaneously more specific frame for the application of information literacy. Paraphrasing the document, it is based on the ideas that authority is built and contextual, information is created as a process, information is valuable, searching must be understood as research, the academic community as dialogue, and searching as strategic exploration. This new conceptual frame was conceived as a theoretical construct from which we can understand IL and develop its application through new practices. These include the

creation and use of resources, such as: curriculum guides, conceptual maps and evaluation tools, to add to the basic set of reflection materials that are provided. The framework rests on the central idea of meta-literacy (understanding the concept of literacy in depth), with special reference to the importance of meta-cognition and critical self-reflection as essential to make IL self-directed, in a constantly and rapidly changing ecosystem.

UNESCO prepared some official proposals that frame and explain the composed concept of Information and Media Literacy, having recently published a series of documents which relate the capacity to deal with information and with the media in a critical and informed manner: the guidance documents *Media and information literacy: policy and strategy guidelines* [4], and *Global Media and Information Literacy Assessment Framework: Country Readiness and Competencies* [5]. Underlying the decision to join these two concepts (information literacy and media literacy) is the need to equip citizens with the necessary competencies for them to seek and enjoy the benefits of universal human rights and fundamental freedoms, particularly freedom of speech and of access to information. Thus, this conceptual association highlights how faded the limits between these literacies are, stressing the need for information literacy in a complex whole, proposing its integration and development in personal, educational, professional and social terms.

Some concepts, such as digital literacy, internet literacy, basic literacy or library literacy, circle around this larger concept like aggregate satellites. UNESCO's efforts to promote information and media literacy is not only visible in the above mentioned guidance documents, but also in the document *Media and Information Literacy Curriculum for Teachers* [6]. This document was developed with the intent to provide a practical tool to attain the objectives of the Grünwald Declaration [7], the Alexandria Declaration [8] and the Paris Agenda [9] – all of them related to Media and Information Literacy. It is a prospective document as it seeks to correspond to current convergence trends of radio, television, internet, newspapers, books, archives and physical and digital libraries in a single platform, showing they are all means to access information, regardless of the format. Specifically designed for teachers, this document took into account the importance of integrating this learning in their formal education, thus enabling a process which aspires to reach and develop the capacities of millions of young people through teachers [6], and working as a catalyst for knowledge. After all, according to its authors, its main purpose is to face the challenge of evaluating the relevance and reliability of information without hindering citizens' full enjoyment of their rights to freedom of speech and to information. It is in this context that the need for media and information literacy should be considered: it expands the movement for civic education that incorporates teachers as the main agents of change.

2   Knowledge and Policies: From Theory to Practice

Currently the social context, especially as regards issues of citizenship, democracy and human rights, is on the agenda of researchers, sociologists, political scientists, educators and philosophers. The great issues of mankind seem to be affected by a change in communication: the simultaneity, virtual, free access and ubiquity of information are features that shape and define a new modernity. Bauman [10] spoke of a liquid modernity, which affects citizens on a general level, because it is contextual, and on a deeply individual level, influencing

their ways of acting and intervening in this social system that is more connected than ever and yet more disconnected from everything and everyone. In a recent statement on the transformation of democracy in Europe, Habermas [11, p. 2] reflected upon the ambivalent attitudes of citizens in Western democracies: while there is a significant decrease in voting, in collaborating in political parties and in other forms of political participation, which show a certain alienation and apathy towards the political sphere, at the same time there is a rapid growth of groups of citizens in active minorities, pressing for a more direct democracy. This is what the author calls a paradoxical simultaneity of contrasting reactions: growing indifference and intensified commitment – the so-called post-democratic syndrome. Also based on this author's work, Serrazina [12] refers to the current political system, describing it as based on the lack of participation. She points to a solution involving information and communication technologies, which are identified as the first necessary requirement for participation. Digital literacy is thus regarded as essential, representing the passage from the sphere of "being able to participate" to the sphere of "knowing how to participate". From this core point and to counter the tendency to move away from the public sphere, the author stresses the importance of communication, language and, inherently, the media, as well as the emergence of other dynamics of participation, related to informal environments, that should be valued and stimulated.

This short reflection is the backdrop for the following question: what is intended of public policies then – more commitment or more distance? More involvement of the State with citizens or more distancing, enhancing autonomy regarding decisions that affect their everyday lives?

With respect to public policies for education, these have sharply risen in the last few years in Portugal, with several educational fields (such as sex education in schools, autonomy in school management and external evaluation) having their activity regulated. Public policies are definitely on the agenda. But how can we understand and explain them? Barroso [13, p. 4] suggests that, to better understand public policies, we must consider not only the State authorities' actions, but public action in general, and he states that, in politics, "problems do not exist outside of solutions". But what does this really mean? We must establish a correlation between problems, knowledge and policies. Understanding this correlation will allow us to better understand the role of policies and to explain subsequent interventions. Thus, understanding that scientific knowledge may be at the base of the problematization of situations that are the target of political intervention is the usual viewpoint of these situations. Another one is to understand that policies use knowledge to sustain themselves, presenting research facts and results as an argument for solving problems with which they seek to deal. In short, according to Barroso [13, p. 7], often mobilised knowledge is of no use in finding solutions to problems, but it is to build problems adjusted to the available solutions. On the other hand, the author adds that more than direct action on policy decision-makers, knowledge (and research) have a direct influence on the process of public action, through multiple learning experiences (individual and organisational) that the different actors go through both by reflecting on their own practices and in more formal educational contexts.

This is the motto to explain the current state of public policies in Portugal, especially with respect to IL. We are at a time when studies and research that build knowledge around this concept are under way. However, in terms of higher education, there is not exactly a

problematization of IL and, accordingly, public action is not mobilized to try and solve any situations regarding this. However, there are national documents that can be regarded as part of a political reference framework, for, as we shall see, they correspond to the assumptions defined by Barroso [13, p. 3] and emerge in this explanation: "knowledge is transformed into policies and policies into knowledge, through an interactive and co-constitutive process, where problematization has a fundamental role".

Finally, public policies are usually the result of a sustained effort that places a certain topic on the social agenda. This public action agenda seeks to draw the attention of society and gather the support of influential groups or people and politicians from different levels of the government. Haras & Brasley [14] studied the state of public policies in IL in the United States and found that they are still not a part of the public agenda. Instead, the topic of IL is claimed by a relatively select group of stakeholders, and it needs to gain acknowledgment and support from a vaster public. An objective sign of this reality, according to these authors, is the fact that it is not compulsory teaching in school, and therefore its implementation continues to be basically ineffective. In this article, IL is considered to be of justified public interest and therefore worthy of a policy. Thus, the authors suggest political options arise from identifying barriers, which will make it possible to provide recommendations for the development and dissemination of IL.

3 A Step Further: Legislation, Guidelines or Policy Recommendations

So, disseminating knowledge about IL has an important role. In a quick search in the largest portal aggregating Portuguese scientific production, the Portuguese Open Access Scientific Repository or RCAAP [15], carried out in April 2015, I obtained 1,896 results regarding this term. In the last few years this topic has received more attention, as this sample shows regarding the evolution of the publications containing it: 2010 (176), 2011 (280), 2012 (375), 2013 (306), 2014 (245). However, by limiting our search to the inclusion of "information literacy" only in the title, which points to a greater relevance of the topic in that document, only 25 results are obtained. On the other hand, I carried out a search on the aggregating portals EBSCO HOST and B-on, as well as on the Web of Knowledge. It aimed to assess the current situation in terms of the available studies in this area, originating from Portugal. Eight results emerged, all of them referring to internationally published studies, with peer-review [16–23]. We recognise the need to promote knowledge in order to problematize a certain field, and we can thus raise the hypothesis that this is one of the reasons for the quasi-inexistence of public policies regarding information literacy: the lack of in-depth scientific knowledge mobilised around this field.

On the national level, we find a shortage of research, development and projection of knowledge. Nevertheless, some scattered projects and studies that have been carried out, namely in the Higher Education context, should be highlighted.

On the one hand, there are reports or case studies on the implementation of training programmes in information literacy [16]. On the other hand, there is more in-depth research which focuses on projects and groups that publish results, such as Lopes & Pinto [24] and Silva [25]. Also worthy of note are the PhD theses [26–28], and the ten

Master's theses [29–38] that form the current body of scientific production specifically in information literacy, produced and made public to get academic degrees in recent years.

Externally, that is, supranationally, we have already seen that UNESCO recognises IL as a key subject for intervention. It states that in order to reach suitable levels of Media and Information Literacy for all, national policies are necessary. In this regard it has published a document that gathers strategic guidelines for Media and Information Literacy policies [5], set forth on a national level by each of the States. This resource is the first of its kind to approach the concept in a comprehensive way, joining Information Literacy and Media Literacy. These guidelines provide a harmonised approach that allows all stakeholders to promote more sustainable national strategies on Media and Information Literacy, describing the process and content to be considered.

With more specific reference to the policies in Media and Information Literacy, one important document – Media and Information Literacy Policies in Portugal (2013) – was prepared by an inter-university research group (Lusófona, Nova and Minho Universities). In it, Costa, Jorge & Pereira [39] carry out a transversal reading of the chronology of the most important publications resulting from public policies in these matters, serving as a guide for us to observe this reality, Actually this document was the result of a European project (2010–2014) whose line of action, "Transforming audiences/transforming societies", coordinated and promoted research efforts for fundamental transformations of European audiences as regards media in a changing environment, identifying their complex interrelations with the social, cultural and political fields in European societies. Once again we find the intrinsic connection between information literacy and media literacy.

As regards the official publication of documentation, there are several occasions on which we can understand how IL emerges as a related topic. The breakthrough document for educational policies in Portugal, *Parecer do Conselho Nacional de Educação sobre Aprendizagem ao Longo da Vida* [Opinion of the National Education Board on Lifelong Learning], mentions a set of assumptions to sustain an educational policy [40, p. 11775]. It explains that the construction of a new model of learning, in which self-learning plays an important part, makes it necessary to reinforce partnerships and to pay special attention to recognition, validation and certification of learning. Achieving the important goals identified in this memorandum requires a prior general awareness of their importance and a marked will across society that naturally reflects the clear benefits each of us can reap from them. The very first chapter broadly addresses the problem of lifelong learning and refers to major topics: education in a context of change, the concept of lifelong learning, the right and duty of lifelong learning, basic competencies for lifelong learning, the (re)organisation of the learning system, partnerships for lifelong learning and learning in all domains of life, the need to regulate recognition, validation and certification of formal, non-formal and informal learning, and funding. With regard to the matter at hand, this document clearly mentions digital literacy, another macro-concept intrinsically connected to information literacy [40, p. 11779]. In the second part, the National Education Board lays down 42 recommendations to put into practice the good implementation of the measures reflected upon, insisting on the appraisal of transversal learning.

On December 18, 2006, the Recommendation of the European Parliament and European Council on key competencies for lifelong learning [41] was published. It defines competencies as a combination of knowledge, skills and attitudes appropriate to the context. It states that key competences are those that support personal fulfilment, social inclusion, active citizenship and employment [41, p. 394/13]. This recommendation seeks to respond to the previous diagnosis that a measurable improvement was needed in European average performance. These reference levels included reading literacy, dropping out of school early, completion of upper secondary education, and participation of adults in lifelong learning, all closely linked to the definition of these key competences.

In 2010, the National Education Board delivered Opinion no. 5/2010, Opinion on Educational Goals 2021 [42], published in the Portuguese Official Gazette on September 20, as the result of a supranational recommendation of the Organisation of Ibero-American States for Education, Science and Culture (OEI), of which Portugal is a member. This is a wide-ranging project focused on the definition of 11 educational goals, including monitoring indicators and expected levels of realisation. Though not explicit regarding information literacy, the document lays down comprehensive policy goals for education, again mentioning lifelong education.

In 2011, the National Education Board issued Recommendation no. 6/2011, Recommendation on Education for Media Literacy [43]. For me, this is the closest official document to a policy involving information literacy, quoting and using the previously mentioned UNESCO document for national policy, though more directed at media literacy.

This recommendation includes four major points: the first is introductory and states external and internal reasons. The second point concerns the concept of media literacy and refers to the scope, context and purpose of the recommendation. The third point consists of a brief chronology of the situation of media education and ICT in education in Portugal, mentioning key guidance documents and educational policies. Finally, the last point regards the current curricular situation and refers to the need to integrate these competencies in the school curriculum. This recommendation clearly shows an integration of the above mentioned concepts, even though there is a visible preference for the media field over the information field or the digital field.

In more extensive contexts, public libraries or school libraries have been more subject to the emanation of public policies with greater national impact, more wide-ranging and with greater social recognition, than university libraries. An example of this for public libraries is Nunes [44] who reflects on the role of these institutions in today's society, with special attention to reading promotion and literacies, regarded as social inclusion factors. This author explains the recent history of public libraries in Portugal and highlights the qualities and malfunctions that are visible in the National Network of Public Libraries, pointing to the development of public policies as a path for change. Parreira & Calixto [45] discuss the legislation published about public libraries and conclude that the implementation of a law is necessary, though this is not the only way to create public policies.

As far as school libraries are concerned, Bastos [46] states that the 2007 Technological Plan for Education has played an important part in the educational context,

encouraging schools and teachers to open their classes to new technologies and thus prepare students for the challenges of the knowledge society. This incentive emerges when the author mentions experiences of school libraries and information literacy, stating the impact of certain recent developments in the Portuguese school context, including the implementation of a self-evaluation model for school libraries.

Also worthy of note is the work of Pereira [47], whose research concentrates on digital literacy and the conceptual framework sustaining it, namely on the policies for technology in Portugal. The author points out some frailties in the implementation of the Technological Plan for Education, namely that with this policy government authorities sought to create the illusion of a reform of the school and of teaching, assuming that having technology would give the power for this to happen. Students equipped with new laptops are considered agents of change within the family. So there is a coherent thematic axis with the conceptual framework previously mentioned. It combines information literacy, digital literacy and media literacy as a multifaceted issue, which is the object of programmes and projects, legislation and regulation – in other words, it has been the target of public policies. Nonetheless, we can see that the definition of policies in information literacy is just beginning, so this exercise we carried out shows a very initial stage of the work which is yet to be done, especially concerning higher education.

4   Final Remarks: An Agenda Under Construction for Information Literacy

This study sought to find public policies on IL. But, as we saw previously, finding public policies set out in any matter of intervention and public action implies negotiating the interests of the political agenda that are in line with the emergence of a social problematization. This is only possible through knowledge and scientific research.

We found that the scientific knowledge circulating in Portugal is valuable but still at quite an initial stage and insufficient for this endeavour – to promote the creation of policies – because the problematization which emerges socially is still scarce. Nevertheless, we may conclude that external influences, together with social factors and interests from other adjacent quarters, have successfully managed to include topics regarding information literacy on the political agenda. Among these are lifelong learning, the importance of technologies in education, and digital and media literacy.

The OECD report Education Policy Outlook 2015: Making Reforms Happen, states that "the analysis of the chosen reforms shows that the most effective policies are those focused on students and on learning, that strengthen teachers' ability and involve all stakeholders" [48, p. 1]. Therefore, we may say that social awareness is one clear path. Ponte [49, p. 55] reminds us that when involving families in this process it is important to take into account certain critical factors. She gives the example of the implementation of public policies in Portugal, between 2005 and 2010, focused on the technological field. Seeking to facilitate the teachers' job and get parents interested and involved in school activities, these public policies considered the children as receivers of knowledge from their teachers, and "natural" promotors of their parents' info-inclusion. However, they forgot to consider conflicts and tensions that might arise due to different uses and

generations. This is an example of lessons to be drawn from the implementation of public policies.

In 2014 another OECD project regarding policies was born – the project Skills Strategy. It includes a scheme for countries to develop a coordinated strategy of competencies, to be the baseline for making decisions about public policies. The Portuguese version is very recent [50]. Believing that better competencies create economic growth, the aim is to boost the conditions for equity in education, entrepreneurial competitiveness and job creation, building a society of active, committed and empowered citizens. The recommendations of this document point to the development of capacity and collaboration on a local level, creating evidence-based policies (which is underdeveloped in Portugal), expanding programme evaluation and regional evaluation, gathering data more systematically to anticipate competency needs, and reinforcing partnerships between stakeholders at different levels. These recommendations are quite flexible and therefore apply to policies of complementary spheres.

It is important to consider that the public agenda's space for negotiation as regards policies has first and foremost to do with the research done in university. It is essential to improve, deepen, systematise and present knowledge, making use of meta-literacy. From studies, projects and research we can bring the topic of information literacy to the public space, adjusting forms of intervention, shaping the role of the main social actors (essentially teachers and librarians), improving education and the curriculum. In this regard, the editors of the book Powerful Literacies [51, p. 5] believe in the need for a systematic and sustained critique as a step towards knowledge, to change the literacy agenda from its current concerns and limitations to being more useful socially, with more interventional and creative approaches. On the national level, we find that most of the work has been carried out by the School Libraries Network Office. This government agency has already produced several documents, including "Aprender com a Biblioteca Escolar/Learning with the School Library" [52], a set of learning standards related to the work of school libraries in kindergarten and primary education. Here, reading literacy, media literacy and information literacy are discussed in detail, and strategies are presented to put into practice actions with students, in order to develop competences in these fields. Documents of this nature regarding higher education in Portugal could prove useful.

In conclusion, we may say that it is by mobilising knowledge that we can converge interests, efforts and finally actions to consolidate an educational framework where information literacy has a key place as a base for the creation and development of transversal competencies for all fields of lifelong learning.

References

1. ALA: American Library Association Presidential Committee on Information Literacy: Final Report (1989). http://www.ala.org/acrl/publications/whitepapers/presidential
2. ALA: Information Literacy Competency Standards for Higher Education. Association of College and Research Libraries, American Library Association, Chicago (2000). http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/standards.pdf

3. ACRL, Association of College and Research Libraries, American Library Association. http://www.ala.org/acrl/

4. UNESCO: Global Media and Information Literacy Assessment Framework: Country Readiness and Competencies. UNESCO, Paris (2013). http://www.uis.unesco.org/Communication/Documents/media-and-information-literacy-assessment-framework.pdf

5. UNESCO: Media and Information Literacy: Policy and Strategy Guidelines. UNESCO, Paris (2013). http://unesdoc.unesco.org/images/0022/002256/225606e.pdf

6. Wilson, C., et al.: Media and Information Literacy Curriculum for Teachers. UNESCO, Paris (2011). http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/media_and_information_literacy_curriculum_for_teachers_en.pdf

7. UNESCO: Declaração de Grünwald sobre Educação para os Media. UNESCO, Grunwald (1982)

8. UNESCO: Declaração de Alexandria sobre Competência Informacional e Aprendizado ao Longo da Vida. The Alexandria Proclamation on Information Literacy and Lifelong Learning. IFLA UNESCO, Alexandria (2005). http://www.ifla.org/files/assets/wsis/Documents/beaconinfsoc-pt.pdf

9. UNESCO: Paris Agenda or 12 Recommendations for Media Education. UNESCO, Paris (2007). http://www.diplomatie.gouv.fr/fr/IMG/pdf/Parisagendafin_en.pdf

10. Bauman, Z.: Modernidade Líquida. Jorge Zahar, Rio de Janeiro (2001)

11. Habermas, J.: Democracy in Europe today. In: Conferência Internacional de Educação 2013: Os Livros e a Leitura: Desafios da Era Digital. Fundação Calouste Gulbenkian, Lisboa (2013). http://www.gulbenkian.pt/media/files/agenda/eventos13/28_10_13Comunicacao;_Habermas_DemokratieInEuropa_Lissabon.pdf

12. Serrazina, F.: Esfera Pública, Tecnologia e Reconfiguração da Identidade Individual. In: Observatorio (OBS*), pp. 177–191, OberCom. 6, Lisboa (2012). http://obs.obercom.pt/index.php/obs/article/download/574/561

13. Barroso, J.: Conhecimentos, Políticas e Práticas em Educação. In: Martins, A.M., Calderon, A.I., et al. (eds.) Políticas e Gestão da Educação: Desafios em Tempos de Mudanças. Autores Associados, Campinas (2013)

14. Haras, C., Brasley, S.S.: Is information literacy a public concern? A practice in search of a policy. In: Library trends, vol. 60, pp. 361–382, The Board of Trustees, University of Illinois, Illinois (2011). http://hdl.handle.net/2142/31875

15. RCAAP - Repositório Científico de Acesso Aberto de Portugal (2015). http://www.rcaap.pt/

16. Sanches, T.: Reception and application of information literacy instruction in portuguese academic libraries. In: Kurbanoğlu, S., Špiranec, S., Grassian, E., Mizrachi, D., Catts, R. (eds.) ECIL 2014. CCIS, vol. 492, pp. 484–493. Springer, Heidelberg (2014). doi: 10.1007/978-3-319-14136-7_51

17. Andrade, I., Prates, M.: An information literacy strategic project implementation at Universidade Nova de Lisboa: Case presentation. In: 12th EAHIL Conference: Discovering New seas of Knowledge: Technologies, Environments and Users in the Future of Health Libraries. European Association for Health Information and Libraries [EAHIL], Estoril (2010)

18. Silva, A.M., Marcial, V.F., Martins, F.: Lessons on information literacy research: a Portuguese experience. In: Kurbanoglu, S., et al. (eds.) Information Literacy: Lifelong Learning and Digital Citizenship in the 21st Century, pp. 180–188. Springer, Heidelberg (2014)

19. Lopes, C.A.: As competências da literacia da informação integradas nos curricula académicos. In: Actas do Congresso Nacional de Bibliotecários, Arquivistas e Documentalistas (No. 12), Lisboa, BAD (2015)

20. Martins, J.T., Canhoto, R.: The use of narrative in organisational learning: making sense of information literacy interventions. In: 14th European Conference on Research Methodology for Business and Management Studies, Univ Malta, Valletta, Malta, 11–12 June 2015
21. Martins, J.T., Martins, R.M.: Portuguese school libraries evaluation model: an analysis of primary schools' results for the 'reading and literacy' domain. Aust. Libr. J. **61**(4), 265–280 (2012)
22. Terra, A.L.: Information literacy skills of Portuguese LIS students: some topics on evaluation of resources credibility. In: Kurbanoglu, S., et al. (eds.) Information Literacy: Lifelong Learning and Digital Citizenship in the 21st Century, pp. 752–762. Springer, Heidelberg (2014)
23. Terra, A.L., Sá, S.: Strategies to assess web resources credibility: results of a case study in primary and secondary schools from Portugal. In: Kurbanoğlu, S., et al. (eds.) Worldwide Commonalities and Challenges in Information Literacy Research and Practice, pp. 492–498. Springer, Heidelberg (2013)
24. Lopes, C., Pinto, M.: IL-HUMASS – Instrumento de Avaliação de Competências em Literacia da Informação: um Estudo de Adaptação à População Portuguesa (Parte I). In: 10º Congresso Nacional de Bibliotecários, Arquivistas e Documentalistas: Politicas de Informação na Sociedade em rede, BAD, Guimarães (2010). http://hdl.handle.net/10400.12/200
25. Silva, A.M.: Modelos e Modelizações em Ciência da Informação: o Modelo eLit.pt e a Investigação em Literacia Informacional. Prisma.Com, CETAC.Media 13, Aveiro (2010). http://revistas.ua.pt/index.php/prismacom/article/view/785/710
26. Sanches, T.: O Contributo da Literacia de Informação para a Pedagogia Universitária: um Desafio para as Bibliotecas Académicas. Instituto de Educação, Universidade de Lisboa, Lisboa (2014). http://hdl.handle.net/10451/10773
27. Kanitar, F.P.: Avaliação de Competências Relacionadas com a Literacia de Informação: um Estudo no Contexto de Pós-Graduações em Educação. Doutoramento, Departamento de Educação, Departamento de Comunicação e Arte, Universidade de Aveiro, Aveiro (2014). http://hdl.handle.net/10773/12719
28. Braga, M.I.P.: A Literacia de Informação no Ensino Politécnico: Competências e Práticas numa Escola Superior. Doutoramento, Faculdade de Letras, Universidade do Porto, Porto (2014). http://sigarra.up.pt/flup/pt/publs_pesquisa.show_publ_file?pct_gdoc_id=94534
29. Cordeiro, R.P.F.: Competências em Literacia da Informação: Estudo de Caso: Alunos de uma Escola E.B. 2,3. Mestrado, Departamento de Ciências da Educação e do Património, Universidade Portucalense, Porto (2011). http://repositorio.uportu.pt/jspui/bitstream/11328/86/2/TMEB%206.pdf
30. Tomé, M.D.C.: A Biblioteca Escolar e o Desafio da Literacia da Informação: um Estudo Empírico no Distrito de Viseu. Mestrado, Departamento de Ciências da Educação, Universidade Aberta, Lisboa (2008). https://repositorioaberto.uab.pt/bitstream/10400.2/1222/1/Tese.pdf
31. Henriques, S.M.J.O.: Literacia da Informação: Projecto para Formação de Utilizadores na Biblioteca CDI da Faculdade de Medicina da Universidade de Lisboa. Mestrado, Faculdade de Letras, Universidade de Lisboa, Lisboa (2012). http://hdl.handle.net/10451/6158
32. Bastos, V.M.: Literacia de Informação: Paradigma de Desenvolvimento de Competências de Informação na Formação Docente em Angola. Mestrado, Faculdade de Letras, Universidade de Lisboa, Lisboa (2010). http://hdl.handle.net/10451/4246
33. Pedroso, F.M.F.: Literacia da Informação: um Projeto de Intervenção no Âmbito dos Comportamentos Informacionais dos Adolescentes. Mestrado, Departamento de Ciências da Educação e do Património, Universidade Portucalense, Porto (2012). http://hdl.handle.net/11328/929

34. Ferreira, S.R.R.: Literacia na Gravidez: Utilização da Internet como Fonte de Informação. Mestrado, Escola Superior de Enfermagem de Coimbra, Coimbra (2014). http://repositorio.esenfc.pt/rc/index.php?module=repository&target=details&id_sp=4530&l=1

35. Mendinhos, I.M.G.B.S.: A Literacia da Informação em Escolas do Concelho de Sintra. Mestrado, Departamento de Educação e Ensino a Distância, Universidade Aberta, Lisboa (2009). https://repositorioaberto.uab.pt/bitstream/10400.2/1382/1/Binder3.pdf

36. Cravo, F.M.C.: As Bibliotecas Escolares e a Literacia da Informação: um Projeto numa Turma de 2º Ciclo. Mestrado, Instituto de Educação, Universidade de Lisboa, Lisboa (2014). http://hdl.handle.net/10451/16161

37. Augusto, M.D.J.G.: Literacia de Informação na Polícia de Segurança Pública. Mestrado, Instituto Superior de Contabilidade e Administração do Porto, Instituto Politécnico do Porto, Porto (2013). http://hdl.handle.net/10400.22/3214

38. Dias, M.D.L.A.: O Papel da Biblioteca Escolar no Desenvolvimento da Literacia de Informação e da Literacia Digital em Articulação com a Área de Projeto e Outros Contextos Letivos. Mestrado, Departamento de Educação à Distância, Universidade Aberta, Lisboa (2011). http://hdl.handle.net/10400.2/2558

39. Costa, C., Jorge, A., Pereira, L.: Media and information literacy policies in Portugal (2013). In: Anr Translıt and Cost "Transforming Audiences/Transforming Societies" (2014). http://ppemi.enscachan.fr/data/media/colloque140528/rapports/PORTUGAL_2014.pdf

40. CNE - Conselho Nacional de Educação. http://www.cnedu.pt/pt/

41. COMISSÃO EUROPEIA: Recomendação do Parlamento Europeu e do Conselho: de 18 de Dezembro de 2006: Sobre as Competências Essenciais para a Aprendizagem ao Longo da Vida. Jornal Oficial da União Europeia **962**, 10–18 (2006). http://www.ifdr.pt/ResourcesUser/OutrosInstrumentosApoio/IC2007_2013/Rec_962_2006.pdf

42. CNE - Conselho Nacional de Educação: Parecer Sobre Metas Educativas 2021. In: Diário da República, Parecer n.º 5/2010 de 20/09, pp. 47612–47617. Ministério da Educação e Ciência, Lisboa (2010)

43. CNE - Conselho Nacional de Educação: Recomendação sobre Educação para a Literacia Mediática. In: Diário da República, Recomendação, vol. 6/2011 de 30/12, pp. 50942–50947. Ministério da Educação e Ciência, Lisboa (2011)

44. Nunes, M.B.: Leitura, Literacias e Inclusão Social: Novos e Velhos Desafios para as Bibliotecas Públicas. In: Lopes, J.T. (ed.) Práticas de Dinamização da Leitura: Colectânea de Textos, pp. 48–59 (Públicos). Sete-Pés, Porto (2007)

45. Parreira, Z., Calixto, J.A.: A regulamentação legal das bibliotecas públicas. In: 11º Congresso Nacional de Bibliotecários, Arquivistas e Documentalistas: Integração, Acesso, Valor Social. BAD, Lisboa (2012). http://www.bad.pt/publicacoes/index.php/congressosbad/article/view/409/pdf

46. Bastos, G.: Collaboration or parallel worlds? Information literacy practices in Portuguese school libraries. In: 17th European Conference on Reading: Literacy & Diversity. Mons, Belgium (2011). https://repositorioaberto.uab.pt/bitstream/10400.2/2142/1/Txt_Bastos.pdf

47. Pereira, L.M.G.: Conceções de Literacia Digital nas Políticas Públicas – Estudo a Partir do Plano Tecnológico da Educação. Doutoramento, Instituto de Ciências Sociais, Universidade do Minho, Braga (2011). http://repositorium.sdum.uminho.pt/bitstream/1822/19825/1/Lu%C3%ADs%20Miguel%20Gon%C3%A7alves%20Pereira.pdf

48. OECD: Education Policy Outlook 2015: Making Reforms Happen. OECD Publishing (2015). doi:10.1787/9789264225442-en

49. Ponte, C.: Digitally empowered? Portuguese children and the national policies for internet inclusion. Estudos em Comunicação/ Commun. Stud. **11**, 49–66 (2012). http://www.ec.ubi.pt/ec/11/pdf/EC11-2012Mai-03.pdf

50. OECD: OECD Skills Strategy Diagnostic Report: Portugal. OECD Publishing (2015). http://skills.oecd.org/developskills/documents/Portugal-Diagnostic-Report-web.pdf
51. Crowther, J., Hamilton, M., Tett, L.: Powerful Literacies. NIACE, London (2001)
52. Conde, E., Mendinhos, I., Correia, P., Martins, R.: Aprender com a Biblioteca Escolar: Referencial de Aprendizagens Associadas ao Trabalho das Bibliotecas Escolares na Educação Pré-escolar e no Ensino Básico. Rede de Bibliotecas Escolares, Lisboa (2012)

Action Plan for Improving the Learning Practices and Motivation of LIS Students

Tania Todorova[(✉)], Elena Ignatova, and Irena Peteva

University of Library Studies and Information Technologies, Sofia, Bulgaria
{t.todorova,e.ignatova,i.peteva}@unibit.bg

Abstract. In 2013, University of Library Studies and Information Technologies (ULSIT) participated in an international survey *'Information Behaviours and Information Literacy Skills of LIS Students'*. In this paper we will use only *selected results* from two questions, aimed at obtaining information on *student learning skills and study practices when completing course-related assignments* as well as about their *motivation of learning and expression* in an academic environment. The findings showed positive and negative tendencies. In response, we prepared an *Action plan for improving the learning practices and motivation of LIS students*. The core of the Action plan is the new design continuing training program based on the integration between academic education, the university library, and the *LibLab* (Laboratory of Library Technologies, Communications and Informing). We suggest setting up a *Virtual Information System* for users, divided into two main modules - *Electronic Register of Academic Assignments* and *Virtual Personal Workplace*.

Keywords: LIS higher education · ULSIT · Learning practices · Student motivation · Virtual information system

1 Introduction and Background

The main focus in this paper is the Action plan for improving the learning practices and motivation of Library and Information Science (LIS) students at University of Library Studies and Information Technologies (ULSIT).

In 2012–2013, ULSIT participated in an international survey that explored the transferability of information literacy (IL) competencies to the overall research and learning experience of LIS students. The international survey, titled *'Information Behaviours and Information Literacy Skills of LIS Students'*, covered eighteen nations and the collaboration was headed by Saunders and Kurbanoglu [1].

At ULSIT the survey covered students from BA Programmes – "Library and Information Management" and "Library Studies and Bibliography" and some PhD students. It was conducted in December 2012 via a web-based survey (LimeSurvey).

The data obtained from this survey are a valuable source of information and are ripe for a thorough analysis of its theoretical and methodological implementations [2, p. 611]. For the goals of this paper we use only purposeful selected data. We interpreted the findings from two of the fifteen core questions. We aimed our analysis at obtaining

information on *student learning skills and study practices when completing course-related assignments* as well as about their *motivation of learning and expression* in an academic environment.

2 Literature Review

A lot of recently conducted studies and research works reveal interest in the information behavior, learning practices, and motivation of LIS students [1–7]. A valuable source of information is the results from the survey, 'Information Behaviours and Information Literacy Skills of LIS Students', that explored how LIS students from 18 countries approached course-related information tasks. Saunders et al. concluded that there were some patterns of information literacy levels and behavior common to LIS students in general, but that there were also some significant differences in the ways in which LIS students from different countries found and used information for course-related assignments. Both the general patterns of behavior and the cross-country differences had implications for LIS faculty as they prepared their students to take on professional roles [1, pp. 91–92].

Recent studies were dedicated to:

- the influence of reasons approving on student motivation for learning [3];
- the impact of paper-based, computer-based and mobile-based self-assessment on student's science motivation and achievement [4];
- the effects of e-learning on students' motivation [5]; and,
- maximization of student motivation via courses and instructional practices redesign [6, 7].

Innovative projects such as the EU international project, AVATAR, bring us a step closer towards the modernization of education. The AVATAR project provides an opportunity for both teachers and students to benefit from Information and Communication Technology (ICT) skill development and social learning opportunities. The project is a resource that helps revive the traditional classroom environment, adding value to the learning process and enriching the engagement and motivation of learners [8].

3 Survey Findings

3.1 Demographics

Ninety-four respondents out of a target group of 170 students answered all questions; 22 did not complete the whole survey. The students who participated in the study included first year students (10.3%); second year students (21.6%); third year students (39.6%); fourth year students (21.6%); and PhD students (5.2%). One point seven percent of respondents skipped this question. The grade point averages (GPA) of the respondents were: Excellent (5.50–6.00) – 36.2%; Very Good (4.50–5.49) – 40.5%; Good (3.50–4.49) – 6%; and Average (3.00–3.49) – 0.9%; 16.4% of respondents skipped this

question. Two thirds (78.4%) of the respondents were female with 19.0% male; 2.6% of respondents skipped this question. The age distribution of the respondents was the following: 18–20 years (7.8%); 21–23 years (30.2%); 24–26 years (12.1%); 27–29 years (12.9%); 30–32 years (8.6%); 33–35 years (11.1%); over 35 years (14.7%); 2.6% of respondents skipped this question.

Our analysis focused on questions and findings about learning habits, attitudes, and use of productivity, and communication tools from LIS students at ULSIT.

3.2   Students' Learning Skills and Study Practices

We saw a positive trend in the analysis of students' responses regarding practices applied in the process of learning. More than half of the respondents stated that they developed a preliminary plan for work on the assignment and on writing the material; understood the importance of quality information support of the research process, of mastering the terminology, and the ability to formulate a hypothesis or opinion. This finding proved the usefulness of the 2012/2013 introduction in of the compulsory *Academic Writing* discipline in the first semester for all courses in the Faculty of Library Science and Cultural Heritage (FLSCH).

An interesting finding was that more than half of respondents (58%) indicated that they developed their assignment entirely according to their own perspectives and opinions. This self-confidence in self-thinking on a problem of educational content was a positive phenomenon, if indeed it was linked to the achieved quality of the finished training product according to the academic requirements and criteria.

However, a fact that deserved attention was that about a quarter of the students (23%) tended to:

- use the same resources when proceeding from one assignment to another;
- write on the same topic when proceeding from one assignment to the next one, and
- spend as little time as possible doing the assignment.

We observed that duplication of topics negatively impacted student incentive. Instructors needed to introduce an *electronic register of academic assignments* such as essays, term papers, theses, and master theses to overcome this problem.

3.3   Students' Motivation of Learning and Expression

In terms of their motivation for learning, LIS students at ULSIT demonstrated maturity. They were driven by the desire to learn something new (96%) and strove to pass their exams (94%), and get high marks (84%). It made a good impression that more than 80% of the students were motivated to improve their skills for research activities and analytical thinking.

3.4   Students' Technological Skills and Use of Productivity Tools

One of the purposes of our survey was to establish the competence of students on technological skills and the use of productivity and communication tools. We asked students

How often do you use each of these tools to prepare and share your course-related assignments? and offered them these response options: *almost always, often, sometimes, rarely, never*, and *Never heard of that before.*

The survey resulted show us that LIS students at ULSIT used word processors; programs to prepare presentations and a spell checker; sites for sharing photos and images; services such as *Google reader;* and social networks, blogs, and online forums. Teachers in specialized disciplines might find these findings important especially regarding the students' use of tools for management and organization of information on personal computers. Twenty-five percent of respondents answered that they "*almost always*" or "*often*" used these tools while 41% "*Never heard of this before*". When asked about their knowledge of tools for citation management such as RefWorks and EndNote, 21% answered that they "*almost always*" or "*often*" used these tools while 20% said that they "*Never heard of this before*". It is necessary to carry out targeted training to boost the use of productivity tools and citation managers in order to improve the quality of students' learning process and research activities.

We also asked students: *How often do you use the enumerated technical devices to access the information you need (e.g., to databases, library catalogs, and web sites) in the process of preparation of course-related assignments*? From the answers it was apparent that students preferred working with PCs and laptops and, to a lesser extent, mobile phones and tablets.

We invited LIS students to answer the question, *How often do you use the technology to communicate with teachers or librarians in the process of preparation of course-related assignments?* The responses we received showed the students' highest degree of preference was for the use of a personal computer or laptop for written communication via e-mail followed by personal contact; communication via mobile phone through different functions; and the use of SMSs and communication using social networks.

With regard to students' technological skills and their use of tools for preparation and sharing of course-relating assignments, we *concluded* that it was necessary to carry out targeted training in order to boost the use of technical tools and improve the quality of academic writing.

4   Action Plan for Improving the LIS Students Learning Practices and Motivation

How do we to respond to new trends in academic education and improve the LIS students' learning practices and motivation?

In our process of seeking an answer to this question, we developed an *Action plan for improving the learning practices and motivation of LIS students.* The core of the *Action plan* was the new design continuing training program of LIS students. The program was based on the integration between academic education structures, Library and Information Centre (LIC), and the Laboratory of Library Technologies, Communications and Informing (*LibLab*). We suggested setting up a *Virtual Information System for Users* divided into two main modules, (1) an *Electronic Register of Academic Assignments;* and (2) the *Virtual Workplace*.

The virtual learning space cannot be built without the active participation of the university library. The Library and Information Centre and the specialists working therein are important factors in creating conditions of active learning by helping students with their homework and increasing their skills in academic writing, research, and analytical thinking. These actions will serve to stimulate the students' interests in the learning process and their desire for self-improvement.

Here we highlight the important role of the *LibLab*, an innovative project created and implemented at ULSIT 2013 to help in the link the theoretical and practical training of LIS students. The *LibLab* combined educational and scientific initiatives such as:

- application of the latest technological solutions in library practice for the formation of information competencies in terms of the global information environment;
- demonstrating and testing innovative solutions related to interactivity of electronic bibliographic resources;
- applying the *learning by doing* method where students test the theoretical knowledge they have acquired in a working environment as close to the real one as possible and accumulate practical skills for various working processes including a survey of the status of library collections, restoration and conservation of documents, bibliographic control, and prevention.

Peteva et al. concluded that, so far, the friendly and attractive atmosphere of this educational project was a powerful incentive for motivating both students and their tutors in the various scientific fields of the university IT environment [9, pp. 511–512].

One of the main goals of the *Virtual Information System for Users* was to provide a virtual space that offered significant educational value and provided additional opportunities for learning and sharing knowledge for academic purposes. It was designed as a tool to optimize the performance of the functions and tasks of academic education by offering an environment for informal and self study. The environment encouraged student participation with a wide range of tools for social interaction and innovation in education. A valuable feature of the *Virtual Information System for Users* was its ability to adapt and evolve according to the individual needs of individual users and contribute to overcoming their limitations by adding training though traditional media [10, pp. 124–125].

Those involved in building the University *Virtual Information System for Users* followed the *following tasks*. They:

- provided web-based communication among students and teachers participants in the scientific and educational process;
- established a system for virtual learning in individual and/or group environments;
- developed of services to provide access and exchange of scientific content;
- offered Web services for search and retrieval of information; and
- integrated innovative models to create, manage, and use content directed at consumers.

Implementation of this project at ULSIT involved using and upgrading the existing e-learning platform, ILIAS, and electronic library and information services. This required the active participation of specialists from the Faculty of Library Science and Cultural Heritage and the Faculty of Information Sciences. *LibLab* will also carry out

various forms of continuing education for students and teachers. The initiative was inspired also by the achievements of the EU international project, AVATAR, whose primary aim is to enhance the quality of teaching and education in high schools through an innovative virtual world learning environment [11].

Thus, the first module of the *Virtual Information System* for users is the *Electronic Register of Academic Assignments* including abstracts, term papers, theses, and master theses. Here, the teaching staff will be provided with the opportunity to track the progress of individual students. Tutors can adopt an individual approach in their work with lagging students while outstanding students will be mentored.

In the Second module, *Virtual Workplace*, the users can create their own profile to:

- store their documents;
- compile lists of literature;
- add comments and keywords;
- input or output information from and to other systems; and,
- creates links from one page to another; these links can be used for navigation to share relevant knowledge.

The creation of the *Virtual Information System for Users* in ULSIT will lead to the achievement of the following results:

- formation of a flexible, interactive and modern approach to online communication between teachers and students;
- creation of an information environment based on the fundamental principles of knowledge management;
- development of a virtual library, of thematic blogs, of discussion forums for exchanging experience and knowledge;
- application of interactive teaching methods and establishment of a virtual learning environment for collaboration.

The system will make accessible digitized materials, modules of educational contents, electronic books and other materials.

The mission of the *Virtual Information System for Users* is to (1) support the implementation of the transfer of information, knowledge and research; (2) assist in improving the quality of student learning skills and study practices; and, (3) stimulate the commitment and motivation of students and teachers.

5   Conclusion

Modern higher education should not be one-way communication channel from teachers to students. In today's increasingly interactive world, education must engage young people, focus on their creative thinking, and make them full participants in the learning process. Students should not only be recipients who are granted access to knowledge acquisition but they must be communicators contributing to the accumulation and transfer of knowledge in an interactive information environment. Today, ICT enables dynamic modification of the model of process of learning where, with the help of

technology and technical support, a real situation or process can be imitated. This simulation enables students to apply their knowledge, show creativity in analyzing the modeled situation, and offer solutions for the tasks assigned. The presence of such interactive educational space contributes to:

- increasing the efficiency and quality of education;
- improving students' learning, research skills, and motivation; improving the conditions for further and continuing education;
- optimizing the performance management of individual universities and the education system as a whole;
- integrating the national information-education systems in the global network; and
- ensuring their presence in the global educational and scientific space.

We found through our observations and conclusions from this institutional and international comparative study of information literacy competencies that through these efforts the LIS students improved their overall research and learning experiences. This largely resulted from the multifaceted application for the improvement of the institutional educational policies and practices in ULSIT. They are reflected in primary objectives and activities of the developed *Action Plan for improving the LIS students learning practices and motivation*, which was implemented in three phases: (1) preparatory; (2) actual execution; and, (3) evaluation of the performance and its impact. Currently it is in the preparatory stage and the implementation will start with the beginning of 2016/2017 Academic Year.

Our strategic goal was the establishment of updated training methodology and services for our students. These actions followed the new concept of integrating the *knowledge triangle* (education, research and innovation) at the institutional, national, and European levels according the European Institute of Innovation and Technology (EIT) Strategic Innovation Agenda (SIA) 2014–2020 [12].

References

1. Saunders, L., et al.: Information behaviors and information literacy skills of LIS students: an international perspective. J Educ. Libr. Inf. Sci. (JELIS) **56**(1), 80–99 (2015)
2. Todorova, T., Peteva, I.: Information literacy competency of LIS students in SULSIT with a special focus on intellectual property. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 610–616. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_82
3. Panisoara, G., Duta, N., Panisoara, I.-O.: The influence of reasons approving on student motivation for learning. Procedia Soc. Behav. Sci. **197**, 1215–1222 (2015)
4. Stavros, A.N., Economides, A.A.: The impact of paper-based, computer-based and mobile-based self-assesment on student's science motivation and achievement. J. Comput. Hum. Behav. **55**(Part B), 1241–1248 (2016)
5. Harandi, S.R.: Effects of e-learning on student's motivation. Procedia Soc. Behav. Sci. **181**, 423–430 (2015)
6. Owen, P.M.: Maximizing student motivation: a course redesign. Procedia Soc. Behav. Sci. **186**, 656–659 (2015)

 7. Schiefele, U., Schaffner, E.: Teacher interests, mastery goals, and self-efficacy as predictors of institutional practices and student motivation. J. Cont. Educ. Psychol. **42**, 159–171 (2015)
 8. Stadler, B.: The AVATAR project brings virtual worlds into the classroom. https://www.fh-joanneum.at/ca/i/bytc/?output=printerfriendly&lan=en
 9. Peteva, I., Denchev, S., Aleksandrova, K.: The role of library laboratory (LibLab) as an innovative project for science education in university information environment. In: Conference Proceedings of the International Conference on the New Perspectives in Science Education, vol. 5, pp. 510–514. Liberiauniversitaria (2016)
10. Ignatova, E.: University Library Transformations. Za Bukvite-O pismeneh, Sofia (2015). (in Bulgarian)
11. Monova-Zheleva, M., Zhelev, Y.: Added value of teaching in a virtual world in the context of the AVATAR project. http://research.bfu.bg:8080/jspui/handle/123456789/106
12. EIT Strategic Innovation Agenda (SIA) 2014–2020. http://eit.europa.eu/interact/bookshelf/eit-strategic-innovation-agenda-sia-2014-2020

Academic Libraries

Intervening Conditions Inside and Outside Libraries in Order to Build Collaboration Between Teaching Faculty and Librarians in Education: Based on a Case Study of Earlham College

Tayo Nagasawa[✉]

Research Development Office, University Library, Mie University, Tsu, Japan
nagasawa.tayo@mie-u.ac.jp

Abstract. A recent massive higher educational reform has asked college and university libraries to review their services inclusive of these reforms. A constructive relationship between teaching faculty and librarians was recognised as contributing to the success of information literacy initiative and information literacy instruction. The purpose of this paper is to explore the research question, "what are the intervening conditions in library, institutional and social contexts which promote collaboration between teaching faculty and librarians," based on a case study of Earlham College. The data, such as a literature review, archival records, interview data and observational data, were collected and analysed through a grounded theory approach. The results show that "leadership of library directors," "librarians as instructors" and "librarians' faculty status" are important factors in the library context. "Small community," "flat hierarchy" and "teaching faculty as educators" were discovered as the important themes in the college context.

Keywords: Collaboration · Faculty-librarian relationship · Information literacy instruction · Case study · Grounded theory · Earlham College

1 Introduction

A recent massive educational reform at an international level, including development of generic skills among undergraduates and construction of internal quality assurance systems in higher education, has motivated college and university libraries to review their services to ensure consistency with these reforms. As a result, information literacy has been identified as part of graduate attributes, and information literacy instruction (ILI) should be a component of higher educational systems. Among the factors contributing to the success of information literacy initiatives and ILI, a constructive relationship between teaching faculty and librarians has been recognised [1, 2].

2   Literature Review

In terms of building successful collaborations between teaching faculty and librarians, previous studies have offered two main research perspectives. One was librarians' strategic approaches to teaching faculty. The other was library, institutional and social contexts which promote collaboration building. Regarding librarians' strategic approaches to teaching faculty, findings such as "educational development," "interpersonal communication," "shared goals/values/means" and "working with other campus units" were extracted [3–8]. Similarly, regarding the library, institutional and social contexts, findings such as "librarians' competencies/experiences," "teaching faculty's attitudes toward libraries/librarians" and "accrediting agencies" were extracted [1, 2, 6, 9–11].

Although these studies indicated various elements regarding both perspectives, few studies have shown the holistic views inclusive of both perspectives [1, 2, 5, 6]. In order to gain an overall picture with actual interactions between both perspectives, those elements under a single context should be correlated. There are findings on the strategic approaches such as "librarians as facilitators," "proactive approaches," "customised ILI" and "instructional support for teaching faculty" under a single context [12–14] (Fig. 1). This paper investigates elements inside and outside libraries which promoted these strategic approaches in the same context, and indicates the overall picture of collaboration building between teaching faculty and librarians in education.
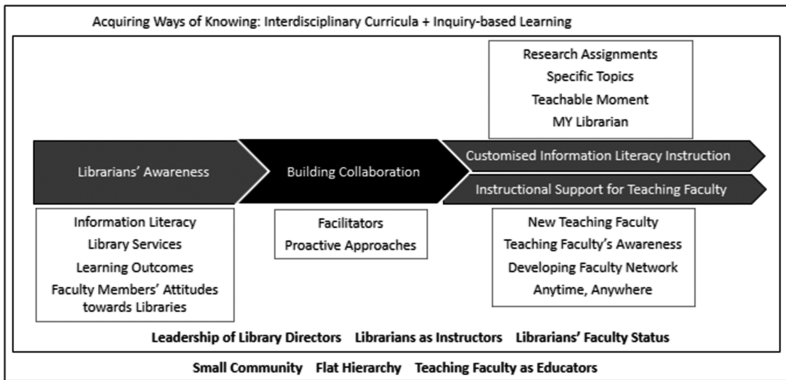
Fig. 1. Model of collaboration building between teaching faculty and librarians at Earlham College

3   Methodology

The research question is "what are the intervening conditions in library, institutional and social contexts which promote collaboration between teaching faculty and librarians." In order to answer this question, a qualitative case study was selected, because a holistic approach should be adopted. As a benchmark, Earlham College was selected in terms of purposeful sampling, in particular maximum variation sampling. Merriam mentioned maximum variation sampling as follows:

A grounded theory … would be more conceptually dense and potentially more useful if it had been "grounded" in widely varying instances of the phenomenon. Findings from even "a small sample of great diversity" yields "important shared patterns that cut across cases and derive their significance from having emerged out of heterogeneity" [15, pp. 62–63].

Earlham College is a private liberal arts college located in Richmond, Indiana, the United States of America. Since the 1960s, its diverse practices of collaboration building between teaching faculty and librarians have resulted in better student outcomes [16], and have influenced many college and university libraries [17].

The data collected in this study, including a literature review, interview data, archival records, administrative documents, reports, dissertations, data on physical artifacts, and observation data were collected between March 2004 and September 2014 including seven on-campus visits. As for interviews, eight teaching faculty and fourteen librarians including library directors were asked about their experiences in relationship building between teaching faculty and librarians (Table 1). Interviews were semi-structured, and were audio recorded and transcribed (Table 2). The data were analysed by open-, axial- and selective-coding using an inductive method, in particular a grounded theory approach [18].

As the results of the analysis, "leadership of library directors," "librarians as instructors" and "librarians' faculty status" were discovered as important factors in the library context. Similarly, "small community," "flat hierarchy" and "teaching faculty as educators" were discovered as important factors in the college context. No factor in the social context was discovered (Table 3).

4   Results and Discussion

4.1   Intervening Conditions Inside Libraries

Leadership of Library Directors. Similar to "librarians as facilitators" as a factor on a strategic approach, library directors were also facilitators at the College level in order to build collaboration between the College and the Library, including teaching faculty and librarians in various ways. Shane indicated "library director's commitment level" as a factor affecting the creation and implementation of a campus-wide information literacy programme. Access or interaction with key individuals, such as administrators and chairs of schools or curriculum committees, via librarians or library directors was considered to be an efficient method of marketing information literacy programming [2]. In general, library directors had more connections with administrators and teaching faculty than librarians. At Earlham College, the library director asked the curriculum committee if a librarian could become an observer in the committee, because knowing current situations of the College programmes would be important for librarians [A (code in Table 1)]. In addition, library directors occasionally introduced new teaching faculty to librarians, because they had already met new teaching faculty during their job interviews [P]. By being involved in current situations in both the College and the Library, library directors directly and indirectly committed to building collaboration between teaching faculty and librarians, especially, their first contacts [16].

There were some contexts which promoted library directors' commitment as facilitators. Firstly, the library directors had experience working as librarians. Therefore, at

Table 1. List of Informants (*Telephone interviews, **Group interviews)

Code	Informants (Academic backgrounds)	Period	Time (mins)	Dates	Sex
A	Library Director I	1962–1994	45	19/05/2004	M
			70	20/05/2004	
B	Library Director II	2001–2010	40	30/03/2004	M
			24	31/03/2004	
			95	19/05/2004	
			50	01/07/2005	
	Librarian (Science)	1965–1979	80	15/03/2007	
			90	26/10/2012*	
			90	01/11/2012*	
C	Library Director III	2011	60	29/03/2004	M
	Librarian (Languages, English, Philosophy)	1998–2011	20	27/05/2004*	
			55	01/10/2012	
			120	02/10/2012	
			100	19/09/2014	
D	Librarian (Politics, Psychology, HDSR, Art)	1981–2012	35	30/03/2004	F
			82	18/09/2014**	
E	Librarian (Biology, Chemistry, Computer Science, Geosciences, Math, Physics)	1982–2011	13	20/09/2005	F
			82	18/09/2014**	
F	Librarian (Religion, English, Music, Peace and Global Studies (PAGS), Women's Studies)		60	29/03/2004	F
			80	19/05/2004	
			7	19/09/2005	
G	Librarian (Management, Economics, History)	2000	70	29/03/2004	F
			73	19/05/2004	
			112	02/10/2012	
			10	03/10/2012	
H	Librarian (History, Theater, Jewish Studies)		67	30/03/2004	F
I	Librarian		10	21/09/2005	M
J	Librarian		23	30/03/2004	F
K	Librarian (Humanities, English, Religion, Philosophy, Classics)	2012	40	01/10/2012	F
L	Librarian (Social Sciences)	2012	58	03/10/2012	F
M	Librarian: Technical Services Librarian		62	03/10/2012	F
N	Librarian: Academic Projects Librarian		10	03/10/2012	M
O	Librarian (Biology, Chemistry, Computer Science, Environmental Science, Geosciences, Math, Physics)	2011	30	12/09/2014	M
P	Teaching faculty (Politics)		30	22/09/2005	M
Q	Teaching faculty (Psychology)		35	22/09/2005	F
R	Teaching faculty (Japanese Studies)		63	19/03/2007	F
S	Teaching faculty (History, Jewish Studies)		45	22/09/2005	M
T	Teaching faculty (ELS, Thematic Studies Abroad)		37	16/03/2007	F
U	Teaching faculty (Art)		57	19/03/2007	M
V	Teaching faculty (First Year Education)		28	16/03/2007	F
W	Teaching faculty (French and Francophone Studies)		35	03/10/2012	F

Table 2. Questions to informants

Questions to Teaching Faculty
• How do teaching faculty work with librarians on campus?
• How do teaching faculty evaluate students' library/information use in their courses?
• What are teaching faculty's attitudes towards libraries and librarians?
• How did teaching faculty use libraries when they were undergraduate students and graduate students?
Questions to Librarians/ Library Directors
• What kinds of information literacy instruction do librarians provide for students?
• What kinds of instructional support services do librarians provide for teaching faculty?
• How do librarians work with teaching faculty in students' learning?
• How do librarians work with other campus units?
• How do librarians communicate with other librarians, teaching faculty and staff on campus, formally and informally?
• How do librarians develop their competencies regarding pedagogical skills?

their installation as library directors, they already knew libraries. In particular, since library directors II and III were librarians at Earlham College, they were familiar with ILI in collaboration with teaching faculty from the beginning. Even after becoming library directors, they worked on the reference desk and in ILI as did other librarians. Their responsibility for ILI showed in their job descriptions[1]. Knowing what actually happened at the front line was considered important for their library management [A]. Secondly, because the directorships were full-time jobs, not additional duties of administrators or teaching faculty, library directors spent most of their time and effort on library management, including collaboration building. Thirdly, their long-term obligations helped them in designing and attaining long-range plans. Library director I worked for thirty-two years [19], and library director II worked for around ten years [C]. At Earlham College, not only library directors but also librarians worked for a long time. Therefore, designing and attaining long-range plans was promoted, because their long-term obligations helped both of them in sharing goals, values and means [D], [E].

Librarians as Instructors. As librarians, engaging in ILI was considered the first priority, not as an additional duty. Therefore, their job descriptions clearly defined their involvement in ILI in collaboration with teaching faculty (see footnote 1). In order to concentrate on and allocate enough time and effort for ILI, librarians optimised their duties. Lower priorities were given to writing annual reports and collecting various kinds of statistics [20], and supporting and student staff engaged in routine activities [B]. Since librarians used their discretion in most of their duties without their superiors' permission and provided ILI mainly for courses with research assignments [G], they were able to make their effort more efficient. In order to recognise the information needs of teaching faculty, librarians took significant time and effort to communicate with them through e-mails, phone calls, meetings, and, when necessary, workshops.

Based on these needs, librarians designed ILI customised to each course [13]. Librarians' self-image was not as gatekeepers of books, but as College staff involved in education [E]. Librarians designed and reflected ILI viewed from how students worked,

---

[1] Job descriptions: library director II, librarians C, D, E, F and G (01/07/2005).

Table 3. Properties and Dimensions* of intervening conditions

Categories	Properties	Dimensional range	Dimensions
Leadership of library directors	Career	Staff — Librarians — Teachers/Instructors — Administrators	Librarian
	Duties	Routine — Service — Instruction — Management	Instruction/Management
	Perspective	Behind the front — Front line	Front line
	Directorship	Additional duty — Full-time Job	Full-time Job
	Obligation period	Short-term — Long-term	Long-term
Librarians as instructors	Duties	Routine — Service — Instruction — Management	Service/Instruction
	Instructional duty	Ad Hoc — Additional — Regular — Primary	Primary
	Discretion	No — Little — Some — Almost — Entire	Almost
	Routine	Student assistants — Library assistants — Librarians	Student assistants/Library assistants
	Developing competencies	Own experience — Sharing with colleagues — On/Off campus programmes — Information study courses	Own experience/Sharing with colleagues
Librarians' faculty status	Status	Hourly staff — Administrative faculty — Teaching faculty	Administrative faculty
	Period	Short-term — Long-term	Long-term
	Committees	Libraries — Campus	Campus
	Roles	Observers — Members — Selective members	Members/Selective members
	Political power	Nothing — Weak — Strong	Strong
Small community	Institutional size	Small — Big — Plural	Small
	Number of campus	One — A few — Several	One
	Style	Informal — Formal	Informal
	Communication	No — Seldom — Sometimes — Often — Always	Often
	Extent	Inside units — Inside departments — Campus-wide	Campus-wide
	Decision making	Informal — Formal	Informal
Flat hierarchy	Social structure	Flat — Hierarchical	Flat
	Decision-making	Bottom-up — Consensus — Top-down	Consensus
	Principle	Equality — Autocracy	Equality
	Status gap	Nothing — Small — Big	Very Small
Teaching faculty as educators	Roles	Educators — Researchers — Administrators	Educator
	Identity	Educators — Researchers — Administrators	Educator
	Interests in education	Nothing — Low — Middle — High	High

* Properties are the characteristics or attributes of a category. Dimensions represent locations of a property along a continuum [18, p. 69].

not how libraries performed [B]. Based on the content analysis of an ILI listserv, Julien et al. revealed some librarians' self-image as full-fledged faculty and rivalrous attitudes toward teaching faculty [10]. At Earlham College, on the presupposition that the heart of the College was not libraries but the learning and educational process [A], librarians regarded themselves as facilitators, who were involved in education, not the same as teaching faculty. Library Director I explained this as follows:

> We disagree strongly here with some devotees of the library-college concept. We feel that while the teaching faculty have the central responsibility in the educational enterprise, librarians can help them carry out that responsibility much more effectively and at the same time enhance it [21, p. 14].

As for librarians' competencies and experiences, Julien et al. state that results of their survey showed some librarians regarded the inadequate pedagogical skills and experience of library staff teaching ILI as institutional challenges [22]. At Earlham College, although the Library mostly hired librarians who had experiences or interests in education [E], pedagogical skills were not necessarily considered to be important [C]. Taking time and effort to design customised ILI in collaboration with teaching faculty was considered more important than developing their pedagogical skills.

Librarians' Faculty Status. The librarians' faculty status promoted librarians joining the campus community. As holders of this status, librarians were entitled to attend faculty meetings as regular members, and to be selected as campus committee members. These entitlements brought librarians more opportunities to follow what actually happened at the College, and, consequently, to understand the potential information needs of teaching faculty and the College. Based on this understanding, librarians were able to approach particular teaching faculty or campus units. There was an example where a librarian as a curriculum committee member gained ideas on a new curriculum. Then, librarians proposed the new ILI model appropriate for the new curriculum in the decision making process [B].

Shane indicated librarians' faculty status affected some constituents' perceptions toward the library, and such perceptions affected collaboration between teaching faculty and librarians [2]. At Earlham College, librarians' entitlements also changed teaching faculty's attitudes toward librarians. Working as selective members of the Faculty Affairs Committee, librarians advised the administration on all tenure, promotion, retention, and hiring decisions. Moreover, when librarians chaired committees, at faculty meetings librarians were able to report the discussion of the committees[2]. Owing to a position of visible power, teaching faculty realised librarians' political power on campus [C]. As a result, teaching faculty regarded librarians as their colleagues, and these perceptions promoted teaching faculty to work with librarians [16].

4.2   Intervening Conditions Outside Libraries

Small Community. Earlham College has a single campus. The constituents were 1,200 undergraduates, around 100 teaching faculty, and 246 staff including 12.8 librarians.

---

[2] Earlham College Faculty Minutes (23/11/1971).

The average class size was 17.6 students [23]. Because of the size, every constituent knew each other. Library director II said, "I knew all [teaching] faculty, they all knew me" [B]. On campus, they bumped into each other very often, and casually exchanged information and ideas. As well as gaining potential information needs of teaching faculty through informal communications, librarians informed teaching faculty about new library services and programmes [F]. Although there were some teaching faculty who forgot to request ILI for their next courses, bumping into librarians reminded them to ask for it [C]. Librarians played roles not only as facilitators but also as walking posters. Black et al. set "development of interpersonal relationships between teaching faculty and librarians" into the collaboration model, and explained that the trust fostered by the interpersonal relationships paved the way for collaboration in ILI [3]. A small community such as Earlham College promoted interpersonal relationships between constituents, and librarians linked these relationships to collaboration in formal settings.

Because of the size, decision making processes on campus were not always formal. Library directors and librarians did not usually go through a long process of negotiations and procedures before starting new services. Rather, they applied the motto "Just do it." As for taking part in interviews with faculty candidates and teaching courses in the departments, library directors informally and directly asked teaching faculty in charge, and teaching faculty accepted on the spot [B].

Flat Hierarchy. The Society of Friends founded Earlham College in 1847. Consensus was regarded as important for decision making process on campus based on Quakerism, which followed equality as its creed. "Quakers carry on organizational matters - that is by consensus." [21, p. 146] Therefore, librarians were scarcely aware of a big status gap between teaching faculty and librarians. This flat structure helped librarians to work with teaching faculty as their colleagues [F].

Based on interviews with forty-eight academic librarians with instructional responsibilities, Julien et al. revealed an unequal balance of power relationships between teaching faculty and librarians, and teaching faculty on the apex in this established relationship. Therefore, teaching faculty "gifted" their time to librarians for ILI, and gifting created an obligation to reciprocate [1]. In contrast, at Earlham College, librarians were hardly concerned about an unequal balance of power relationships, because of the campus culture. Since teaching faculty regarded librarians as their colleagues [P], librarians did not feel exploited nor feel any disrespect toward librarians.

Teaching Faculty as Educators. Earlham College is a liberal arts college. Since the main duty of teaching faculty was considered to be teaching, the applications for teaching faculty positions described that clearly[3]. Orientations for new teaching faculty provided by the College focused on teaching, not research [C]. Teaching faculty explained, "[t]he faculty pride themselves on their close and informal relationships with students and on their continual and yet gradual innovations in teaching" [24, p. 162]. Based on literature reviews on the culture of teaching faculty, Hardesty revealed "[a] major element in faculty culture is that teaching is not highly discussed among faculty" [9, p. 349].

---

[3] Application for the position: Earlham College (2005).

Teaching faculty have complete professional autonomy combined with academic freedom, and militate against inviting others such as librarians to share in the teaching process. Furthermore, librarians' perceptions of teaching faculty focused on their lack of time, and the resistance to change [9]. In such contexts, collaboration between teaching faculty and librarians in education would be unachievable. On the other hand, at Earlham College, the teaching faculty, focused on teaching and had interest in education, and had no strong resistance to collaborate with librarians in their courses because both teaching faculty and librarians were able to share the same interests and goals in education.

Table 4. Correlations between categories or strategic approaches and categories on intervening conditions

Strategic approaches intervening conditions	Librarians as facilitators	Proactive approaches	Customised ILI	Instructional support for teaching faculty
Leadership of library directors	X			
Librarians as instructors	X	X	X	X
librarians' faculty status		X		
Small community	X	X		
Flat hierarchy	X		X	X
Teaching faculty as educators			X	X

5   Conclusion

The research question is "what are the intervening conditions in library, institutional and social contexts which promote collaboration between teaching faculty and librarians." The data analysis showed that, "leadership of library directors," "librarians as instructors" and "librarians' faculty status" were factors in the library context, and "small community," "flat hierarchy" and "teaching faculty as educators" were identified as factors in the college context. No category in the social context was discovered. These factors show some resemblances to factors from previous studies. "Librarians as instructors" and "librarians' faculty status" were similar to "librarians' competencies/experiences," and "flat hierarchy" was similar to "teaching faculty's attitudes toward libraries/librarians." Since Earlham College Library started their collaboration building in the 1960s, "accrediting agencies" was not identified.

Based on previous studies of Earlham College, factors related to strategic approaches such as "librarians as facilitators," "proactive approaches," "customised ILI" and "instructional support for teaching faculty" were discovered. In this paper, factors related to intervening conditions such as "leadership of library directors," "librarians as instructors" and "librarians' faculty status" were discovered. Based on the indication of correlating factors related to strategic approaches and the intervening conditions in a single context, this paper showed the actual overall picture of collaboration building between teaching faculty and librarians (Fig. 1, Table 4).

This paper suggests a grounded theory on collaboration building between teaching faculty and librarians in education, based on a case study of Earlham College. Future research is needed to expand this grounded theory and compare it to theoretical frameworks regarding the faculty-librarian relationship, such as relationship marketing and interprofessional collaborations, as well as to analyse models developed from multiple case studies, including this case study, through thematic coding appraoch.

References

1. Julien, H., Pecoskie, J.: Librarians' experiences of the teaching role: grounded in campus relationship. Libr. Inf. Sci. Res. **31**(3), 149–154 (2009)
2. Shane, J.M.Y.: Formal and informal structures for collaboration on a campus-wide information literacy program. Resour. Sharing Inf. Netw. **17**(1/2), 85–110 (2004)
3. Black, C., Crest, S., Volland, M.: Building a successful information literacy infrastructure on the foundation of librarian-faculty collaboration. Res. Strat. **18**, 215–225 (2001)
4. Bruce, C.: Faculty-librarian partnerships in australian higher education: critical dimensions. Ref. Serv. Rev. **29**(2), 106–115 (2001)
5. Machin, A.I., Harding, A., Derbyshire, J.: Enhancing the student experience through effective collaboration. New Rev. Acad. Librarianship **15**, 145–159 (2009)
6. Amante, M.J., Extremeno, A., da Costa, A.F.: Modelling variables that contribute to faculty willingness to collaborate with librarians. J. Librarianship Inf. Sci. **45**(2), 91–102 (2012)
7. Phelps, S.F., Campbell, N.: Commitment and trust in librarian-faculty relationships: a systematic review of the literature. J. Acad. Librarianship **38**(1), 13–19 (2012)
8. Henry, J.: Academic library liaison programs: four case studies. Libr. Rev. **61**(7), 485–496 (2012)
9. Hardesty, L.: Faculty culture and bibliographic instruction: an exploratory analysis. Libr. Trends **44**(2), 339–367 (1995)

10. Julien, H., Given, L.: Faculty-librarian relationships in the information literacy context. Can. J. Inf. Libr. Sci. **27**(3), 65–87 (2003)
11. Ducas, A.M., Michaud-Oystryk, N.: Toward a new enterprise: capitalizing on the faculty-librarian partnership. Coll. Res. Libr. **64**(1), 55–74 (2003)
12. Nagasawa, T.: Librarians' approaches to developing nodal points in order to build collaboration between faculty members and librarians in education. J. Jpn. Soc. Libr. Inf. Sci. **58**(1), 18–34 (2012) (In Japanese)
13. Nagasawa, T.: Customized learning support services in order to build collaboration between faculty members and librarians in education. J. Jpn. Soc. Libr. Inf. Sci. **58**(4), 185–201 (2012) (In Japanese)
14. Nagasawa, T.: Instructional support services to faculty members in order to build collaboration between faculty members and librarians in education: based on a case study of Earlham college. Libr. World **67**(4), 228–243 (2015) (In Japanese)
15. Merriam, S.B.: Qualitative Research and Case Study Applications in Education. Jossey-Bass, San Francisco (1998)
16. Hardesty, L., Hastreiter, J., Henderson, D. (eds.): Bibliographic Instruction in Practice: A Tribute to the Legacy of Evan Ira Farber. Pierian Press, Ann Arbor (1993)
17. Grassian, E.S., Kaplowitz, J.R.: Information literacy instruction. In: Bates, M.J., Maack, M.N. (eds.) Encyclopedia of Library and Information Sciences, 3rd edn, pp. 2429–2444. CRC Press, Boca Raton (2010)
18. Strauss, A., Corbin, J.: Basics of Qualitative Research. Sage, London (1998)
19. College, E.: The Story of the College, 1847–1962. Earlham College Press, Richmond (1963)
20. Taylor, S.K.: An Examination of Course-Related Library Instruction Programs at Three Small Private Liberal Arts Colleges. Kansas State University, Manhattan (1991)
21. Ganz, D. (ed.): College Libraries and the Teaching/Learning Process: Selections from the Writings of Evan Ira Farber. Earlham College Press, Richmond (2007)
22. Julien, H., Tan, M., Merillat, S.: Instruction for information literacy in Canadian academic libraries: a longitudinal analysis of aims, methods, and success. Can. J. Inf. Libr. Sci. **37**(2), 81–102 (2013)
23. Earlham College: The Earlham College Fact Book 2003. Earlham College, Richmond (2003)
24. Woolpy, J.H.: Information retrieval for introductory science courses. Am. Biol. Teach. **39**(3), 162–164, 171 (1977)

Information Literacy as a Key to Academic Success: Results from a Longitudinal Study

Anne-Kathrin Mayer[1(✉)] and Günter Krampen[1,2]

[1] ZPID - Leibniz Institute for Psychology Information, Trier, Germany
mayer@zpid.de

[2] University of Trier, Trier, Germany
krampen@uni-trier.de

Abstract. The present paper examines whether university students' information literacy contributes to their academic performance over and above their level of general cognitive abilities. Fifty-three German psychology students (18–25 years, 85% female) participated in a longitudinal study with four waves of measurement spanning the first 18 months of their bachelor studies. Stepwise multiple regression analyses revealed that scholarly information literacy (as assessed by a fixed-choice test of knowledge about information search and evaluation) predicted university grade point average as well as basic psychology knowledge even when controlling for fluid intelligence. According to additional simple slope analyses, information literacy was able to compensate for limited cognitive ability: Information literacy and academic performance were only associated in students with lower working memory capacity.

Keywords: Information literacy · Fluid intelligence · Working memory · Academic achievements · Expertise · Higher education · Psychology

1 Introduction

Information literacy is hypothesized to play a major role in learning and academic performance [1]. However, empirical evidence supporting this assumption is scarce [2]. In contrast, numerous studies have identified individual differences in general cognitive abilities as the most important predictor of academic achievements and job performance [3–5]. For example, several metaanalyses have reported mean population correlations ranging from $\rho = .34$ to .54 between intelligence and scholastic achievements [6]. The present paper complements this research by exploring the relationship between information literacy (as assessed by a test of declarative knowledge related to searching and evaluating scholarly information) and general cognitive abilities, as well as their joint associations with academic performance. Specifically, it examines whether psychology students' scholarly information literacy contributes to their grade point average and their basic psychology knowledge over and above their level of cognitive abilities, taking into account possible additive (independent) as well as interactive effects of general abilities and domain-specific information literacy.

1.1 Information Literacy and Academic Performance

Information literacy, defined as a set of knowledge and skills required to determine an information need and to find, evaluate, and use information, is considered a key competency in lifelong learning [7] and a major learning goal for university students [8]. It is hypothesized that information literacy supports the active construction of knowledge by complementing and integrating prior knowledge with new information, thereby fostering conceptual understanding, processes of self-regulated learning, and problem solving [9, 10]. These competencies should, in turn, contribute to academic performance and educational success.

Yet, empirical studies demonstrating associations of information literacy with academic performance indicators are scarce and methodologically weak [2]. Several researchers have analyzed the relationships between students' achievements such as course grades or grade point average (GPA) and their previous exposure to library instruction [11] or their library use [12], assuming that these activities will result in increased information literacy and, in turn, better academic performance. Findings of these studies were mixed, with some studies revealing small differences consistent with this hypothesis and some reporting no advantages for library instruction participants. This does not come as a surprise because in most studies only one-shot instruction was delivered. Short interventions like that, however, may not be expected to have large and long-lasting effects. Furthermore, the hypothesized increase in information literacy was not verified by applying standardized tests or other performance measures. For a stronger test of the hypothesis that information literacy promotes academic success, individual differences in the corresponding knowledge or skills should be assessed directly and related to students' achievements.

1.2 Cognitive Abilities and Information Literacy

When taking a closer look at the concepts of general cognitive abilities, it becomes obvious that information literacy and cognitive abilities share several features. For example, fluid intelligence is commonly defined as the ability to reason and to solve novel problems [13]. More precisely, fluid intelligence may be conceptualized as the '… ability to decompose problems into manageable segments and iterate through them, the differential ability to manage the hierarchy of goals and subgoals generated by this problem decomposition, and the differential ability to form higher level abstractions' [14, p. 429]. These iterative processes are typical for the demands of complex information searches which require searchers to define their information needs, specify a hierarchy of search goals, develop search strategies, and critically evaluate and integrate their results with previous knowledge. Based on these similarities in relevant processes, individuals with high levels of fluid intelligence should also be more information literate. In line with this assumption, a weak positive relationship between scholarly information-seeking knowledge and fluid intelligence (as measured by Ravens Advanced Progressive Matrices APM), [15] was reported in a recent study [16].

A cognitive ability closely related to fluid intelligence is "working memory" [17]. Working memory is a cognitive subsystem which is responsible for the simultaneous

short-time maintenance and active manipulation of information. Individuals differ in their working memory capacity, defined as the number of elements which may be processed simultaneously. Thus, a high capacity of working memory facilitates the elaboration of incoming information and its integration with the contents of long-term memory. This is especially true in ill-structured situations, when it is difficult to control and direct attention and to keep focussed on specific goals. [18] argued that working memory capacity would foster the acquisition of scholarly information literacy. According to their reasoning, learning to use the multiple functions of academic search engines and bibliographic databases might overtax searchers with lower working memory capacity, particularly when these learning processes are solely self-determined and not supported by adequate formal instruction. Corresponding with this expectation, the authors found that psychology students' increase in information-seeking knowledge over the first half of their undergraduate studies was – albeit weakly – associated with their working memory capacity. This finding is in line with comprehensive research which supports the view that individual differences in general cognitive abilities affect the acquisition of domain-specific competencies such as verbal literacy or numeracy [19].

In sum, while general cognitive abilities and domain-specific competencies are conceptually as well as empirically associated, they are best conceived of as related but distinct concepts [20]. Thus, it seams reasonable to analyze their joint impact on academic performance.

1.3   Research Questions

The present study aims at analyzing whether information literacy would predict academic performance over and above their level of fluid intelligence or verbal working memory capacity. Regarding bivariate associations between the variables, positive correlations were expected between cognitive abilities and information literacy as well as between each of these predictors and the performance indicators.

As for the multivariate prediction of academic performance, in line with the reasoning of [21, 22], three descriptive models were explored: First, general cognitive ability and information literacy might have additive or independent effects on academic performance because cognitive abilities are basic mechanisms underlying learning. These basic mechanisms should operate independent of domain-specific knowledge as assessed by an information literacy test (*additive model*). Second, cognitive ability and information literacy might interact on performance, with high information literacy compensating for lower cognitive ability (*compensation model*). For example, if university courses are highly demanding, students with higher information literacy will be more proficient at searching materials which support their understanding. Third, high levels of information literacy might enhance the effect of cognitive ability on academic performance and vice versa. Students with high levels of cognitive ability should benefit from information literacy to a greater extent than students with lower levels of cognitive ability because they are able to use their specific competencies more efficiently (*enhancement model*).

2   Methods

2.1   Participants and Procedure

Data were gathered in a longitudinal study with four waves of measurement spanning the first 18 months of bachelor studies.[1] Participants were psychology students at the University of Trier (Germany). Baseline data (t1) were collected during the first four weeks of participants' first semester, followed by three regular waves of measurement (t2 to t4) at the beginning of the second, third, and fourth semester, respectively. About two weeks after t4, a subsample of the longitudinal cohort participated in an additional study. The subsequent analyses are based on this subsample of $N = 53$ students (18–25 years, 85% female).[2] Data collection took place in groups (maximum size: 20 participants) in the university's computer labs. Participation in all studies was voluntary; participants were financially compensated.

2.2   Measures

Two standardized tests of cognitive abilities were administered. At t1, participants worked on a paper-pencil version of Ravens APM [15]. The test comprises 32 systematically designed visual patterns with one missing piece each. Participants are requested to complete each pattern by choosing the correct piece from eight alternatives. A time limit of 20 min was imposed as recommended when using the test for research purposes [23]. All other measures were administered in a computerized format. At t2, verbal working memory capacity (WMC) was assessed by aggregating scores on three computerized tasks [24]. The tasks require participants to work on and selectively recall verbal materials such as words from specific semantic categories or combinations of nouns and numbers (for details see [7]). Scoring is based on the correctness of responses. As a measure of information literacy, the Information Literacy Test for Psychology (ILT-P) was used in the additional study following t4. The ILT-P is a test of declarative knowledge about scholarly information search and evaluation which is an extended and revised version of the test published by [25]. The test comprises 50 fixed choice items. For each item, three response options are provided, and participants are instructed to mark all response options that are correct. Academic success was assessed at t4: Participants completed a test of psychology knowledge [26] which is interpreted as a measure of professional expertise. The 21 test items cover a sample of those "core concepts" [27] which are indexed most frequently in common introductory psychology textbooks, and, thus, may be considered basic psychology knowledge [8]. In addition, participants

[2]   The total sample of the longitudinal study comprised $N = 137$ students at t1 (representing approximately 80 percent of that cohort of first year students enrolled at the university), and still $n = 115$ students at t4. With regard to gender, age, and all study variables referred to in this paper, no differences were found between those participants who refused to participate in the additional study and the participating subsample. Thus, the subsample may be considered representative for the total longitudinal cohort.

provided a transcript of their grades from the university records. According to the German grading system, grades may range from "1" to "5", with smaller numbers indicating better performance. Because students are relatively free to determine the sequence of their written exams, the type and number of exams varies considerably among participants. In this sample, preliminary GPA at t4 is based on three to eight exams, with 75% of the participants providing five to six grades.

3   Results

Correlations between the study variables are reported in Table 1. ILT-P scores were correlated with both fluid intelligence and working memory capacity, supporting the assumption that general cognitive abilities are related to knowledge about information searching and evaluation. The bivariate and multivariate associations between cognitive abilities, information literacy, and academic performance were examined in a series of four stepwise multiple regression analyses. In step 1 of each analysis, academic performance (psychology knowledge or GPA) was regressed on cognitive ability (APM or WMC). In step 2, the ILT-P was added as a predictor, testing the additive model of information literacy. Finally, the interaction term of cognitive ability and ILT-P was added in step 3 to explore possible interaction effects according to the interactive compensation and enhancement models. All predictors were z-standardized to prevent multicollinearity [28].

Table 1. Intercorrelations of the study variables.

	APM	WMC	ILT-P	GPA
WMC	$.45^{***}$			
ILT-P	$.42^{***}$	$.30^*$		
GPA	$-.25^*$	$-.14$	$-.35^*$	
Psychology knowledge	$.25^*$	$.17$	$.50^{***}$	$-.46^{***}$

$^{***} p < .001;\ ^{**} p < .01;\ ^* p < .05$

APM scores were associated with psychology knowledge ($\beta = .25$) and GPA ($\beta = -.25$) in Step 1 of the analyses. However, they lost their predictive value when ILT-P scores were added in Step 2 (see Table 2). The interaction term was nonsignificant; accordingly, results of Step 3 are not included in the table. Thus, neither the additive nor the compensation or enhancement model was supported by the analyses.

For WMC, no significant bivariate association with academic performance emerged in Step 1 while the ILT-P predicted both criteria in step 2 (GPA: $\beta = -.35$; psychology knowledge: $\beta = .36$). In step 3, interaction effects of WMC and ILT-P were found for both dependent variables (see Table 2). The effects are illustrated in Fig. 1 for participants with "low" versus "high" WMC and ILT-P scores (defined as minus versus plus one standard deviation from the mean score of the respective measure). To explore the interaction effects in detail, simple slope analyses were conducted [29]. Psychology

knowledge ($b = -.01$, $t < 1$) and GPA ($b = .03$, $t < 1$) were independent of ILT-P scores in students with high WMC. However, in students with low WMC, a positive relationship between ILT-P scores and psychology knowledge ($b = .08$, $t = 4.44$, $p < .01$) and better GPA ($b = -.44$, $t = -4.17$, $p < .01$) was found. This pattern of results is in line with the compensation model which assumes that high information literacy may compensate the limited level of cognitive ability.

Table 2. Results of the stepwise multiple regression analyses predicting academic performance from cognitive abilities and information literacy.

Predictor	b	SE(b)	β	t
Independent Variables: Raven's APM and ILT-P; Dependent Variable: Psychology Knowledge ($R^2 = 0.155$, F[2, 47] = 4.30, p < .05)				
Constant	.65	.02		42.88***
Z(APM)	.01	.02	.11	0.75
Z(ILT-P)	.04	.02	.33	2.26*
Independent Variables: Raven's APM and ILT-P; Dependent Variable: Grade Point Average ($R^2 = 0.144$, F[2, 47] = 3.94, p < .05)				
Constant	2.07	.07		28.10***
Z(Raven's APM)	−.07	.08	−.13	−0.87
Z(ILT-P)	−.17	.08	−.31	−2.05*
Independent Variables: WMC and ILT-P; Dependent Variable: Psychology Knowledge ($R^2 = 0.323$, F[3, 46] = 7.30, p < .01; $R_{chg}^2 = 0.175$, p < .001)				
Constant	.66	.01		46.08***
Z(WMC)	−.01	.02	−.12	−0.84
Z(ILT-P)	.04	.02	.37	2.92**
Z(WMC x ILT)	−.05	.02	−45	−3.45**
Independent Variables: WMC and ILT-P; Dependent Variable: Grade Point Average ($R^2 = 0.288$, F[3, 46] = 6.22, p < .01; $R_{chg}^2 = 0.158$, p < .001)				
Constant	2.00	.07		27.96***
Z(WMC)	.08	.08	.14	1.00
Z(ILT-P)	−.20	.07	−.36	−2.77**
Z(WMC x ILT-P)	.23	.07	.43	3.20**

*** $p < .001$; ** $p < .01$; * $p < .05$

Note. b = unstandardized regression weight, SE(b) = standard error of b, β = standardized regression weight; t = t-value of regression weight; R^2 = variance of the dependent variable explained by the predictors.
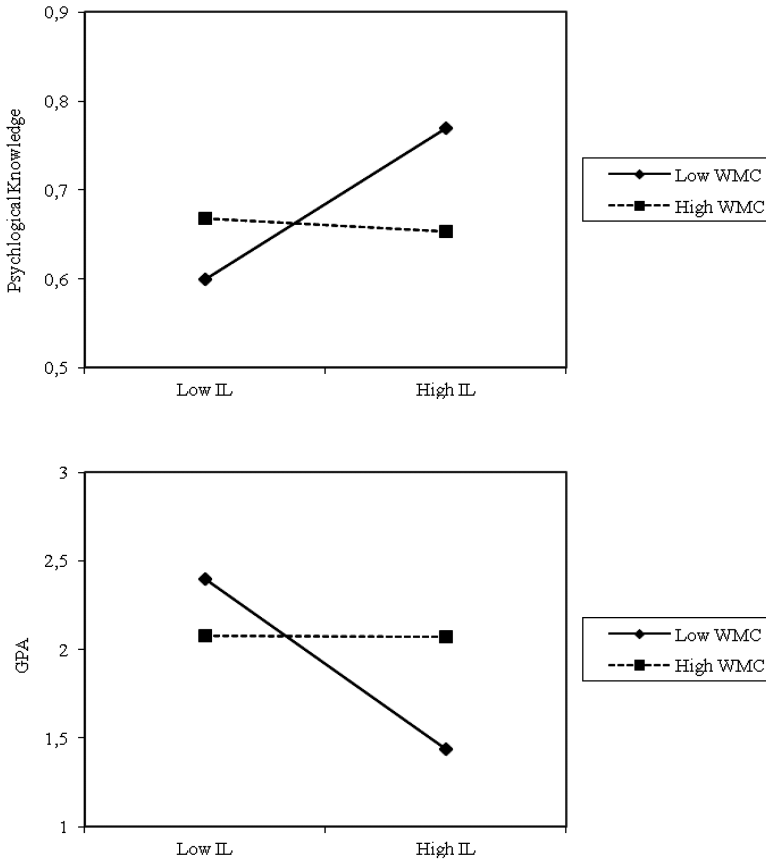
Fig. 1. Interaction of information literacy (IL) and working memory capacity (WMC) on psychology knowledge (upper panel) and GPA (lower panel).

4   Discussion and Conclusions

The purpose of the present study was to investigate whether information literacy would contribute to psychology students' academic performance over and above the level of cognitive abilities. This assumption was partially confirmed by our analyses predicting GPA and level of psychology knowledge from fluid intelligence and declarative knowledge about scholarly information searches and evaluation: Although fluid intelligence had a positive bivariate association with GPA and psychology knowledge, the effect of information literacy on both criteria was stronger. Thus, there were no additive or interactive effects of both variables; instead, information literacy was the only significant predictor of performance. At first sight, these findings contradict previous research which identified cognitive abilities as the most important predictor of performance [3–6]. In combination with the findings reported by [16], the results, however, are suggestive of a mediator effect: Fluid intelligence might foster the acquisition of information

literacy which, in turn, promotes academic performance. In post-hoc mediation analyses [29], this assumption was not supported. However, as statistical power of the analyses was limited due to small sample size, the mediation hypothesis should not be rejected prematurely. Another possible explanation is that, compared to Raven's APM, the test concept of the ILT-P is more similar to written exams and the psychology knowledge test, because all of them aim at assessing declarative or factual knowledge. Thus, similarity of the assessment tools may be responsible for the pattern of results. If this explanation holds true, Raven's APM scores should be more closely associated with performance in exams which require logical and analytical thinking and problem solving abilities.

For verbal working memory capacity, no direct effects on academic performance but significant interaction effects emerged: In participants with higher working memory capacity, academic performance and information literacy proved to be independent. However, in participants with low working memory capacity, basic psychology knowledge as well as grades increased with higher levels of information literacy.

Several limitations have to be considered when interpreting the results. First, the results are based on a small sample of psychology students. Further research should strive to replicate the findings in larger and more heterogeneous samples and to demonstrate their generalizability by including participants from diverse fields of studies. A second limitation arises from the fact that preliminary GPA was computed from grades achieved during the first three semesters of bachelor studies while information literacy was assessed at the beginning of the fourth semester. Because the predictor was assessed chronologically after the criterion, no inferences about causal effects may be drawn from the results in spite of the longitudinal study design. A follow-up study should aim at examining the long-term effects of information literacy on academic performance such as students' final GPA or the quality of the bachelor's thesis. We assume that information literacy might even become more important in more advanced studies and during the work on the final thesis when students are required to perform more complex and comprehensive information searches.

Yet, the results of our study underline the importance of scholarly information literacy for academic success. Cognitive abilities and information literacy are conceptually as well as empirically related, but still distinct concepts which might jointly affect performance. Based on these findings, an increased investment of financial and personal resources in information literacy education seems justified.

References

1. Eisenberg, M.B., Lowe, C.A., Spitzer, K.L.: Information Literacy: Essential Skills for the Information Age. Information Resources Publications, Greenwood Publishing Group, Westport (2004)
2. Squibb, S.D., Mikkelsen, S.: Assessing the value of course-embedded ınformation literacy on student learning and achievement. Coll. Res. Libr. **77**(2), 164–183 (2016)
3. Cowan, N.: Working memory underpins cognitive development, learning, and education. Educ. Psychol. Rev. **26**(2), 197–223 (2014)

4. Gustafsson, J., Balke, G.: General and specific abilities as predictors of school achievement. Multivar. Behav. Res. **28**, 407–434 (1993)
5. Morris, S.B., Daisley, R.L., Wheeler, M., Boyer, P.: A meta-analysis of the relationship between individual assessments and job performance. J. Appl. Psychol. **100**(1), 5–20 (2015)
6. Roth, B., Becker, N., Romeyke, S., Schäfer, S., Domnick, F., Spinath, F.M.: Intelligence and school grades: a meta-analysis. Intelligence **53**, 118–137 (2015)
7. Kiliç-Çakmak, E.: Learning strategies and motivational factors predicting ınformation literacy self-efficacy of e-learners. Australas. J. Educ. Technol. **26**(2), 192–208 (2010)
8. American Psychological Association: APA Guidelines For The Undergraduate Psychology Major: Version 2.0 (2013). http://www.apa.org/ed/precollege/undergrad/index.aspx
9. Brand-Gruwel, S., Wopereis, I., Vermetten, Y.: Information problem solving by experts and novices: analysis of a complex cognitive skill. Comput. Hum. Behav. **21**(3), 487–508 (2005)
10. Johnston, B., Webber, S.: Information literacy in higher education: a review and case study. Stud. High. Educ. **28**(3), 335–352 (2003)
11. Bowles-Terry, M.: Library instruction and academic success: a mixed-methods assessment of a library instruction program. Evid. Based Libr. Inf. Pract. **7**(1), 82–95 (2012)
12. Soria, K.M., Fransen, J., Nackerud, S.: Stacks, serials, search engines, and students' success: first-year undergraduate students' library use, academic achievement, and retention. J. Acad. Libr. **40**(1), 84–91 (2014)
13. Cattell, R.B.: Abilities: Their Structure and Growth. Houghton Mifflin, Boston (1971)
14. Carpenter, P., Just, M., Shell, P.: What one ıntelligence test measures: a theoretical account of the processing in the raven progressive matrices test. Psychol. Rev. **97**, 404–431 (1990)
15. Raven, J., Raven, J.C., Court, J.H.: Raven Manual Section 4: Advanced Progressive Matrices. Oxford Psychologists Press, Oxford (1998)
16. Rosman, T., Mayer, A.-K., Krampen, G.: Intelligence, academic self-concept, and information literacy: the role of adequate perceptions of academic ability in the acquisition of knowledge about information searching. Inf. Res. **20**(1), 1 (2015). Special Supplement, paper isic34
17. Baddeley, A.: Working memory: theories, models, and controversies. Ann. Rev. Psychol. **63**, 1–29 (2012)
18. Rosman, T., Mayer, A.-K., Krampen, G.: A longitudinal study on ınformation-seeking knowledge in psychology undergraduates: exploring the role of ınformation literacy ınstruction and working memory capacity. Comput. Educ. **96**, 94–108 (2016)
19. Weinert, S., Artelt, C., Prenzel, M., Senkbeil, M., Carstensen, C.H.: Development of competencies across the life span. Zeitschrift für Erziehungswissenschaft **14**(2), 67–86 (2011)
20. Baumert, J., Lüdtke, O., Trautwein, U., Brunner, M.: Large-scale student assessment studies measure the results of processes of knowledge acquisition: evidence in support of the distinction between intelligence and student achievement. Educ. Res. Rev. **4**(3), 165–176 (2009)
21. Hambrick, D.Z., Engle, R.W.: Effects of domain knowledge, working memory capacity, and age on cognitive performance: an investigation of the knowledge-is-power hypothesis. Cogn. Psychol. **44**(4), 339–387 (2002)
22. Escher, S., Grabarkiewicz, R., Frese, M., van Steekelenburg, G.: The moderator effect of cognitive ability on the relationship between planning strategies and business success of small scale business owners in south africa: a longitudinal study. J. Dev. Entrepreneurship **7**(3), 305–318 (2002)
23. Hamel, R., Schmittmann, V.D.: The 20-minute version as a predictor of the raven advanced progressive matrices test. Educ. Psychol. Meas. **66**(6), 1039–1046 (2006)
24. Wilhelm, O., Hildebrandt, A., Oberauer, K.: What is working memory capacity, and how can we measure it. Front. Psychol. **4**(433), 1–22 (2013)

25. Leichner, N., Peter, J., Mayer, A.-K., Krampen, G.: Assessing ınformation literacy among german psychology students. Ref. Serv. Rev. **41**, 660–674 (2013)
26. Peter, J., Leichner, N., Mayer, A.K., Krampen, G.: A short test for the assessment of basic knowledge in psychology. Psychol. Learn. Teach. **14**(3), 224–235 (2015)
27. Griggs, R.A., Bujak-Johnson, A., Proctor, D.L.: Using common core vocabulary in text selection and teaching the introductory course. Teach. Psychol. **31**(4), 265–269 (2004)
28. Aiken, L.S., West, S.G., Reno, R.R.: Multiple Regression: Testing and Interpreting Interactions. Sage, Newbury Park (1991)
29. Hayes, A.F.: Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. Guilford Press, New York (2013)

Web 2.0 and Academic Libraries: A Survey Investigating Uptake Among University Students

Emmanouel Garoufallou[1,3(✉)], Souzana Maranga[1], Chrysanthi Chatzopoulou[1],
Eleni Tzura[1], Rania Siatri[1], Georgia Zafeiriou[1], and Stavroula Antonopoulou[2,3]

[1] Alexander Technological Educational Institute (ATEI) of Thessaloniki, Thessaloniki, Greece
{mgarou,gzafeiri}@libd.teithe.gr,
smaranga22@hotmail.com,chatzopoulou.c@gmail.com,
tzura.eleni@gmail.com, rsiatri@gmail.com
[2] American Farm School, Perrotis College, Thessaloniki, Greece
santon@afs.edu.gr
[3] Alcala University, Alcalá de Henares, Spain

Abstract. Web 2.0 technologies provide an alternative creative Launchpad both for libraries and their users to create access and share information. The concept of libraries 2.0 represents modern efforts made by the library community to engage its users and market its services and online tools to the public through Web 2.0 eliminating geographical, temporal or economic constraints. This study aimed to examine the use of Web 2.0 library services and mobile technology, by university students in an academic environment. The findings of this study will be used to inform the design of information literacy programs specifically focused on the use of these services by university students. A web-based questionnaire survey was used to collect data of the respondents that consisted of all undergraduate students in the Department of Aesthetics and Cosmetology of ATEI of Thessaloniki. Findings indicated that although students of Department, use some of the Web 2.0 tools and services, they do not possess a deep knowledge and familiarity with the majority of the tools, and their use of educational settings.

Keywords: Web 2.0 · Web 2.0 tools · Library 2.0 · Social networks · Wikis · Blogs · Rss feeds · Facebook · YouTube · Mobile technology · Academic libraries · Media literacy

1 Introduction

O'Reillyfirst coined the term "Web 2.0" in late 2004 by [1] at a conference brainstorming session where the foundation for the web in the way we knowit today was laid. As O'Reilly has described, the central idea of the Web was the creation and sharing of content that would be produced and consumed by users. In that context, social networking, RSS feeds, social bookmarkers, and many other tools and services have been created in the basis of interoperability, information sharing, communicating, and user-based designed [2].

In parallel, Michael Casey who inspired the "Library 2.0" concept in autumn 2005. Xu, Ouyang and Chu discussed the applications and implications of the Library 2.0 and

Web 2.0 [3]. These two terms presented many common characteristics overriding the user-centered focus that Casey and Savastinuk [4] described as the heart of Library 2.0. According to LeBlanc and Kay [5], the concept of Library 2.0 represented modern efforts by the library community to engage its users and market its services and online tools to the public through Web 2.0, eliminating geographical, temporal, or economic constraints [6]. Our research investigating the students of the Aesthetics and Cosmetology Department in the Alexander Technological Educational Institute (ATEI) of Thessaloniki, tried to specify to what extent users were familiarized with Web 2.0 technologies in libraries, whether these technologies were incorporated in their curriculum or whether they were encouraged to develop content and metadata themselves.

2   Literature Review

Web 2.0 has become a central topic in today's information world. According to Miller [7], Web 2.0 is participative and presents the value of user-generated content. This designation occured due to the possibilities that Web 2.0 offered, such as editing information and creating or editing online content. Vassilakaki and Garoufallou [8–10] reviewed the literature to seek ways Facebook impacted libraries and librarians, investigating library Facebook practices and the impact of Twitter on libraries. Furthermore, research showed that library professionals and, especially students, related Web 2.0 with terms such as Twitter, Facebook, blogs, wikis, podcasts, RSS feeds, and the social web, which are digital tools providing the abovementioned capabilities to users [11].

Much research effort has been directed toward how Web 2.0 is interpreted and how users tended to relate with features of Web 2.0. Four main characteristics summarize the results of research that tested how users interacted with Web 2.0 tools:

- user generated content, as selfpublishing is promoted;
- the network effect if sharing information, based on the increase of the value to existing users of a service, will increase because a greater number of number of people will use it;
- openness will increase based on working with open standards, free of use data, open source software, and open innovation; and, finally
- wisdom of the crowds will continue to be recognized as a theory underpinned by the fact that groups can solve any problem more effectively than any individual member [12–14].

As expected, when related to libraries, new technologies and Web 2.0 tools brought quite a commotion. The incorporation of new capabilities is never easy and Aharony [11] stated the most of the times it is directly related to the emotional situation of people. He tested resistance to change by observing librarians embodying Web 2.0 to their work responsibilities. According to his findings, complete change occurred only when people found that resources did not meet the situational demands of users.

Despite the fact that transition was hard, Web 2.0 has proved to be a valuable tool for libraries as it enables users to connect with them in a bidirectional way of communicating and exchanging information [15]. Its tools promote interaction in a variety of

ways, with each and every one of them offering something special. For example, RSS feeds are ideal for informing users for new library activities whilst blogs are the best way for them to provide feedback to their library [16].

The impact of new technologies was also inevitable in all education fields due to the fact that the emerging trends deluged people's everyday life. Mobile technology evolution increased students' expectations by providing access to everything. Cooner [17] tried to predict the future with a study in which he defined the advantages and disadvantages of incorporating mobile technologies to education. His results stated that mobile learning is binding for students because it is active and presents an alternative, enriched environment. Nevertheless, although mobile technologies have proved to operate positively for students, faculty and information resources, they are also accompanied with disadvantages. As an example, during research conducted through has found that people do not feel confident and/or disliked reading from the screen [18–20].

3   Methodology

We conducted this research between October 2015 and January 2016 at the ATEI of Thessaloniki, Greece. All the participants were undergraduate students in the Aesthetics and Cosmetology Department. The total population of active full-time students of the department was 462. A total of 135 students (29.22%) of the total population) from all academic years answered the questionnaire, submitting 130 (28.14%) usable questionnaires. We used a Web-based questionnaire for collecting data. The questionnaire included both open-ended and closed-ended questions covering the subject of Web 2.0 tools and mobile technology in the academic library context. Our approach was based on a methodology developed and used by Garoufallouand Charitopoulou [16, 21]. We further developed the research tool to serve the aim and objectives of the current research.

Our choice of using a Web-based questionnaire was based on our need for validity, personal anonymity, and timely collection of answers. The questionnaire had several parts with a wide range of questions. First, there were personal questions about gender, semester, and level of familiarity with the Internet and PCs. Following general questions for Web 2.0 tools we asked more specific questions regarding the use and usage frequency for individual Web 2.0 tools including RSS feeds, social networks, social bookmarkers, blogs, Web games, digital maps, and wikis. In addition, we asked questions that related to the department's learning process and use of Web 2.0 tools. Furthermore, we asked questions concerning mobile devices, like mobile phones, tablets, laptops, ipads, e-book readers, and students's general use of them and how they used them for accessing in library services.

We analyzed the data using descriptive statistics and chi-squared tests to investigate differences in categorical variables. We used SPSS version 20.0 in this analysis.

4   Results

4.1   Demographics

We collected a total of 130 usable questionnaires out of 135 surveys submitted. The returned surveys represented a response rate of 28.14% of the total population of 462 students. All students were undergraduates in the Department of Aesthetics and Cosmetology Department of ATEI of Thessaloniki, Greece. The sample consisted of 99.2% women and only 0.8% men, a total of one person who was male. Fifty-four point six percent of the answers came from final year students, followed by first year students with 33.8% while the remaining 4.7% of the answers came from second year students and 6.9% from third year students.

The questionnaire consisted of questions based on a hierarchical structure. In the general research question: "How would you describe your familiarity in using a PC?" 40% said "above average", 27% "average", 14% "below average", while a small percentage of 16% answered "excellent". See Table 1.

Table 1.   Student familiarity with PCs

	Excellent %	Above average %	Average %	Below average %	Poor %
Mashups	16	40	27	14	3

Regarding the research question, "How many hours do you use the Internet?", twenty-seven percent of respondents used the Internet from 4 to 5 h per day, 21% from 6 to 9 h, while 36% used the Internet 3 h or fewer daily. From the analysis of open-ended questions, we found that students used the Internet mainly for their personal information such as to read news and retrieve information on personal interests, as well as for academic purposes like searching for scientific information, reading and studying articles and finding information in order to write assignments or complete student projects. Additionally, a large amount of the respondents (60.8%) did not use or consider the Internet as a supporting tool for their courses and their study. It is worth mentioning that these students stated that they did not use the Internet to access and search the university's educational learning platform, Moodle that was very popular in other university departments.

4.2   Web 2.0 and Students

Our survey focused on the use of Web 2.0 tools by undergraduate students in the Aesthetics and Cosmetology Department. The questionnaire consisted of questions concerning which Web 2.0 tools students preferred to use, how often they used them, if they used them for personal purposes, for entertainment or/and for their studies and for accessing library services.

Our results showed that undergraduate students had an inadequate relation with Web 2.0 tools. Students had minimal impact and usage of tools including RSS, tagging, bookmarks, podcast, and mashups. Eighty-eight point five percent of respondents were

not familiar with RSS feeds, 76.2% had never used Flickr, 71.5% never used a tagging tool, and 60% had never used bookmarks for saving and organizing websites or sharing valuable information. In contrast, it became obvious that students used Facebook with 87.6% saying that they always used Facebook, and 83.9% used YouTube by, 25.3% used Wikis, and 19.3% used Messaging, as show in Table 2.

Table 2. Students' familiarity with Web 2.0 tools

	Never %	Rarely %	Often %	Very often %	Always %
Blogs	33.1	31.5	23.1	9.2	3.1
Wikis	17.7	23.1	33.8	21.5	3.8
Facebook	1.5	1.5	9.2	23.8	63.8
Flickr	76.2	16.2	5.4	1.5	0.8
Youtube	0.8	2.3	13.1	33.1	50.8
RSS	88.5	7.7	3.8	0.0	0.0
Tagging	71.5	12.3	10.0	6.2	0.0
Bookmakrs	60.0	23.8	11.5	4.6	0.0
BitTorrent	48.5	21.5	17.7	6.9	5.4
Podcasts	79.2	9.2	9.2	2.3	0.0
Messaging	53.1	12.3	15.4	8.5	10.8
Mashups	84.6	10	4.6	0.8	0.0

In order to analyze the results and gain a better understanding of informational behavior of the respondents we also compared the percentage of use and adoption of Web 2.0 tools by academic teachers in this particular Department. For this purpose, we asked the students if their Department kept a blog, used a wiki, or used any other service for storage and dissemination of information. We asked if the staff showed videos from YouTube or any other video service provider and whether the department website used services such as RSS feeds. The vast majority of students mentioned that the department and staff did not follow any of these social media tools either as a mean of promoting services or for supporting teaching and communication with students. The most common and only tool used was the departmental website and electronic communication.

It is obvious that academic staff was using traditional teaching methods while students were ready to adapt social media tools for learning and support. Furthermore, while we observed that students might not have maximized the use of all social media tools, they were way ahead of their department as the departmental use of social media tools was nonexistent.

Last but not least, students responded positively when we asked them whether "they would like their department to create Web 2.0 tools". Table 3 shows the percentage of students who thought a given tool was essential in their department. Blogs were mentioned by 56.9%, Facebook profile by 46.9%, a YouTube channel by 46.2%, and a departmental Wiki by 32.3%. The creation and support of a department a blog was the only tool that had more positive answers than negative. İt is worth observing that 52.3% of students believed that a Facebook profile was not necessary for the department. These answers can be explained if we compared them with students' familiarity with Web 2.0 tools. It seemed that students in this particular department did not trust new social

network tools and services, they did not know them well, and did not use them in their daily life, as seen in Table 2.

Table 3. Students perception about creating new Web 2.0 tools in aesthetics and cosmetology department

Do you think it would be essential to…	Yes %	No %
Create a blog for your department?	56.9	42.3
Create a wiki for your department?	32.3	66.9
Create Facebook profile for your department?	46.9	52.3
Create flickr account for your department?	5.4	93.8
Create YouTube channel for your department?	46.2	53.1
Create RSS feeds for your department?	4.6	94.6
Create podcast or vidcast for your department?	5.4	93.8
Create mashups for your department?	4.6	94.6

4.3   Mobile Technology and Students

In this survey we also investigated students' familiarity with mobile technology. One hundred and thirty undergraduate students answered the question of *which mobile technology they preferred to use in order to access university library services*. Students mainly preferred mobile phones and laptops to access library services. As showed in Table 4, 63.1% of students used a mobile phone for accessing information concerning opening hours, 57.7% answered that they used it for accessing maps, and 53.1% in order to contact a librarian or library services. One could say that these preferences might be expected because mobile phones are power tools for retrieving information and are available to the vast majority of students. Also, it is evident that students preferred to use laptops for more specialized library services such as searching and accessing databases and the library catalog.

Table 4. Mobile technology use for library services

	Mobile phone %	Tablet %	Netbook %	Ipad %	Laptop %	PC %	E-book reader %
Opening hours	63.1	7.7	0.0	0.8	23.8	4.6	0.0
Maps	57.7	5.4	0.8	1.5	30.8	3.8	0.0
Contact	53.1	6.9	0.0	3.1	30.0	6.2	0.8
OPAC	35.4	7.7	2.3	2.3	41.5	8.5	2.3
User account	36.2	8.5	1.5	1.5	42.3	9.2	0.8
E-journals	27.7	8.5	2.3	3.1	48.5	8.5	0.8
Databases	27.7	8.5	0.8	0.8	50.8	10.0	0.8
Reading e-books	23.1	14.6	2.3	3.8	48.5	6.9	0.8
Borrowing/ reserving	35.4	8.5	1.5	3.1	43.1	6.9	0.8
Digital Library	30.0	8.5	3.8	2.3	48.5	5.4	1.5
Institutional repository	26.9	7.7	1.5	3.1	50.8	9.2	0.8

Devices that had a minimal impact for using library services were netbooks, iPads, and e-book readers. Analysing the data one can see that only a few students held devices such as an iPad or netbook, mainly due to the students' economic situation. Thus, the plethora of various devices, applications, and services led to confusion among students of what to choose in order to meet their information needs.

5   Conclusion

The aim of our research was to investigate the preferences of undergraduate students and their familiarity of Web 2.0 tools in conjunction with usage of mobile computing devices in order to access library services. Liu, Peng, Wu and Lin [22] stated that the educational advantages that students gained through their experience by mobile learning was much more than *"simply accessing resources"*. The role of library was very significant in convincing the students of the benefits of that process as well in initiating them to new technologies.

Our survey was in line with research conducted by Dresselhaus and Shrode [23], Bomhold [24], Seeholzer and Salem [25], and shared similarities with the survey conducted by Vassilakaki and Garoufallou concerning the use of Facebook [8], Facebook practices [9], and the use of Twitter [10]. Thus, Garoufallou and Charitopoulou's survey of LIS students revealed heavy use of social media services and went a long way to prove the educational value of these tools [16, 21].

Our survey showed that although students used the Internet on a daily basis, they were not familiar with many Web 2.0 tools such as RSS feeds, Flickr, Tagging, and Mashups. Moreover, students felt that it was essential for their department to establish some Web 2.0 services such as blogs, a Facebook profile, and a YouTube channel. These, also are among the most well-known social media tools that young people use across the globe. İt is worth noting two findings: (a) students had a limited use of Web 2.0 tools in order to meet their educational needs such as attending online academic courses or searching for information to complete an assignment; (b) students felt that departmental staff did not support and develop Web 2.0 tools and services in order to engage students in the learning process.

It seemed that students felt "unsafe to trust the unknown", modern means of technology, whether they were social media and other Web 2.0 tools or new mobile devices. In particular, an overwhelming percentage of respondents used two very popular social media, Facebook and YouTube, mainly for personal usage. Similarly, as with regards to the usage of mobile devices students preferred mobile phones and laptops mainly because these tools are widely available. They used mobile phones to communicate and the same time to search for general information through the Internet and to access Facebook and YouTube; mobile phones were the most popular tool used among students. On the other hand, students stated that their preference to use laptops to write assignments and field works was due to the fact that the laptop offered a large screen, was portable, used software tools that they knew well, and had the mobility of other devices. It was evident that the Web 2.0 tools and mobile devices had penetrated student life but

there was still a long way to go before these tools were adopted as educational tools for the Greek students.

It is also worth noting that the Library of ATEI of Thessaloniki has to play a significant role in training both students and academic staff in the use of Web 2.0 and social media services for retrieving information, access library services, on how to use these services to promote learning and how to adapt them in the educational process. Even though the Library of ATEI has a strong Informational Literacy Programs focusing on a variety of issues seems that there are departments that still need attention on how to use services and tools. Information literacy programs should connect the informational skills of individuals with the potential of library services. So, the benefits from this process will be multiple, because the students will become independent users and staff will have the ability to use, adapt, and develop added value educational tools. Last, but not least, the academic library will boost its value by offering qualitative, user-centered services that will result in attracting more users; thus, it will contribute to enhance the quality of learning and teaching methods that will benefit the whole university.

References

1. O' Reilly, T.: What is Web 2.0: design patterns and business models for the next generation of software (2005)
2. Tripathi, M., Kumar, S.: Use of Web 2.0 tools in academic libraries: a reconnaissance of the international landscape. Int. Inf. Libr. Rev. **42**, 195–207 (2010)
3. Xu, C., Ouyang, F., Chu, H.: The academic library meets Web 2.0: applications and implications. J. Acad. Libr. **35**(4), 324–331 (2009)
4. Casey, M., Savastinuk, L.: Library 2.0. http://lj.libraryjournal.com/2010/05/technology/library-2-0/
5. LeBlanc, L., Kim, K.K.: Web 2.0 and social media: applications for academic libraries. Inf. Secur. Comput. Fraud **2**(2), 28–32 (2014). doi:10.12691/iscf-2-2-2
6. Stephens, M., Collins, M.: Web 2.0, library 2.0 and the hyperlinked library. Ser. Rev. **33**(4), 253–256 (2007)
7. Miller, P.: Library 2.0: the challenge of disruptive innovation (2006). http://cmapspublic2.ihmc.us/rid=1211299379745_1806224281_20373/447_Library_2_prf1.pdf
8. Vassilakaki, E., Garoufallou, E.: The impact of Facebook on libraries and librarians: a review of the literature. Program **48**(3), 226–245 (2014)
9. Vassilakaki, E., Garoufallou, E.: Library Facebook practices for creating and promoting a professional profile. Program **49**(3), 343–359 (2015). doi:10.1108/PROG-10-2014-0073
10. Vassilakaki, E., Garoufallou, E.: The impact of Twitter on libraries: a critical review of the literature. Electron. Libr. **33**(4), 795–809 (2015). doi:10.1108/EL-03-2014-0051
11. Aharony, N.: Web 2.0 use by librarians. Libr. Inf. Sci. Res. **31**, 29–37 (2009)
12. Downes, S.: Educational blogging. Educause Rev. **39**, 14–26 (2004). https://net.educause.edu/ir/library/pdf/erm0450.pdf
13. Klemperer, P.: Network effects and switching costs: two short essays for the new palgrave (2006)
14. Anderson, P.: What is Web 2.0? Ideas, Technologies and Implications for Education. JISC Technology and Standards Watch, Bristol (2007)
15. Kim, Y.M., Abbas, J.: Adoption of library 2.0 functionalities by academic libraries and users: a knowledge management perspective. J. Acad. Libr. **36**(3), 211–218 (2010)

16. Garoufallou, E., Charitopoulou, V.: The use and awareness of Web 2.0 tools by greek LIS students. New Libr. World **112**(11/12), 490–498 (2011)
17. Cooner, T.: Preparing for ICT enhanced practice learning opportunities in 2010 - a speculative view. Soc. Work Educ. **23**(6), 731–744 (2004). http://dx.doi.org/10.1080/0261547042000294509
18. Tees, T.: Ereaders in academic libraries – a literature review. Aust. Libr. J. **59**(4), 180–186 (2010). doi:10.1080/00049670.2010.10736023
19. Ituma, A.: An evaluation of students' perceptions and engagement with e-learning components in a campus based university. Active Learn. High. Educ. **12**(1), 57–68 (2011)
20. Miller, W.: iTeaching and learning. Libr. Technol. Rep. **48**(8), 54–59 (2012)
21. Garoufallou, E., Charitopoulou, V.: Web 2.0 in library and information science education: the greek case. New Libr. World **113**(3–4), 202–217 (2012). doi:10.1108/03074801211218561
22. Liu, T., Peng, H., Wu, W., Lin, M.: The effects of mobile natural-science learning based on the 5E learning cycle: a case study. Educ. Technol. Soc. **12**(4), 344–358 (2009). Gikas, J., Grant, M.: Mobile Computing Devices in Higher Education: Student Perspectives on Learning with Cellphones, Smartphones & Social Media. Internet & Higher Education 19, 18–26 (2013)
23. Dresselhaus, A., Shrode, F.: Mobile technologies & academics: do students use mobile technologies in their academic lives and are librarians ready to meet this challenge? Inf. Technol. Libr. **31**(2), 82–101 (2012)
24. Bomhold, R.: Educational use of smart phone technology: a survey of mobile phone application use by undergraduate university students. Program **47**(4), 424–436 (2013)
25. Seeholzer, J., Salem, J.A.: Library on the go: a focus group study of the mobile web and the academic library. Coll. Res. Libr. **72**(1), 9–20 (2011)

Librarians

Librarians as Educators: Affective Dimensions Experienced in Teaching

Vincas Grigas[1(✉)], Roma Fedosejevaitė[1], and Anna Mierzecka[2]

[1] Vilnius University, Vilnius, Lithuania
{vincas.grigas,roma.fedosejevaite}@mb.vu.lt
[2] University of Warsaw, Warsaw, Poland
anna.mierzecka@uw.edu.pl

Abstract. The objective of the research is to enhance knowledge regarding librarians' emotions experienced while teaching, as a component of a librarian as an educator identity. Affective dimensions of teaching were researched in academic libraries of Lithuania and Poland. Data for this study were gathered using Computer-assisted web interviewing (CAWI) technique. Affective dimensions experienced while teaching were explored through the semantic differential technique. The most obvious finding to emerge from this study is that librarians as educators have more positive than negative emotions about their teaching. Librarians feel that their teaching is being consistent and they have a positive attitude toward teaching, but it requires a significant effort. The largest deviation of the results was seen when talking about feelings of tiredness during the teaching process and the difficulty of teaching role. For better insight the analysis was carried out comparing results from Lithuania and Poland as well as linking emotions with job meaningfulness.

Keywords: Affective dimensions · Librarian as educator · Academic library

1 Introduction

Librarians as educators are still being marginalised in the university community – they are neither "real" librarians, nor "real" faculty members [1–3]. The various kinds of sterotypes formed about teaching librarians has a strong effect on librarians' self-perception as educators [4–6]. As the result, educational duties could cause negative emotions of librarians as educators regarding their teaching and, as a matter of fact, it could lead to lower proficiency. Evidence suggests that librarians' emotions about their teaching were among the most important factors for improving their proficiency [7–10]. This suggests a need to analyse librarians as educators' affective dimensions in order to understand how they percept the role of teachers, what they like and dislike about it, their perception of themselves as teaching librarians so that to get a wider picture on how do teaching librarians evaluate their teaching related emotions.

The objective of the research is to enhance knowledge regarding librarians' emotions about their teaching and we understand it as a component of a librarian as an educator identity. We would like to propose a new line of research about librarians as educators'

emotions in order to collect valid evidences about the affective dimensions of teaching librarians in Lithuania and Poland academic libraries. There has been no detailed investigation of any kind in this field in Lithuania and Poland. Our research provides an explanation of librarians as educators' emotions about their teaching duties in countries where instruction activities are still quite novel. And in most cases teaching activities are implemented not so intensively in comparison, for instance, with Scandinavian countries. Novelty can be perceived as an advantage, but on the other hand, as disadvantage. Novelty of teaching could lead to the feelings of embarrassment and the whole teaching process can be perceived as very difficult and tiring. On the other hand, lack of routine and overwork in a field could lead to oversimplification of teaching activities. Another important aspect is related to emotions about the assessment of meaningfulness such as instructional activities as a job requirement. Some previous studies have shown that the feeling of meaningfulness at work is related to accepting identity, role, and role requirements at work [11]. Understanding the link between job meaningfulness and emotions felt about teaching activities helped to find out additional important aspects in establishing a wider picture of teaching librarians emotions.

Data for this research were gathered using Computer-assisted web interviewing (CAWI) technique. The online survey was implemented using 1KA.SI web survey tool. The questionnaire was based on research conducted by counterparts from Spain. They analysed affective dimensions of university professors about their teaching by exploring it through the semantic differential technique [12]. Respondents of our survey were librarians from academic libraries in Lithuania and Poland who taught Information Literacy courses. Respondents were asked to evaluate 16 pairs of bi-polar adjectives grouped into three parts: "Motivation for teaching"; "Evaluation of oneself as a teacher"; and "Performance of Teaching". The "Work meaningfulness scale" [11] was added to the questionnaire.

2 Theoretical Background

2.1 Professional Identity and Emotions

A considerable amount of literature has been published on analysing the importance of professional identity (core of the teaching profession) in teachers' development and the impact of a range of internal and external factors to the formation of professional identity [13–17]. Throughout this paper, the term professional identity will refer to, according to Sachs [18], understanding teacher professional identity as dynamic and non-obligatory, which is learned through experience and the sense of that experience. While a variety of definitions of the term emotions have been suggested, this paper will use the definition suggested by Lazarus [19] who saw it as "organized system consisting of thoughts, beliefs, motives, meanings, subjective bodily experiences, and physiological states" (p. 100). In this paper, the term emotions about teaching will be used, according to Gargante, Meneses and Monereo [12], as a "specific set of teachers' knowledge on the affective dimension of their teaching" (p. 163).

A significant analysis and discussion on the subject was presented by Beauchamp and Thomas [13] who have highlighted that emotions are one of the most important

factors for teachers' professional identity. Emotions could lead to a change of a teacher's attitude to the profession, for instance, professional life or particular teaching culture (cognition). On the other hand, various aspects of the profession, for instance, nature of teaching or teaching discipline, may have an influence on motivation.

It can therefore be assumed that research of emotions could help to collect data for interpretation of teachers' attitude to the profession and to predict what factors of the profession have an impact on teachers' emotions.

2.2 Teaching Librarians Professional Identity

Throughout this paper, the terms teaching librarian or librarian as an educator will refer to a librarian who is engaged in any kind of teaching activity in an academic library.

Much uncertainty still exists on teaching librarians' professional identity. Walter [2], who is known for his prominent researches on teaching librarians' professional identity, raised a question: "Teaching skills are clearly recognized as important to the professional work of academic librarians, but to what degree do academic librarians think of themselves as teachers when they consider their place on campus, and to what degree is 'teacher identity' a recognized aspect of the broader professional identity of academic librarians?" (p. 53). Walters' question suggests a weak link may exist between librarian working as a teacher and identifying teaching as part of his professional identity. As Albitz [20] asserts, librarians are to be found in a subordinate role within the institutional hierarchy where they are placed as information services providers whereas faculties are responsible for educational activities.

In such a case librarians are seen as having a passive role (supporters) rather than active one (implementers) in educational activities. For instance, Kuhlthau [21] found out, that information users see the library as a "self-service" environment so librarians are not seen as active participators in information use; Grigas and Balčiūnaitė [22] found out that active librarian engagement in study process is seen as least important service of the academic library; and Wheeler and McKinney [10] figured out that some librarians "feel less confident about their teaching and less willing to acknowledge that they are teachers, or that they teach, even if it is obvious what they are doing" (p. 123). Recent research on the librarians stereotypes has shown that perpetuating professional stereotypes damage librarians ability to interact with students and devaluates their work [6]. Having in mind that emotions are part of a professional identity we should be aware of the consciousness of teaching librarians about their emotions regarding teaching activities in a context where, as Whitworth pointed out [23], shift of perception of librarians as providers of information to librarians as educators is not definitive.

2.3 Teaching Librarians Emotions

In recent years a few authors have published studies attempting to explore emotions in librarians' instructional work [2, 10, 24–27].

As some researchers revealed, there is, therefore, a definite need for deeper analysis in the field. Austin and Bhandol [26] showed that as librarians are drawn more into a teaching role, the more understanding of the processes of librarians becoming a teacher

becomes crucial, because, as Davis [27] figured out, for many librarians expanded their teaching role causes varying degrees of anxiety. One of the important aspects of the process is, as Wheeler and McKinney [10] investigated, that librarians have different approaches to teaching, some consider themselves teachers, others – trainers. Different approaches draw out altered kind of emotions.

A significant analysis and discussion on the subject were presented by Julien and Genuis who carried out a number of investigations exploring librarians' emotions in the teaching role [24, 25]. Five broad themes stemmed from the analysis. First, emotional labour is an important element in teaching librarians' agenda; second, instruction related negative emotions have an effect on librarians as educators' motivation for instruction activities; third, considering emotional labour on librarians as educator may be useful for professionals as well as for library as an organization; fourth, it is important to address the range of external and internal influences librarians as educators face related to instruction activities; and fifth, self-conception and intrapersonal factors have an impact on librarians as educators' association of instructional work with other their duties within library.

2.4   Work Meaningfulness

The psychological condition of meaningfulness has a significant role at work. The importance of meaningfulness was recognised in number of researches and theories about motivation, work engagement and others. For example, famous psychologist Frankl [28] has argued that individuals have a primary motive to seek meaning in their life and work. Oldham, Hackman and Pearce in their very well-known theory of work motivation defines meaningfulness as the value of a work goal or purpose, judged in relation to an individual's own ideals or standards [29]. Lack of meaning could have unwanted organizational consequences related to intentions to leave work, and disengagement [30]. The feeling of meaningfulness can be related to personal growth and work motivation [31]. The newest researches about young specialists have found that Generation Y has the strongest need for meaningful work than any previous generation [32].

3   Method

3.1   Data Collection and Participants

The study was conducted in the form of a survey using CAWI, with data being gathered via an online survey tool 1KA.SI, the open source software that allows use of semantic differential technique.

Data collection started on 4th of April 2016 and came to an end on 30th of April 2016. Directors of academic libraries were asked for permission to implement the survey in their library and to introduce the teaching librarians to the main goal of the survey and encourage their participation. Only a few academic libraries have made public information about staff members involved in Information Literacy teaching activities so there was no possibility of contacting teaching librarians directly. No other research was

carried out in this area that could anticipate the number of potential respondents for the survey. Invitations to participate in the survey were sent to 40 academic libraries in Lithuania and 62 academic libraries in Poland. An additional message was sent during one month of survey administration to remind non-responders of the survey. By the end of the survey period, data were gathered from 125 teaching librarians (68 from Lithuania (LT) and 57 from Poland (PL)). Data was gathered following confidentiality procedures.

Teaching experience of the participants can be seen in Table 1 and types of lectures can be seen in Table 2.

Table 1. Teaching experience of participants in Lithuania and Poland

Teaching experience	Percent	
	LT	PL
Less than 5 years	25.9	54.4
1.5	25.9	23.5
Between 11 and 15 years	17.2	11.8
Between 16 and 20 years	15.5	8.8
More than 20 years	15.5	

Table 2. Type of teaching librarians implement in Lithuania and Poland

Type of lectures	Percent	
	LT	PL
1. Credit-based Information Literacy study programme integrated into study programme and implemented without faculty assistance	4.4	20.7
2. Several hours long Information Literacy course integrated into the study programmes study subject	16.2	8.6
3. Information Literacy course is not included into study programme and students can choose the course freely	47.1	32.8
1st and 3rd type of lectures	4.4	5.2
1st and 2nd type of lectures	2.9	10.3
2nd and 3rd type of lectures	19.1	8.6
All three types of lectures	2.9	10.3
Other	2.9	3.4

3.2   Measures

The design of the questionnaires was built on research conducted by counterparts in Spain who analysed affective dimensions of university professors about their teaching by exploring it through the semantic differential technique [12]. The authors gave their permission to use their questionnaire for the research in Lithuania and Poland.

The questionnaire was translated into Lithuanian and Polish languages and retranslated back to English in order to check consistency of translation. Minor differences

were found which were discussed and changed in Polish and Lithuanian versions of the questionnaire. Pilot surveys were undertaken with 21 participants in order to measure internal consistency of the questionnaire. Results were satisfactory – Cronbach alpha for questionnaire was 0.865 and for work meaningfulness scale – 0.873.

Sixteen pairs of adjectives were used to report teaching librarians' emotions through a seven-point rating Likert scale. Semantic differential scores were transformed to fit in a scale ranging from −3 to +3, which is easier to interpret because of the middle or neutral point in zero (0).

Adjectives were contained in three factors.

The first factor – "Motivation for Teaching" encompasses the following items (five pairs of adjectives): feelings regarding respondent's attitude towards teaching (negative – positive); significance of teaching to respondent personally (irrelevant – relevant); respondent's attitude to their future improvement as a teacher (pessimistic – optimistic); while teaching, respondent feels (tense – calm); and feelings that respondents have about teaching (intrusive – pleasant).

The second factor – "Evaluation of Oneself as a Teacher" encompasses the following items (five pairs of adjectives): evaluate respondent's teaching approach (inflexible – flexible); respondent's involvement in teaching (superficial – deep); personal evaluation of respondent's teaching (bad – good); respondent's teaching response to the needs of students (inconsistent – consistent); and respondent's teaching level (superficial – comprehensive).

The third factor – "Process of Teaching" encompasses the following items (six pairs of adjectives): need of effort (slight – significant); the amount of work respondent have to invest (large – little); consistency of respondent's teaching (unadaptable – adaptable); role of the teacher (harsh – pleasant); and teaching, as a process (tiresome – undemanding; demotivating – motivating).

Respondents were asked to fill in the work meaningfulness scale [11], which consist of five propositions: The work that I do is important; I have a meaningful job; The work that I do makes the world a better place; What I do at work makes a difference in the world; The work that I do is meaningful.

This research seeks to address the following questions:

1. What kinds of emotions are evoked in the teaching process?
2. How emotions have been affected by country, experience and type of lectures?
3. How work meaningfulness evaluation correlates with emotions?

What is the inner connection between emotions and the teaching process?

3.3 Analytical Approach

We compared the average scores (averages and standard deviation (std.)) of adjectives in order to find the most positively valued pairs of adjectives and factors. We explored correlation between the teaching librarians' approaches to teaching. We explored possible link between both constructs by using a Spearman's rank correlation coefficient and analysed the differences in the means of the independent groups and factors by

applying the Oneway ANOVA method. We used multiple regression analysis to link affective dimensions with job meaningfulness.

4 Findings

The high reliability of the questionnaire (Cronbach's alpha 0.922) let us analyse findings of this study with confidence.

4.1 General Results

At first let us look at general evaluation of librarians' feelings related with teaching process and comparison of the results from Lithuania and Poland.

As it is seen from Table 3, teaching librarians have more positive than negative emotions about their teaching in both countries. Highest results are seen in questions about consistency of the teaching (for Lithuanian librarians) and feelings regarding attitude towards teaching (for Polish librarians).

Table 3. Descriptive statistics: means, standard deviation of Lithuania (LT) and Poland (PL) sample

Affective dimensions	Mean		Std.	
	LT	PL	LT	PL
negative – positive	5.78	6.38	1.660	1.006
irrelevant – relevant	6.06	6.05	1.347	1.276
pessimistic – optimistic	5.99	6.29	1.419	1.092
tense – calm	4.82	5.50	1.906	1.536
intrusive – pleasant	5.24	5.71	1.801	1.298
inflexible – flexible	5.84	6.19	1.154	1.034
superficial – deep	6.04	6.26	1.007	0.870
bad – good	5.66	6.03	0.978	0.898
inconsistent – consistent	6.12	6.21	0.749	0.840
superficial – comprehensive	5.93	5.97	0.858	1.008
slight – significant	3.68	6.07	1.943	1.090
large – little	6.07	6.24	1.027	0.885
unadaptable – adaptable	6.06	6.31	0.879	1.143
harsh – pleasant	5.31	5.21	1.887	1.823
tiresome – undemanding	4.56	4.40	1.982	1.498
demotivating – motivating	5.72	6.03	1.506	1.270

The most striking result to emerge from the data is that we have got an almost ideal round pattern, and only in few cases was there a slight deviation from very positive emotions to slightly negative (Fig. 1). The correlation between Lithuania and Poland is interesting because the results are almost similar, but we may see more positive tendency in Poland's side. Mean of all affective dimensions for Lithuania is 5.55 (Std. 1.38) and for Poland accordingly – 5.93 (Std. 1.16).
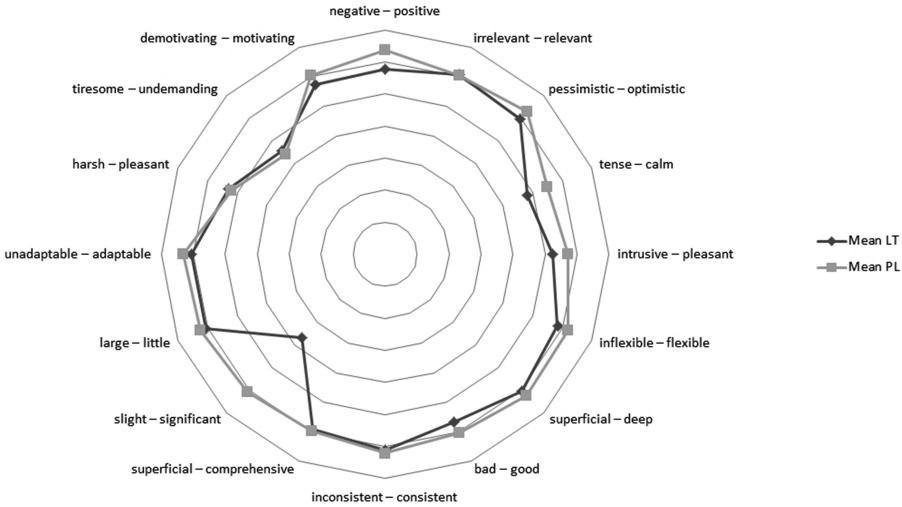
Fig. 1. Comparison of averages of affective dimensions between Lithuania and Poland (starting from outer circle with value of 7 where higher values are related to emotion with positive connotation).

The single most striking observation to emerge from the data comparison was that the need of effort (slight-significant) differentiates the most between Lithuania and Poland. As we may see from Fig. 1, the biggest deviation can be seen in the question about feelings of tiredness during the teaching process and the difficulty of the teaching role for the Polish librarians. It should be noticed, that the standard deviation between the results in all questions is quite high – it could mean that teaching evokes very diverse feelings for different librarians.

Teaching librarians in both countries have a very positive perception of themselves as teachers (Fig. 2). Interestingly, motivation for teaching and the process of teaching was associated with a bit less positive emotions. A comparison of the two results reveals that Lithuania's teaching librarians evaluated their emotions slightly less positive than counterparts from Poland.

Some interesting insights can be made from the correlation analysis. The least correlation can be seen regarding the amount of work one has to invest (large-little). This result could be explained by not assigning emotions regarding the preparation process to the teaching process itself.

The results of the correlational analysis showed that respondents evaluated their emotions about motivation of teaching consistently and the significance of teaching and attitude to future improvements as teacher is strongly related to what kind of feelings teaching arose, opinions about teaching, and the role teacher implements.

Significance of teaching may be seen as criteria which could help to predict how librarians would evaluate other important aspects related to teaching – improvement and evaluation of teaching itself and role of teacher. Significance of teaching to librarians

personally (irrelevant or relevant) here refers to experience applicable to personal aspirations.
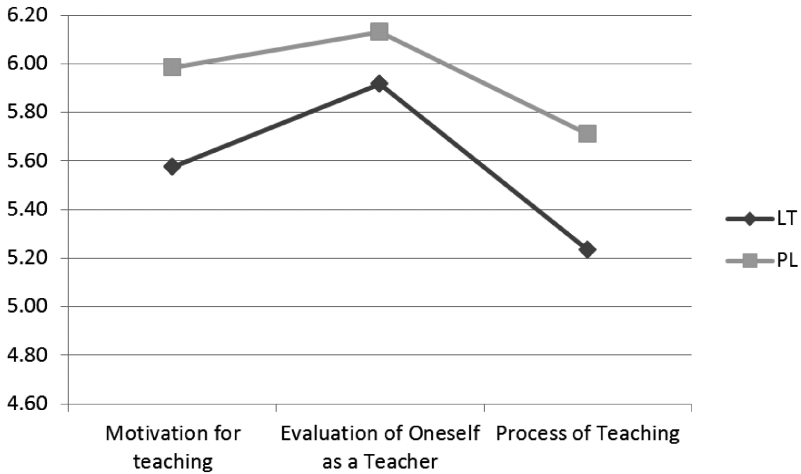
Fig. 2. Comparison of means between factors

We made multiple regression analysis to link affective dimensions of librarians and their job meaningfulness. Our analysis showed that only personally felt significance of teaching has a role in predicting job meaningfulness ($\beta = 0.411$, $p < 0.005$, $R^2 = 0.49$).

4.2   Analysis of Affective Dimensions

For better understanding of the results, a deeper look into every question is required. To see the differences between LT and PL and compare them all, we converted results to a percentage equivalent. We decided to measure what percent of highest evaluation criteria (+2 and +3) were chosen. We think it helped us to clarify which of the affective dimensions received the most positive evaluation.

The answers to the question about the significance of teaching for respondents personally (irrelevant – relevant) are very interesting. Just few librarians in both countries value their teaching as irrelevant, but they are not sure about the relevance of their teaching as well – there is no such upward tendency as in other questions (Table 4).

The answers to the question about their attitude to future improvement as a teacher (pessimistic – optimistic) are very interesting too. Just a few librarians in both countries value their attitude as pessimistic. Most librarians in both countries have an optimistic attitude to improvement.

Deviation of answers to the question "While teaching you feel" (tense – calm) shows the most recognisable differences between countries. The difference is statistically significant ($p > 0.032$). Issues related to teaching librarians from Lithuania were not particularly prominent in comparison with teaching librarians from Poland. Less than half of Lithuanians chose the highest criteria. It could be interpreted as a sign of

insufficient experience in teaching. Although more counterparts from Poland felt more calm than tense, we do not see clear upward tendency of the answers.

Table 4. Percent of +2 and +3 evaluation criteria were chosen in Lithuania (LT) and Poland (PL) sample and difference between countries

Affective dimensions	Percent of +2 and +3		Difference between countries (p)
	LT	PL	
negative – positive	74	86	0.014
irrelevant – relevant	77	81	0.973
pessimistic – optimistic	77	83	0.181
tense – calm	47	71	0.032
intrusive – pleasant	58	66	0.103
inflexible – flexible	73	85	0.076
superficial – deep	77	85	0.210
bad – good	65	70	0.027
inconsistent – consistent	81	84	0.524
superficial – comprehensive	76	84	0.810
slight – significant	22	58	**0.000****
large – little	75	79	0.332
unadaptable – adaptable	70	88	0.166
harsh – pleasant	58	60	0.759
tiresome – undemanding	46	19	0.634
demotivating – motivating	66	72	0.216
Average overall	**65**	**73**	
Average by factors:			
Motivation for teaching	67	77	
Evaluation of Oneself as a Teacher	74	82	
Process of Teaching	56	63	

**p < 0.005

Deviation of answers to the question "Feelings you have about teaching" (intrusive – pleasant) shows almost no difference between Lithuania and Poland. The difference is statistically insignificant ($p > 0.103$). But it shows the breakdown of evaluation – it is the lowest result for Poland (66%) and one of the lowest for Lithuania (58%) in the first factor "Motivation for Teaching".

Deviation of answers to the question "Personal evaluation of your teaching" shows a slight difference between countries although the difference is statistically significant ($p > 0.027$). More than half the respondents felt positive about their teaching. What is interesting about this data is that librarians of both countries avoided choosing the highest (+3) criteria. It shows a contradiction with previous results where motivation for teaching was evaluated much higher. None of librarians in Lithuania or Poland evaluated their teaching as bad, and a few of them evaluated it as most relevant to them. This result could mean that librarians are not particularly confident about their teaching.

Deviation of answers to the question "Your teaching responds to students' needs" shows almost no difference between countries (the difference is statistically insignificant ($p > 0.524$)). But it is interesting to note that Lithuanians evaluated their response to students needs as the highest in comparison with other affective dimensions and for Poland counterparts it was one of the highest results as well.

Deviation of answers to the question "Need of effort" (slight – significant) shows a huge statistically significant difference between countries ($p > 0.000$). A minority of respondents felt positive emotions about the need of effort. Lithuanian results are very similar in every option – this could mean that Lithuanian librarians understand their role and requirements for themselves very differently. This result does not match any other kind of Lithuanian results. In Poland's case, we could see that the results of the need of effort are very similar to results about feelings they have towards teaching.

Deviation of answers to the question "The amount of work you have to invest" (large – little) shows a slight difference between countries, although the difference is statistically insignificant ($p > 0.332$). This result strongly differs from the need of effort. This rather contradictory result may be due to a different approach to the amount of work invested in preparing teaching material for lectures and efforts needed for delivering teaching material in class.

Deviation of answers to the question "Consistency of your teaching" (unadaptable – adaptable) shows a difference between countries although the difference is statistically insignificant ($p > 0.166$). This result is the highest for Poland and it is in a similar line with attitude, teaching tenet, involvement in teaching, response to student's needs, and teaching level. Interestingly, Lithuanians quite often chose criteria "-1" (26%) and it is the highest result of all.

Deviation of answers to the question "Role of the teacher" (harsh – pleasant) shows a slight difference between countries although the difference is statistically insignificant ($p > 0.759$). This result is one of the lowest for both countries. Only a few librarians in both countries chose "pleasant". This result can be related to previous results – librarians need to invest more effort and work in the teaching process.

Deviation of answers to the question "Teaching, as a process" shows a visible difference between countries although the difference is statistically insignificant ($p > 0.634$). This result is one of the lowest for both countries, but Poland showed very distinctive result – it is almost 3–4 times less than other affective dimensions. It shows that evaluation of teaching as a process for Poland's librarians is slightly vague, and they chose "safer" criteria – -1. In contrast to earlier findings, however, Lithuania librarians chose more positive criteria.

Deviation of answers to the question "Teaching, as a process" (demotivating – motivating) shows is a slight difference between countries although the difference is statistically insignificant ($p > 0.216$). We can see an interesting result, that despite the greater effort and work that Polish librarians invest, they have higher motivation for teaching that librarians from Lithuania.

5   Discussion

This study showed that teaching librarians feel far more positive emotions than negative ones, but the standard deviation between the results in all questions was quite high. These results provide further support for the presumption that teaching librarians are not a homogenous group and teaching evokes diverse emotions for different librarians. It also can be related to the fact that in the case of librarians, the educational duties could have diverse forms – from one hour course to the whole year lectures – and the feelings related to this obviously differ.

Respondents mostly highlighted the emotions related to evaluation of themselves as teachers and motivation for teaching, but the process of teaching was seen as less important. They also avoided scoring their feelings in both ends of the semantic differential. It is important to bear in mind the possible bias in these responses. It can let us presuppose that librarians are not confident in their role of being teachers. On the one hand they feel confident and motivated, but on the other hand they feel less positive in performing teacher's role. One of the possible explanations of this situation might be related to the fact that libraries do not define tasks for teaching librarians as clearly as they could and do not give unambiguous feedback about their teaching. Also, there is abundant room for further progress in determining what the impact of highlighted emotions has university professors' attitude towards teaching librarians – are they seeing teaching librarians as information providers or as teachers?

Almost similar results from Lithuania and Poland can give us convincing insights about general difficulties (not affected by institutional differences) related to librarians transforming into teachers. However, these results were not particularly encouraging. The results of this study contradict the Spanish [12] and other studies on affective dimensions of professors.

Results of regression analysis showed that emotions related to significance of teaching to librarians personally (irrelevant or relevant) can predict work meaningfulness. This relation gives us essential insight and helps to define guidelines for further work – relevance of teaching should be strengthened and this issue should stay in the agenda of academic libraries' staff responsible for development of teaching activities within the university.

However, more research on this topic needs to be undertaken before we may conclude that being involved in teaching at the high level has a positive impact on affective emotions.

Results from Poland and Lithuania do not differ in statistical significance but we can see a tendency that Polish results are higher than Lithuanian ones. These differences may be caused by many factors. We paid attention to the two possible explanations: (1) teaching librarians in Poland are younger than the ones in Lithuania – they are more positive about new duties which have recently become a part of librarian's job than their older colleagues; (2) Polish survey participants more often teach credit-based Information Literacy study programmes integrated into study programmes – the official status of educational duties may causes more positive emotions arising from the perception of the importance of the job. From this point of view it would be recommended that Information literacy programmes in Lithuania also be integrated into study programmes. It

could help to find other factors that caused more positive results in Poland and can give a chance to learn from Polish librarians' good experience.

For further investigations, it might be feasible to use additional criteria with more details about respondents. For instance, methods used for teaching and evaluation, and status of official duty at the library.

6   Conclusions

This paper has argued that librarians feel embarrassed in the teaching librarians' role. Analysis of previous research in the field showed no promising signals on the matter. The main goal of the current study was to determine whether it is true that librarians are seen and consider themselves as information services providers rather than teaching librarians.

This study has shown that for librarians in Lithuania and Poland, the teaching process evoked the whole range of emotions, but most of them were more positive than negative. The most positive evaluations were given to consistency and positive attitude toward teaching. The most pessimistic evaluations were given to effort that teaching requires and feeling of tenseness during the teaching process.

Although the results of this research support the idea that emotions experienced by teaching librarians differ in relation to their teaching experience or type of lectures they are instructing, but the difference is not statistically significant.

The present study makes a noteworthy contribution to finding out what makes an impact on work meaningfulness. It was found that significance of teaching to librarians personally (irrelevant or relevant) can help to predict the feeling of work meaningfulness for teaching librarians.

The empirical findings in this study provide a new understanding about teaching librarians as professionals and what is their cornerstone in professional identity. In general, therefore, it seems that librarians of both countries evaluated themselves as teachers very positively (felt great confidence and self-respect – internal aspects), but motivation for teaching and process of teaching was associated with slightly less positive emotions (felt less confident about others thoughts about them as teachers – external aspects). The current research was not specifically designed to evaluate factors related to impact of outside factors. This limitation means that study findings on external aspects need to be interpreted cautiously.

More research is required to determine the efficacy of the questionnaire. Authors think it would be valuable to extend the survey to other Baltic Sea region countries. This research will serve as a base for future studies on affective dimensions of teaching librarians and will allow the use it as a tool for measuring change of emotional climate of teaching librarians in a particular library.

References

1. Rosenfeld, J., Gatten, R., Nalani Meulemans, Y., Carr, A.: Not at your service: building genuine faculty-librarian partnerships. Ref. Serv. Rev. **41**, 80–90 (2013)

2. Walter, S.: Librarians as teachers: a qualitative inquiry into professional identity. Coll. Res. Libr. **69**, 51–71 (2008)
3. Austin, T., Bhandol, J.: The academic librarian: buying into, playing out, and resisting the teacher role in higher education. New Rev. Acad. Librariansh. **19**, 15–35 (2013)
4. Donovan, C.: Sense of self: embracing your teacher identity. Libr, Lead Pipe (2009)
5. Pagowsky, N., DeFrain, E.: Ice ice baby: are librarian stereotypes freezing us out of instruction? Libr. Lead Pipe. (2014)
6. Jennings, E.: The librarian stereotype: how librarians are damaging their image and profession. Coll. Undergrad. Libr. **23**, 93–100 (2016)
7. Polger, M.A., Okamoto, K.: " Can't Anyone be a Teacher Anyway?": Student Perceptions of Academic Librarians as Teachers. Libr. Philos. Pract. (2010)
8. Julien, H., Genuis, S.K.: Emotional labour in librarians' instructional work. J. Doc. **65**, 926–937 (2009)
9. Medaille, A.: Librarians view instruction as integral to their professional identities. Evid. Based Libr. Inf. Pract. **6**, 120–123 (2011)
10. Wheeler, E., McKinney, P.: Are librarians teachers? Investigating Academic Librarians' Perceptions of their own teaching skills. J. Inf. Lit. **9**, 111–128 (2015)
11. Bunderson, J.S., Thompson, J.A.: The call of the wild: zookeepers, callings, and the double-edged sword of deeply meaningful work. Adm. Sci. Q. **54**, 32–57 (2009)
12. Badia Garganté, A., Meneses, J., Monereo, C.: Affective dimension of university professors about their teaching: an exploration through the semantic differential technique. Univ. Psychol. **13**, 161–173 (2014)
13. Beauchamp, C., Thomas, L.: Understanding teacher identity: an overview of issues in the literature and implications for teacher education. Camb. J. Educ. **39**, 175–189 (2009)
14. Walkington, J.: Becoming a teacher: encouraging development of teacher identity through reflective practice. Asia-Pac. J. Teach. Educ. **33**, 53–64 (2005)
15. Zembylas, M.: Emotions and teacher identity: a poststructural perspective. Teach. Teach. Theory Pract. **9**, 213–238 (2003)
16. Volkmann, M.J., Anderson, M.A.: Creating professional identity: dilemmas and metaphors of a first-year chemistry teacher. Sci. Educ. **82**, 293–310 (1998)
17. Akkerman, S.F., Meijer, P.C.: A dialogical approach to conceptualizing teacher identity. Teach. Teach. Educ. **27**, 308–319 (2011)
18. Sachs, J.: Teacher education and the development of professional identity: learning to be a teacher. In: Connecting Policy and Practice: Challenges for Teaching and Learning in Schools and Universities. pp. 5–21. Routledge, Oxford (2005)
19. Lazarus, R.S.: Stress and Emotion: A New Synthesis. Springer Publishing Company, New York (2006)
20. Albitz, R.S.: The What and Who of Information Literacy and Critical Thinking in Higher Education. Portal Libr. Acad. **7**, 97–109 (2007)
21. Kuhlthau, C.C.: Seeking meaning: a process approach to library and information services. Libraries Unlimited, Westport Conn, London (2004)
22. Grigas, V., Balčiūnaitė, L.: Mokymosi bendrijos raiška akademinėje bibliotekoje: vilniaus universiteto bibliotekos atvejis. Vilniaus Univ. Bibl. Metrašt. **2015**, 109–131 (2015)
23. Whitworth, A.: The reflective information literacy educator. Nord. J. Inf. Lit. High. Educ. **4** (2012)
24. Julien, H., Genuis, S.K.: Emotional labour in librarians' instructional work. J. Doc. **65**, 926–937 (2009)
25. Julien, H., Genuis, S.K.: Librarians' experiences of the teaching role: a national survey of librarians. Libr. Inf. Sci. Res. **33**, 103–111 (2011)

26. Austin, T., Bhandol, J.: The academic librarian: buying into, playing out, and resisting the teacher role in higher education. New Rev. Acad. Librariansh. **19**, 15–35 (2013)
27. Davis, K.D.: The academic librarian as instructor: a study of teacher anxiety. Coll. Undergrad. Libr. **14**, 77–101 (2007)
28. Frankl, V.E.: Man's Search for Meaning: from Death-camp to Existentialism: An Introduction to Logotherapy. Beacon Press, Boston (1965)
29. Oldham, G.R., Hackman, J.R., Pearce, J.L.: Conditions under which employees respond positively to enriched work. J. Appl. Psychol. **61**, 395 (1976)
30. Aktouf, O.: Management and theories of organizations in the 1990s: toward a critical radical humanism? Acad. Manage. Rev. **17**, 407–431 (1992)
31. Spreitzer, G.M., Kizilos, M.A., Nason, S.W.: A Dimensional Analysis of the Relationship Between Psychological Empowerment and Effectiveness Satisfaction, and Strain. J. Manag. **23**, 679–704 (1997)
32. Barnes, G.: Guess who's coming to work: generation Y. Are you ready for them? Public Libr. Q. **28**, 58–63 (2009)

Copyright Literacy Competencies from Portuguese LIS Professionals

Ana Lúcia Terra[✉]

Polytechnic Institute of Porto, CETAC.MEDIA, Porto, Portugal
`anaterra@eseig.ipp.pt`

Abstract. Copyright literacy among Portuguese information professionals, especially academic librarians, was studied as part of a multinational survey. The sample included 127 completed questionnaires. After the literature review, the data gathering methodology is explained. Then the respondent profile is presented. Data about general knowledge of copyright and opinions related to this issue are discussed. Familiarity with licenses, exceptions and other conditions of copyright access are also analysed. The familiarity regarding specific context and objects of copyright is discussed. Finally, personal opinions about copyright specific issues and aspects related to learning about copyright are presented.

Keywords: Copyright · Copyright literacy · Information professionals · Portugal

1 Introduction

Copyright is a form of property that confers on the author exclusive rights. These rights are economic, they enabling authors and producers to control the material production and dissemination for sale. They are also moral or personal rights and include the rights of attribution, that is to be named the author of the work, and the rights of integrity, which prevent adaptation or misuse of the work that does not regard the work as conceived by the author. This right has its foundations in Roman law regarding the principles of property, according to which possession confers ownership. The first time that legislation recognized the author's right to control the production of books occurred in England in 1710 with the Statute of Anne. But, in the twenty-first century, changes introduced by Information and Communication Technologies raised increasingly complex problems in the area of copyright and related rights [1]. There is a clear relation between knowledge generation, intellectual property rights, and economic development. As Horava [2] underlined, copyright legislation determines the framework by which researchers can legitimately use protected information to create new intellectual work.

In this context, information professionals have to deal with new issues directly linked to this scope such as licenses to use some information resources, conditions of licenses use in institutional contexts, copyright related with institutional repositories, authors' rights regarding resources available in e-learning tools, Creative Commons Licenses or the notion of fair use, among others. These professionals have to face increasingly complex copyright issues that require specific knowledge and skills. So it is important

to ascertain their level of knowledge about copyright and related intellectual property issues.

In this paper, after a literature review, we will present Portuguese results from an international survey that gathered the opinions and perceptions of experiences related to copyright issues, mainly among librarians, and other professionals from cultural institutions.

2   Literature Review

In the USA, Charbonneau and Priehs [3] carried out a national survey on academic librarians and library staff (n. 226) about their awareness of copyright policies, partnerships with campus groups to address copyright issues, and training needs. Findings showed that almost all the sample (93%) had to provide answers related to copyright issues in the workplace. This is in line with previous studies [2, 4] that states that, regarding copyright and intellectual property, the library was a central point to the university and copyright management information activities were mainly related to a library administrative unit. Despite that, librarians seemed to want a better preparation to provide copyright information to library users [3, 4]. According to Charbonneau and Priehs [3], it was clear that more needed to be done to support those working in academic libraries in order to increase their knowledge level of copyright policies, since only 56.6% of the respondents said they were comfortable or very comfortable with the issue.

According to Graveline [5] and Horava [2] librarians can educate themselves on this matter and those responsible for copyright issues in campus does not need to have a law school background. But, according to Albitz's [4] study of 12 US universities the decision between hiring an attorney or a librarian depended solely on cost differential in some institutions. About ten years ago, Vesely [6] explained why university administrators were increasingly hiring copyright librarians in order to ensure protection regarding infringement complaints, namely in digital environment. Educating the community on copyright issues, creating and implementing copyright policies, advocating for the implementation of copyright law that supports teaching, learning, and research are other important responsibilities related to copyright librarians [4].

So, copyright aspects are an important issue to information services and there is a need to undertake research about this matter.

3   Methodology

The results we presented and analysed in this study were part of an international research project led by the State University of Library Studies and Information Technologies, Sofia, Bulgaria, entitled, *Copyright Policies of Libraries and Other Cultural Institutions* (2012–2014). Initially, the project focused on a thematic bibliography on copyright and about 3,200 records were compiled [7]. In the second phase of the project, we designed a questionnaire to collect data on librarians', archivists', and curators' opinions, perceptions, and experiences related to copyright issues in four countries (Bulgaria, Croatia, France and Turkey). We designed this questionnaire, *Copyright Literacy of Specialists*

from Libraries and Other Cultural Institutions, to comparatively investigate the level of knowledge and skills of information professionals in different countries. We intended to determine the extent to which information professionals were familiar with the issue of copyright and related rights; what was their knowledge on policies and copyright practices in their countries and within the institution where they worked; what was their opinion on the inclusion of issues related to copyright in academic training and continuing training; what skills would information professionals need with regard to copyright in order to study what need to be improved and to compare differences and similarities between the different countries involved in the study [8].

We organized this data collection tool into four parts. The first concerned the general knowledge and perceptions of copyright and related aspects in the specific context of information services and other cultural institutions, including ten questions. The second part, included one question, concerned the existence of copyright policies at the institutional level. The relevant aspects for training on copyright issues and related rights made up the third part of the questionnaire, covering five questions. The fourth part of the survey dealt with general data of respondents (gender, age, education and professional environment) in order to characterize the sample, including six questions. The survey included 22 questions, most with closed response options, some of which applied the Likert scale.

Initially, we developed the questionnaire in English and then we translated it into the languages of the countries where it was distributed and broadcast online via the LimeSurvey platform. A collector was created for each participating country. More countries were included in the project in 2014, namely the United Kingdom, Italy, USA, Romania, Finland, Hungary, Portugal, Mexico, Lithuania, Norway, and Brazil. Portugal joined the working group in the first half of 2014, having administered the survey between December 2014 and February 2015. We created a convenience sample in Portugal by sending 2,500 e-mail messages for institutions (libraries, archives and museums) and professionals. The questionnaire was viewed 209 times but only 127 questionnaires were completed. Our report will present the analysis of the results from these 127 completed questionnaires.

4   Findings

4.1   Respondents Profile

The Portuguese sample included 73.2% female professionals and 26.7% male professionals. The predominance of female respondents confirmed the common idea that information professions are mainly carried out by women. This result was also demonstrated by the samples from Bulgaria, Croatia, and France [8], from the UK [9], and from Finland [10]. With respect to age, the largest group is that of 40–49 years (41.7%), followed by those between 50–60 years (24.4%). The average age was higher in Portugal than in other countries [8, 9]. Three point nine percent of the sample was 60 years or older. We concluded that respondents were middle-aged professionals; those who were between 30 to39 years old accounted for 22% while only 7.8% were under than 30 years. These data appeared to be consistent with the answers to the question about how long

the respondents had worked at their current institution, although naturally throughout their professional career they can change employers. We found that nearly a quarter of respondents (24.2%) had a connection to the institution where they worked for 20 years or more. Twenty point four percent worked from 15 to 19 years and maintained their link with the institution while 21.2% who worked between 10 and 14 years were connected to their institution of employment. According to these results, respondents must have a good knowledge of their institution, given their long connection with that context.

A large portion of the sample had a connection to library services: 32.2% to academic libraries, 9.4% to public libraries, 2.3% to school libraries, and 11.8% to specialized libraries. Some of the respondents (34.6%) choose the "other" option to indicate the type of institution although this type was already included in available options, predominantly different categories of libraries. Another aspect that must be stressed is that archive services are under-represented, with 7.8% of respondents indicating they had a connection to an archive. Only one respondent indicated that he or she had a connection with a museum. Given these figures, it was noteworthy that, in the Portuguese case, the initial goal to collect professional contributions in the area of archive services and museum services was not accomplished. However, data collected in Bulgaria, Croatia, France, and Turkey, showed a significant predominance of librarians (78%), 19% pursued their activities in another type of cultural institution, and only 2% and 1% in archives and in museums respectively [8]. In the specific case of France, this situation was even more pronounced because, in 329 respondents, one worked in a museum and all the others worked in different categories of libraries, and there is no archivist in the sample [11].

The sample majority claimed to be Bachelors (40.1%) or Masters degree holders (33.8%). Those who attended post-graduate courses, a Portuguese specificity for many years, choose the "other" option and amounted to 15.7%. Some respondents (10.2%) indicated having a PhD as their highest degree. Regarding training areas, most of the sample (58.2%) claimed to have training in the field of Information Science – Librarianship. These results showed a difference between Portugal and Finland, where 69% of the respondents held at least a Masters degree [10].

4.2 Knowledge and Awareness of Copyright

In the first part of the questionnaire, we intended to gather data about general knowledge and opinions of copyright.

According to data in Fig. 1 when asked about their familiarity with copyright, a majority of the sample expressed moderate knowledge with regard to the national copyright context. More than half (58.3%) said that they were moderately familiar with copyright and related law, and expressed a similar familiarity regarding institutions responsible for managing copyright in Portugal (50.4%) and for institutions related to copyright in the country (48.8%). Those who claim to be extremely familiar with these three issues in the national context were between 11% and 14.2%. Therefore, according to their self-report and personal perception, respondents had a level of knowledge of copyright that seemed to need improvement. This was further accentuated when considering the international context because respondents tended to say they were only

somewhat familiar with copyright and related law (34.6%) and institutions related to copyright in the international context (30.7%). Those who considered themselves extremely familiar with these issues represented residual percentages ranging between 5.5% and 3.1%. On the other hand, those who considered themselves not at all familiar or slightly familiar with copyright and related rights at international level reached 29.9%. The same degree of familiarity with the institutions related to copyright in the international context reach 39.4%. As in the UK context, the Portuguese sample showed a better knowledge of national issues [9].
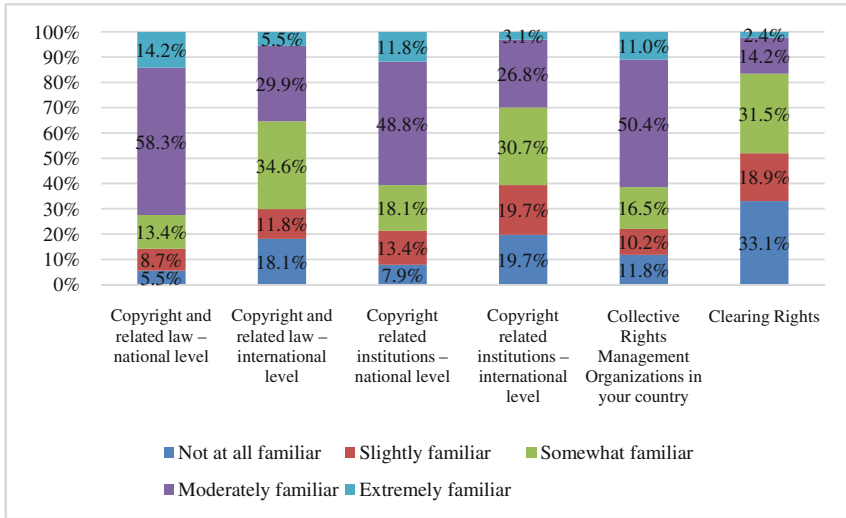
Fig. 1. Familiarity with copyright issues

Clearing rights appeared to be the less familiar issue for respondents, as 31.3% reported not being familiar and 18.9% said they were slightly familiar. Only 2.4% felt they were extremely familiar with the subject.

Figure 2 presents aspects related with access conditions under copyright framework. Respondents expressed a moderate knowledge of

- licenses for use of information sources, including digital resources (38.8%);
- license usage conditions in the institution in which the respondent worked (39.4%);
- copyright in the context of institutional repositories (36.2%);
- Creative Commons Licenses (29.9%); and,
- aspects related to Open Access, Open Data, and Open Educational Resources (34.6%).
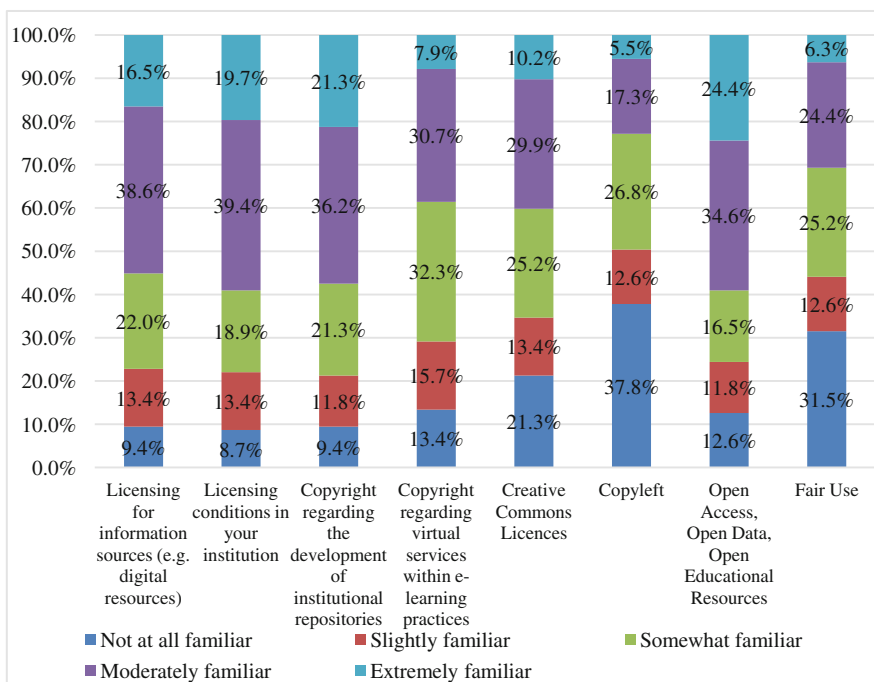
Fig. 2. Familiarity with licences, exceptions and other conditions of copyright access

The issues with which respondents have less familiarity concerned copyleft issues (37.8%) and fair use (31.5%) as in the international sample studied by Todorova et al. [8]. The topics with the highest degree of familiarity were copyright in the context of institutional repositories (21.3%) and license usage conditions in the institution to which the respondent belonged (19.7%).

It seemed that it would be useful to strengthen the knowledge about the current importance of using digital resources, namely databases. Their access often is limited to certain conditions since the databases are paid by the institutions, particularly in the context of academic libraries. In fact, it should be stressed that 44.8% of the respondents had a familiarity with the subject ranging from not at all familiar to somewhat familiar.

It should also be noted that, regarding copyleft, 77.2% of respondents indicated that their level of familiarity ranged from not at all familiar to somewhat familiar. Knowledge of the notion of fair use also needed enhancement, because 69.3% of respondents said they had no or very little familiarity with the subject. Although there was a rule in American law that defined limitations to copyright in order to facilitate the use of the work in specific situations such as the educational context, given that a lot of information available online is of US origin, it is relevant that information professionals in Portugal be aware of this topic, particularly in the context of academic libraries.

Familiarity with copyright related resources available in e-learning contexts was also low; as 61.4% of respondents indicated having no or very little knowledge or experience

with this. This is also a relevant matter to be improved if we consider the importance that e-learning platforms have taken on different levels of education.

We asked respondents about their familiarity with respect to digitization projects, material from public domain, out-of-print works, and orphan works (Fig. 3). The data analysis shows that it appeared that respondents had moderate familiarity with copyright applicable to digitization projects (30.7%) and to copyright regarding materials from public domain (34.6%). In the latter case, 14.2% were extremely familiar with the subject. As in the UK sample [9], Portuguese results showed a greater proximity with digitization issues, which can be explained because institutions were putting a great investment in this sector. Respondents were somewhat familiar with copyright related to out-of-print works (28.3%) and copyright related to orphan works (29.1%). The topic that the largest number of respondents indicated that they had no familiarity with were orphan works (27.6%) and materials from the public domain (13.4%).
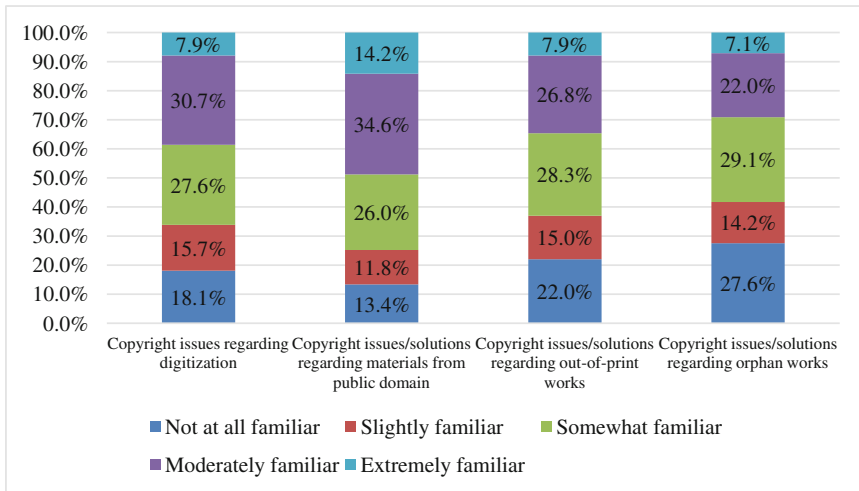
Fig. 3. Familiarity regarding specific context and objects of copyright

When asked about their general degree of familiarity with copyright issues, 42.5% claimed to have a moderate knowledge. This response was in line with the results obtained in the previous questions, reinforcing the perception that respondents were honest with their answers. This also indicates that the level of knowledge can be improved: only 8.7% said they were extremely familiar with this field and 48.9% said they were not at all familiar, slightly, or somewhat familiar regarding this topic.

We asked respondents to give their personal opinion about specific issues related to copyright. According to the data shown in Fig. 4, 72.4% agree that the services provided by libraries and other cultural institutions must comply with the legislation on copyright. However, it is important to stress that a little more than a quarter (27.6%) neither agreed nor disagreed with that statement, showing that they did not identify themselves in a strict compliance with legal obligations by information services with regard to copyright. At the same time, 86.6% expressed the opinion that an international harmonization of

exceptions and limitations of copyright in the context of libraries and archives was necessary, reinforcing the idea that information services have particularities that must be taken into account when applying copyright. On the other hand, these figures also expressed the importance of creating regulations that go beyond the national context, which is understandable if we consider that Internet, the main source of access to information, has a supranational character. In this sense, 63.8% of respondents agreed that WIPO should better define the exceptions and limitations to copyright in the digital environment but 30.7% preferred to keep a neutral position, indicating that they neither agreed nor disagreed. Finally, 74% of the sample saw the Treaty of Marrakech, promoted by WIPO, as an important initiative to facilitate access to published works to solve barriers to access printed text especially for people who are blind or visually impaired. This document, which was signed on 27 July 2013 by the 186 member countries of WIPO, was intended to increase the amount of printed material adapted to people with disabilities to read or handle the book, encouraging their contact with the writing word. For the provisions of the document to become a reality, it is necessary that 20 member states of the WIPO ratify the treaty, which has not happened yet, even in Portugal, although the document is already translated in to Portuguese language.
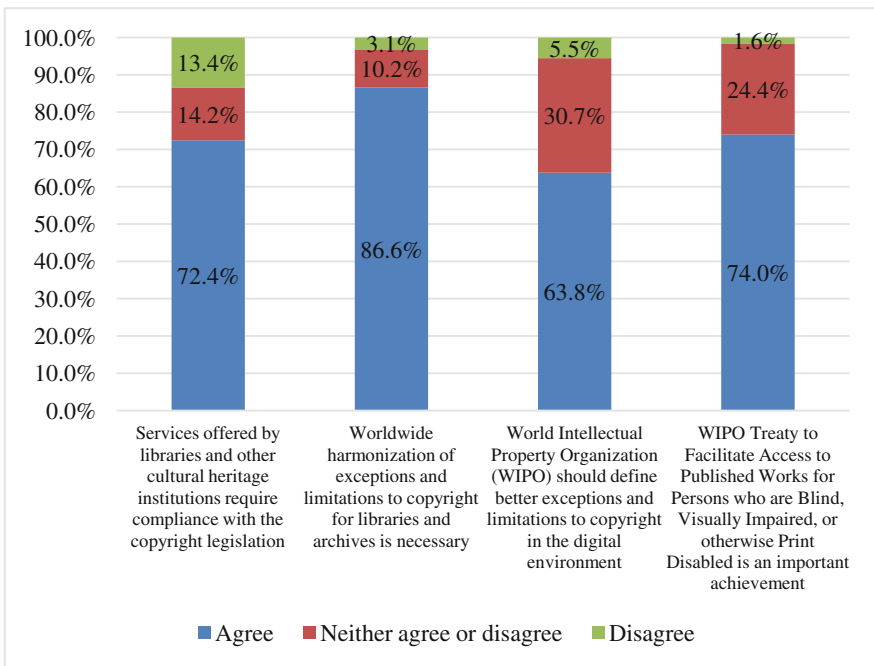
Fig. 4. Personal opinions about copyright specific issues

4.3   Learning About Copyright

When asked about the inclusion of matters related to intellectual property and copyright in the curriculum of Library and Information Science Studies and Cultural Heritage Studies (88.2%) and in continuing training (89%), the respondents were almost unanimous in agreeing that this was necessary. Thus, the Portuguese sample seemed to be sensitive to the relevance of copyright and related law, as in the UK [9]. It should be noted that even those who disagreed represented a very residual number (about 1%) and those who preferred to keep a neutral position, not agreeing nor disagreeing, were around 10%, for the initial training or continuing education.

Regarding the level of training in which matters related to intellectual property and copyright should be included, almost all (91.3%) of the respondents indicated the degree level at which they felt training should take place. A little more than half indicated the Masters level (59.1%) and 36.2% preferred including this training in doctoral studies. Only 3.2% indicated that training should take place at any level. Therefore, the sample seemed to recognize the issue of intellectual property and copyright as a fundamental aspect of the training of information professionals.

Respondents indicated a range of sources they used to enhance their knowledge about intellectual property and copyright. We are highlighting four of these sources because they were selected by more than half or nearly half of the sample. Noteworthy were web sites (59.1%), colleagues (50.4%), like in Finland [10], books and articles (49.6%), including, for example, works on copyright for Librarians, and National Library and professional associations (48%). Specialized sources of personal information in these areas had a lower degree of preference, with 40.2% for jurists and 38.6% for specialists in the academic and scientific community. Their demand for international information sources was medium, particularly with regard to WIPO, with 37.8% of the choices, and IFLA, which featured 33.1% of the preferences. The Electronic Information for Libraries Network (eIFL) was a choice for only 11.8% of respondents.

Note that these results were quite different from the choices registered in the French sample where the preferences were to go to web sites (77.5%), books and articles (72.3%), colleagues (57.8%) blogs and wikis (43.8%) and professional mailing lists (42.6%), IFLA and WIPO (12.5%) and eIFL (1.5%) [11]. The difference between the French and Portuguese results lied mainly in the degree of preference regarding blogs and wikis as well as to professional mailing lists, which in Portugal recorded a relatively insignificant number.

5   Conclusion

In this paper we presented data from a research that should be understood as a diagnostic approach for the Portuguese context due to the sample size. So future work should be considered to enlarge the sample in order to include a greater number of respondents with a special focus on those working in archives and museums. Despite these limitations, the collected elements are a good starting point to know the Portuguese reality regarding skills of information professionals regarding issues of copyright and related rights. Through self-reporting behaviours, respondents revealed a moderate level of

knowledge and skills regarding copyright issues. It is also important to emphasize that the respondents seem to have shown a significant degree of honesty in their choices, not opting for the answers that could be understood as desirable. These data reinforced the degree of reliability of the study. The survey results found that the level of familiarity regarding copyright should be increased, particularly in an international perspective. So, like other researches, Portuguese results show there was a need for additional training and support in order to improve copyright literacy among information professionals.

References

1. Atkinson, B., Fitzgerald, B.: A Short History of Copyright: The Genie of Information. Springer, Heidelberg (2014)
2. Horava, T.: Copyright communication in canadian academic libraries: a national survey. Can. J. Inf. Libr. Sci. **34**(1), 1–38 (2010)
3. Charbonneau, D.H., Priehs, M.: Copyright awareness, partnerships, and training issues in academic libraries. J. Acad. Librarianship **40**(3–4), 228–233 (2014)
4. Albitz, R.S.: Copyright information management and the university library: staffing, organizational placement and authority. J. Acad. Librarianshipcademic Librarianship **39**(5), 429–435 (2013)
5. Graveline, J.D.: Launching a successful copyright education program. Coll. Undergraduate Libr. **18**(1), 92–96 (2011)
6. Vesely, S.A.: Do you need a copyright librarian? Internet Ref. Serv. Q. **11**(4), 69–82 (2006)
7. Yankova, I., Vasileva, R., Stancheva, S., Miltenoff, P.: A bibliographical overview of "copyright literacy" as a key ıssue in memory institution management. In: Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (eds.) ECIL 2013. CCIS, vol. 397, pp. 655–661. Springer, Heidelberg (2013). doi:10.1007/978-3-319-03919-0_88
8. Todorova, T., Trencheva, T., Kurbanoglu, S., Dogan, G., Horvat, A., Boustany, J.: A multinational study on copyright literacy competencies of LIS professionals. In: Kurbanoglu, S., et al. (eds.) Information Literacy: Lifelong Learning and Digital Citizenship in the 21st Century, pp. 138–148. Springer, Heidelberg (2014)
9. Secker, J., Morrison, C.: Copyright literacy in the UK: results from a survey of libray and information professionals. In: Kurbanoglu, S., et al. (eds.) Information Literacy: Moving Toward Sustainability, pp. 191–201. Springer, Heidelberg (2015)
10. Kortelainen, T.: Copyright literacy in finnish libraries, archives and museums. In: Kurbanoglu, S., et al. (eds.) Information Literacy: Moving Toward Sustainability, pp. 202–209. Springer, Heidelberg (2015)
11. Boustany, J.: Copyright literacy of librarians in France. In: Kurbanoglu, S., et al. (eds.) Information Literacy: Lifelong Learning and Digital Citizenship in the 21st Century, pp. 91–100. Springer, Heidelberg (2014)

Information Literacy Education and the Educational Needs of Teaching Librarians: The Czech Republic in Comparison with the Other Visegrad Four Countries

Pavla Kovářová[✉]

Masaryk University, Brno, Czech Republic
kovarova@phil.muni.cz

Abstract. The goal is to describe information literacy education in Czech libraries and explore the educational needs of teaching librarians. Educational content was described according to the Media and Information Literacy Competency Matrix. Questionnaire results were compared with the other countries of the Visegrad Four. The majority of Czech teaching librarians (62.9%) have their own conception of the topic and continue to use the same, mostly traditional methods (lecture, discussions, individual exercises). The topics most often addressed cover MIL Component 1 (Access), while topics under MIL Component 3 (Creation) occur least frequently. The results of all countries were fairly similar, although some significant differences were also found.

Keywords: Educational needs analysis · Libraries · Media and Information Literacy · Organization of lessons · Research

1 Introduction

Information literacy education (hereafter ILE) has become a specialization within the library profession; however, information literacy is important for all librarians [1–3]. The position of ILE is particularly strong in academic libraries, where the number of lessons and students as well as the amount of time spent on teaching is increasing [4]. The accent on lifelong learning is making its way to other types of libraries, too. Information technologies (hereafter IT) have shifted the key issue from searching (the quantity of information available can even lead to information overload) to evaluation as a precondition of critical thinking, that is, the ability to choose the most relevant information to the information need and to use it appropriately. In 2012, UNESCO produced the Moscow Declaration on Media and Information Literacy [5], emphasizing not only access to information, but also its evaluation and creation. In 2015, ACRL adopted the Framework for Information Literacy for Higher Education [6], demonstrating a shift in relevant topics as well as in teaching methods. These changes reflect the current need of the society for libraries where development of information literacy is part of their activity. However, the question is to what extent libraries reflect these changes in their practice and to what extent they are ready for them.

The goal of this paper is to describe the organization and content of current ILE in Czech libraries in comparison with the other countries of the Visegrad Four (V4 consist of the Czech Republic, Slovakia, Poland, and Hungary) and explore the educational needs of teaching librarians. Connecting these focuses helps to find information needs and norms and identify their specificity for the Czech Republic (hereafter CR) by comparison with the nearest countries with similar conditions. Some identical characteristics of information literacy literature and initiatives, as well as some differences on a deeper level were described in 2010 [7]; however, the question remains whether educational practice is transferable among individual V4 countries.

2 Literature Review

Which libraries will take charge of ILE depends on their function within the library system in the country. School libraries in the CR tend to serve merely as book lending facilities operated by literature teachers. Schools, therefore, cooperate on ILE for primary and secondary school students with public libraries that are widely accessible – as of 1 January 2016, there were 6,101 libraries [8] for 10.5 million people [9], an average of 1,721 people per library. However, about 50% of professional library staff, in particular outside cities, do not have a library science education [10].

ILE literature and practice have been abandoning behaviourism and cognitivism in favour of constructivism in recent years [11]. Experts have accented the need for a shift from a mechanical solution (e.g., a checklist of reference formats) to critical thinking, inquiry-based learning and problem-based learning [12–16]. These approaches are effective when appropriately applied to the target group, that is, following the principles of student-centred learning [15, 16]. The method and content should be adjusted to the target group, currently often young people characterized as Millennials (born between 1982 and 2000) [17] or the Google Generation (more influenced by mindset than age) [18], who prefer active learning, visualization, linking the subject learned with personal practical life, working with Internet browsers, browsing just the first few hits (and trusting the first they see), and cut and paste instead of analysis and interpretation. Hunter [18] reports that students were able to change their approach to information after information literacy lessons. It is difficult to implement this manner of education when the librarian does not have education for teaching and thus proceeds intuitively. Librarians have to cope with limited preparation at school and in professional courses in the CR, as well as in other countries [1–4, 7, 14, 19]. It is also debatable to what extent the skills obtained in the courses correspond to the essential skills defined by ALA [20] or research results [4, 21]. In the CR, the first university cycle accredited by the Ministry of Education focused on education has been offered to LIS students and graduates since 2016 [22]; information literacy topics have been part of the curriculum for more than 10 years [3, 23].

Educational context of ILE in the CR was studied in public [24] and university libraries [25]. These questionnaires did not cover such topics as information credibility or creation, despite their significance for the current conception [13, 15, 18, 26]. Organization of lessons

and use of IT have been investigated insufficiently, although educational technologies affect education [26–29], the manner of learning and teaching and instructional materials, and they can enhance efficiency and motivation. Research on Czech public libraries was carried in 2010, without any follow-up research; thematic division was simple (orientation in the library, information apparatus of the library, catalogues and databases) [24]. Research in academic libraries has been conducted every two years since 2002, but current topics have not been included for comparison of development. It is therefore not possible to assess to what extent the content corresponds to the current standards of ALA [6] or UNESCO [30].

Although there is some sharing of good practice thanks to library associations and conferences, it is lacking a theoretical and pedagogical basis. This leads to uncertainty in information literacy advocacy aimed at acknowledging the impact of education by stakeholders that are as vital as ILE itself [4, 12, 19, 21]. Advocacy and research are essential in relation to students since their self-assessment of information literacy skills often does not correspond to the objective level [12]. Evaluation of lessons is a tool for improvement [15, 19]. Different methods, such as questionnaires, interviews, tests, observations, analysis of bibliographies and essays, portfolios, peer evaluation, research log journals, can be applied [11, 19, 31, 32], each having its advantages and limitations. The results of education should be shared, in particular by internal reports, presentations at conferences, journal articles, monographs, accreditation reports and other media [19]. When advocacy and evaluation are carried out successfully, embedded and conceptual ILE is more likely to be accepted, bringing the advantage of higher effectiveness in comparison with individual lessons [7, 16, 19].

3   Methods

A questionnaire consisted of 26 questions to map ILE and educational needs of teaching librarians; questions were mostly closed and multiple choice. It was created in Czech by the paper author. Then it was translated in English and revised according to comments of six members of the project team. Finally, it was translated into the respective local languages and distributed in electronic form (Google Form in Poland; other countries used Survey-Monkey) between 3 and 20 December 2015 by local partners using online communities of practice focusing on information literacy. We addressed librarians whose workload includes direct education of those using these communities and also by emphasizing this requirement in the questionnaire. Respondents represented libraries of all types (public, academic, school or other libraries) providing ILE. We received 97 Czech, 280 Polish, 35 Hungarian, and 33 Slovak responses. Experts from all countries agreed that the number of respondents is close to the number of active teaching librarians in their country who are willing to participate in research. We strictly used relative values for comparing countries because of the significant differences in numbers of respondents.

The questionnaire was divided into five parts: preparation (including topic identification), teaching (pedagogy, andragogy, educational technologies), topics of lessons (according to the MIL Matrix [30]), research and experience sharing and demographic questions. This covered the process of implementing ILE in potential activities according to ALA [20]; however, mapping of proficiencies reached

different depths. Respondents' interest in further education was determined for each part. The research questions sorted according to the objectives of the paper were:

- Description of current ILE: How do librarians organize ILE? How do they teach information literacy? What topics under MIL are covered in the lessons provided?
- Educational needs of librarians: In which topics would librarians like to develop?
- Comparison of the Visegrad Four: Are there any differences among countries?

MIL Matrix and Framework for Information Literacy for Higher Education are similar in teaching paradigm. They differ more in their topic emphasis, but they are complementary, not exclusive. MIL Matrix was chosen for this paper because it is not so strongly connected with academic libraries and can be used in life-long learning including tertiary education. The framework is used only partly in discussion.

The collected data were converted into a single data file for processing in SPSS. Open questions were inductively coded and clustered. Kruskal-Wallis test was applied for a statistical comparison of the countries and frequency analysis was used to identify the prevailing thematic focus of the lessons.

4   Results

The size and composition of the research sample are different in different countries (Table 1). 74.6% of respondents from the CR used the answer "librarian" or "executive" to an open question about their position. Only four respondents labelled themselves as a "teaching librarian" and the other four "reference librarian." There is major difference in Poland, where 70.7% identified with the "teaching librarian" or teacher-librarian. In comparison with the other countries, respondents in the CR devote more time to education, are younger and have less experience with teaching ($p \leq 0,001$); the differences are statistically significant according to the Kruskal-Wallis test. The strongest link to information literacy was observed in lessons in Slovakia, whereas it was the weakest in Poland.

Librarians from all the countries gave comparable assessments of the support of their superiors for lessons. The most highly appreciated item was the environment (office, software, etc.) and material provision (printing, board, paper…); evaluation of support for further education of librarians and time available was less favourable, and technical support (availability of an IT expert and equipment) was seen as the weakest point. IT issues were emphasized in particular by Polish respondents. When looking for a lesson topic, responding to an assignment of school or library management was most frequent in the CR, Slovakia and Hungary (37–40%), while in Poland the choice was most strongly motivated by an educational needs analysis (42.9%), which accounted for 19–21% of cases in the other countries. Results for the CR as well as the overall results indicate that the topic is least often determined within a conceptual framework according to an information literacy standard.

Methods of evaluating the lesson varied, with the librarian's feeling after the lesson being the most prevalent option. Asking students about feelings after the

Table 1. Respondents' demographics

		CR	Poland	Hungary	Slovakia
Number of respondents		97 (21.8%)	280 (62.9%)	35 (7.9%)	33 (7.4%)
Teaching librarian		4	120	0	0
Librarian		30	68	6	12
Teacher		3	51	2	0
Executive		20	3	6	7
IT specialist		6	0	3	2
Reference librarian		4	0	3	0
Men		12	13	3	2
Women		59	265	17	21
Year of birth	95% Confidence interval for mean	<1973; 1979>	<1968; 1971>	<1962; 1972>	<1968; 1979>
	Mean	1976	1969	1967	1974
Years of teaching experience	95% Confidence interval for mean	<8.6; 13.8>	<19.0; 21.7>	<8.2; 8.3>	<8.2; 21.3>
	Mean	11.2	20.3	13.2	14.8
Hours per week to teaching	95% Confidence interval for mean	<7.6; 12.4>	<4.9; 6.5>	<2.5; 8.3>	<2.4; 14.9>
	Mean	10.0	5.7	5.4	8.7
Information literacy lesson		30	33	8	19
Lessons partly supporting IL		23	87	8	13
Lessons not supporting IL		21	76	3	3
No lessons for the public		24	77	4	2

lesson and waiting for informal sharing were also widespread. Questionnaires are most frequent in the CR and in Poland, while in Slovakia and Hungary they are not widely used. Least frequently used methods included tests, interviews and an analysis of products or the opinions of students' colleagues. Respondents usually perceived feedback as a recommendation, which they did not always accept. In all countries, over 65% of respondents discuss lessons with their colleagues, whereas 11% of respondents do not share their experiences at all. Presenting at a conference is quite widespread. Sharing of materials for a lesson in a public database, submitting a paper to a scholarly journal or a report in an electronic conference are rather uncommon.

Even though face-to-face teaching prevails (58.7% in Slovakia to 73.8% in Poland), blended learning (16.0% in Poland to 19.6% in Slovakia) and distance learning (highest in Slovakia – 21.7%) are also common. The most widespread method is lecture with ICT, discussion and didactic games. Out of eleven methods

suggested, didactic games are the second least applied method in the CR; the least used method in the CR is the role-play method, which is the sixth most frequent in the whole sample. The second most widespread method in the CR is practical individual work of students with ICT, which is among the less widespread methods in the whole V4. The majority of Czech teaching librarians (62.9%) have their own conception and continue to use the same, usually traditional teaching methods (lecture, discussions, individual exercises). Educational technologies are mostly instructor's computer and computers for the students in the CR, Slovakia and Hungary. Interactive boards are more widespread only in Poland, where, on the other hand, computers for students are used less often. The most prevalent software is PowerPoint or Prezi electronic presentations. Video and instructional games are represented to a lesser degree. They prevail in Poland, while in the CR their use is negligible. Only less than 10% of V4 respondents indicated using social networks and an LMS, such as Moodle.

The most frequent topics of lessons in V4 are shown in Table 2; the topics in the CR are the same, only the order is slightly different. Understanding the role of metadata was among the least represented topics of Component 1. Topics under Component 3 were represented in V4 to the least extent; less than 10% of respondents include: understanding the relationships between users and victims/perpetrators/witnesses/other users in ICT environment; use of the results of monitoring for editing and producing new information; interaction with other authors, users and mediators of information; monitoring and evaluation of shared information; understanding the functions and roles of public relation (hereafter PR) institutions; and how and where appreciation or complaint can be communicated. Respondents in all countries preferred to include a smaller number of topics in the lessons, which results in a lower diversity of lesson content.

Table 2. The most frequent topics in ILE in V4 according to the MIL Competency Matrix.

Access	Evaluation	Creation
Awareness of the need for and use of different information sources for different purposes	Understanding of author's rights	Communication of information in an ethical and legal manner
Formulation of a basic question for search	Awareness of the impact of information on individuals	Protection of own work, personal data and privacy
Awareness of and defining an information need	Selecting key information from a document	Awareness of the impact and risks of electronic communication
Compliance with law and ethics in accessing information and understanding the reasons	Comparing information from different media and sources	Using different ICT for sharing of information

Factor analysis revealed three significant factors for classification of lesson topics (Principal Component Analysis with a Oblimin with Kaiser Normalization rotation of 50 dichotomous variables, KMO = 0,868 and Bartlett's Test of Sphericity p = 0,000, factor loadings => 0,30). The first factor concerned traditional

information literacy topics with focus on searching with defined evaluation criteria (Access and Evaluation components). The second factor covered exclusively the Creation component and included the majority of topics of this component, in particular different ways of interaction and monitoring; this factor showed a stronger prevalence in Slovakia. The third factor was composed of topics from all components related to information ethics and safety (in particular, for instance, communication of information in an ethical and legal manner, understanding the rights of the author, protection of own work, personal data and privacy, awareness of the impacts and risks of electronic communication); the third factor was represented to the largest degree in the CR.

The questionnaire mapped interest in development of respondents' competencies. In preparing for a lesson, respondents expressed the most intense interest in analysis of educational needs (36.6%), while interest in advocacy was the lowest (19.6%). Czech respondents in comparison with others expressed greatest interest in didactics (44.3%); the topic was interesting also for Slovaks (30.0%). As a means of supporting evaluation and sharing, respondents from all countries expressed their interest in particular in training in writing a scholarly paper and in Kirkpatrick's model for lesson evaluation. In addition, Czech respondents were interested in evaluation questionnaires (the second least frequent topic in V4). Development of teaching skills was appealing to more than a quarter of respondents in the creation of instructional videos, use of interactive boards and open educational resources, teaching in Moodle, using ICT in lessons with methods of critical thinking, and producing graphics for lessons. Out of the above topics, Czech respondents were less interested in interactive boards and Moodle; on the other hand, they showed a stronger interest in electronic presentation except Power-Point, webinars and social networks in education. Many respondents did not indicate interest in any of the MIL topics, while only a few were interested in all of them. Respondents from the whole V4 most often selected one to two topics. The most often selected components were: becoming aware of the need for and using different sources of information for different needs, understanding the rights of the author, and using different tools for creation and presentation of knowledge in different formats. The topics most prevalent in the CR were: selection, organization and retaining of obtained information with appropriate tools, use of tools for organizing information, and understanding of the functions and roles of PR institutions. The number of topics selected is low for any statistical conclusions.

5   Discussion

The questionnaire outlined the current ILE practice and educational needs of teaching librarians in the CR in comparison with the other Visegrad Four countries. Covering different types of libraries in different countries, it would be appropriate to verify the results by directly addressing a representative simple random sample, in contrast to the self-selection in communities of practice applied. The response rate was low in Slovakia and Hungary; experts believe that the rate reflects the actual situation, but it is possible

that only a portion of teaching librarians was addressed. Adding qualitative research would help to gain a deeper understanding of the background of the findings. The research is geographically limited. Another limitation is mapping of the situation in the context of the desirable state at the present, while changes in information literacy are relatively recent and may be reflected in practice after some time. Despite these limitations, the questionnaire offered useful information about current practice.

While in other countries ILE is connected primarily with reference librarians [21], in the CR, Hungary and Slovakia, teaching librarians were represented mainly by executive staff, or they labelled themselves in general as librarians, because in smaller libraries librarians usually carry out a wide range of activities. In contrast, Polish respondents were largely connected with schools, which may have been influenced by the data collection. Respondents appreciated support in available material and space, but the situation is not so favourable when they need more specialized equipment, in particular, IT or assistance of an IT expert. Nevertheless, various hardware and software is used often in teaching. The problems perceived point to a need for better information literacy advocacy, which has paradoxically not been identified as a matter of interest for further education. The reasons would be worth examining – whether librarians do not want to integrate ILE into library activities or whether they perceive it as wasted effort without any chance of success.

Information literacy lessons in the CR are often one-time activities (less so in academic libraries), the focus of which is defined by library management or a cooperating school. Librarians thus often cannot select the focus according to what they identify as necessary or what corresponds to an information literacy standard. Only Poland is exceptional, as nearly half of the respondents use an educational needs analysis. The use of research for evaluation of lessons is also rather insufficient – it is almost exclusively limited to the satisfaction level according to Kirkpatrick's model [32]. Respondents would like to change this; they are interested in training in various research methods. Czech respondents strongly rely on questionnaires, even though the impact thus identified is only on the level of opinions, not objective impact. There is limited sharing of experience, which diminishes their impact and leads to a situation where lessons about the same topics are repeatedly prepared for different libraries.

Librarians continue to prefer the same teaching methods, in particular lecture with individual work, which may be due to the demands of interactive teaching and lack of certainty in didactics, but can be also caused by the fact that the librarians do not necessarily know their target group well enough to adjust their teaching. This situation is not in accordance with the trend of active and cooperative teaching [14, 15, 17, 27], which promotes more critical thinking. Czech respondents show an interest in development in didactics; they are probably aware of their insufficient knowledge and would like to use other teaching methods. Librarians were also interested in use of multimedia, which is in line with the interests of younger generation [18].

Lessons are offered mainly on topics about which librarians feel certain, that is, traditional topics dealing with obtaining information in the "right" ways, even

though this mechanical approach has been criticized as going against creative thinking [11, 12, 16]. Topics from the MIL Creation component appear less frequently compared to the other topics; Slovakia is more progressive in this point. The CR, on the other hand, puts more emphasis on information ethics and safety, which may be ascribed to the activities of numerous non-library organizations and library schools [33]. Inclusion of information safety is in line with the MIL Competency Matrix [30] and foreign practice [29]. Respondents did not show much interest in further education in MIL topics, which can be interpreted as a lack of interest in achieving greater thematic diversification.

6   Conclusion

The exploratory study fulfilled the objectives and represents the first comparison of ILE in V4 countries. This is only the first mapping that requires follow-up studies based on the detected similarities and differences among and within countries. Description of the current ILE showed that teaching librarians often stayed at an intuitive or an externally directed approach and topics. Yet librarians trying for evidence-based or theory-based practice were identified. The interest in personal competency development of teaching librarians was similar. This showed the strong potential and interest in improving ILE, although not for all librarians, but for significant numbers of them. These librarians can be seen as early adopters. If they will be encouraged to develop ILE according to current theory and research and their practice improves, it will transfer to other librarians who currently remain with the established approach for various reasons. Development of librarians can be supported by library schools and organizations, as well as sharing experiences. All of these supports are not limited to one country. There were many overlapping results among countries, which indicated the portability of practices. Identified differences in turn can be used to identify possible information sources when librarians want to develop in the direction already widespread in another country.

References

1. Cox, A.M., Corrall, S.: Evolving academic library specialties. J. Am. Soc. Inf. Sci. Technol. **64**, 1526–1542 (2013)
2. Lynch, B.P., Smith, K.R.: The changing nature of work in academic libraries. Coll. Res. Libr. **62**, 407–420 (2001)
3. Landová, H.: Vzdělávací Aspekty Informační Vědy a Informační Profese. Knihovna **21**, 82–92 (2010)
4. Walter, S.: Librarians as teachers: a qualitative inquiry into professional identity. Coll. Res. Libr. **69**, 51–71 (2008)
5. Moscow Declaration on Media and Information Literacy. http://www.ifla.org/publications/moscow-declaration-on-media-and-information-literacy

6. Framework for Information Literacy for Higher Education. http://www.ala.org/acrl/standards/ilframework

7. Koltay, T., Krakowska, M., Landova, H., Prókai, M.: Information literacy in the Visegrad group countries: literature and initiatives. Educ. Inf. **28**, 57–76 (2010)

8. Seznam evidovaných knihoven 1 Mar 2016. https://www.mkcr.cz/doc/dokumenty_file/seznam-evidovanych-knihoven-132016-110.xls

9. Počet obyvatel v regionech soudržnosti, krajích a okresech České republiky k 1. Jan 2016. https://www.czso.cz/documents/10180/32853387/1300721601.pdf

10. Houšková, Z.: Existujeme?: Koncepce celoživotního vzdělávání knihovníků. http://sdruk.mlp.cz/data/xinha/sdruk/ks2014/SEC_CZV.pdf

11. Fluk, L.R.: Foregrounding the research log in information literacy instruction. J. Acad. Libr. **41**, 488–498 (2015)

12. Margolin, S., Hayden, W.: Beyond mechanics: reframing the pedagogy and development of information literacy teaching tools. J. Acad. Libr. **41**, 602–612 (2015)

13. Swanson, T.: Teaching students about information: information literacy and cognitive authority. Res. Strat. **20**, 322–333 (2005)

14. Wheeler, E., McKinney, P.: Are librarians teachers? investigating academic librarians' perceptions of their own teaching roles. J. Inf. Literacy **9**, 111–128 (2015)

15. Carder, L., Willingham, P., Bibb, D.: Case-based, problem-based learning: information literacy for the real world. Res. Strat. **18**, 181–190 (2001)

16. Mokhtar, I.A., Majid, S., Foo, S.: Information literacy education: applications of mediated learning and multiple intelligences. Libr. Inf. Sci. Res. **30**, 195–206 (2008)

17. Porter, B.: Designing a library information literacy program using threshold concepts, student learning theory, and millennial research in the development of information literacy sessions. Internet Ref. Serv. Q. **19**, 233–244 (2015)

18. Hunter, I.: Information literacy and the google generation: teaching research skills to sixth-formers. Leg. Inf. Manag. **13**, 107–111 (2013)

19. Sobel, K., Sugimoto, C.R.: Assessment of learning during library instruction: practices, prevalence, and preparation. J. Acad. Libr. **38**, 191–204 (2012)

20. Standards for Proficiencies for Instruction Librarians and Coordinators. In: ALA, Association of College and Research Libraries, Chicago (2008)

21. Saunders, L., Jordan, M.: Significantly different? reference services competencies in public and academic libraries. Ref. User Serv. Q. **52**, 216–223 (2013)

22. Černý, M.: Studium Pedagogiky se Zaměřením na Technologie ve Vzdělávání. http://kisk.phil.muni.cz/cs/kurzy/pedagogicke-minimum

23. Kovářová, P.: Informační Gramotnost. http://kisk.phil.muni.cz/cs/co-resime/informacni-gramotnost

24. Nejezchlebová, J.: Veřejné Knihovny 21. Století a Informační Vzdělávání. In: Kovářová, P. (ed.) Trendy v Informačním Vzdělávání, pp. 38–48. VeRBuM, Zlín (2012)

25. Landová, H., Civínová, Z.: Aktivity Vysokoškolských Knihoven v Oblasti Informačního Vzdělávání. ProInflow **2**, 4–22 (2010)

26. Burgess, C.: Teaching students, not standards: the new acrl information literacy framework and threshold crossings for instructors. Partnership Can. J. Libr. Inf. Pract. Res. **10**, 1–6 (2015)

27. Dukic, D.: Teaching information literacy using children's literature. Access **21**, 21–26 (2007)

28. Luo, L.: Web 2.0 integration in information literacy instruction: an overview. J. Acad. Libr. **36**, 32–40 (2010)

29. Welch, C.C.: What and how we teach now: a survey of youth services faculty. J. Educ. Libr. Inf. Sci. **54**, 220–234 (2013)

30. Global Media and Information Literacy Assessment Framework: Country Readiness and Competencies. UNESCO, Paris (2013)
31. Walter, S.: Instructional improvement: building capacity for the professional development of librarians as teachers. Ref. User Serv. Q. **45**, 213–218 (2006)
32. Kovářová, P., Šimková, G.: Evidence-based learning approach in evaluation of information literacy education. In: Kurbanoglu, S., et al. (eds.) Information Literacy: Lifelong Learning and Digital Citizenship in the 21st Century. Communications in Computer and Information Science, vol. 492, pp. 560–569. Springer, Heidelberg (2015)
33. Kovářová, P.: Six Views on Information Safety Education in Libraries. In: Kurbanoglu, S., et al. (eds.) Information Literacy: Lifelong Learning and Digital Citizenship in the 21st Century. Communications in Computer in Computer and Information, pp. 703–712. Springer, Heidelberg (2015)

Effects of a Virtual Learning Environment on Librarians' Information Literacy and Digital Literacy Competences

Ana Novo[1(✉)], Glória Bastos[2], and Ana Isabel Vasconcelos[3]

[1] Universidade Aberta/LE@D/CIDEHUS- UÉ, UID/HIS00057/2013, Lisbon, Portugal
anovo@uab.pt
[2] Universidade Aberta/CEMRI/LE@D, Lisbon, Portugal
gloria.bastos@uab.pt
[3] Universidade Aberta/LE@D, Lisbon, Portugal
ana.vasconcelos@uab.pt

Abstract. The continuing professional development of librarians is a requirement imposed by the permanent progress of the knowledge society. In this context, Universidade Aberta (Portuguese Open University) offers a post-graduate course in Library and Information Sciences for librarians. Being an e-learning course based on a Learning Management System (LMS), it is expected that the course not only develops information literacy (IL) and digital literacy (DL) skills but also allows for the deepening of these skills due to the learning environment itself. The aim of this study was to analyze students' perception in relation to their competences in IL and DL and the articulation between their development and the virtual learning context. The adopted methodology was a case study, through the application of a questionnaire, to students from the 2012 to 2015 editions of the course. The results show that at the end of the course, students consider having significantly improved their IL and DL skills, which directly influences their daily work practices.

Keywords: LIS education · E-learning · Information literacy · Digital literacy · Universidade Aberta · Portugal

1 Introduction

In the Portuguese Higher Education system, Universidade Aberta (Portuguese Open University), with a history of nearly 30 years, is the only distance education public university. This uniqueness requires a systematic investment in the continuous observation, analysis and assessment of the adequacy of its courses in this teaching mode, as this University uses a self created virtual pedagogical model, certified by prestigious international bodies. This pedagogical model is based on four pillars: student-centered learning, the primacy of flexibility, the primacy of interaction and the principle of digital inclusion [1]. Conceived and implemented as a result of the Bologna process, this model gives conceptual as well as functional support to new courses, keeping in mind the changes that are occurring in the field of higher education and, in particular, of distance education.

The course under study is a post-graduate course in information sciences that aims at the professional development of an adult population which works in this field. As students are already in the job market, this post-graduation is designed for deepening and critically reflecting on central issues to the practice of the profession. These two aspects are particularly valued in this course, taking into account the rapid changes that have been occurring in recent decades, with direct influence on the performance of information professionals.

To understand the framework in which the study was performed, it is important to characterize, albeit briefly, the course under review. This post-graduate degree is structured around two essential components: a practical-theoretical component developed in an e-learning environment (Moodle), and the other, mainly practical-reflective, which is developed in a professional context. The aim of this course is to achieve an output profile oriented towards the following aspects: (i) training of a professional who cares about the social and technological changes and transformations that directly influence his/her activity and the ability to reflect and to intervene appropriately in the working context; (ii) training of a professional with skills to design, integrate and evaluate local development projects, in the scientific areas of the course; (iii) training of a professional with the ability to interact with peers on the availability to collaborate and share practices and knowledge.

As a common denominator of the three referred aspects we identified the informational and digital skills that information professionals should master. This article focuses precisely on the analysis of students' perceptions in relation to their competences in information literacy (IL) and digital literacy (DL) and the articulation between its development and the virtual learning context.

2   Conceptual Background

2.1   Information Literacy and Digital Literacy in Library and Information Science Education

In the information society the consolidation and constant update of knowledge is required, making learning an ongoing effort throughout our lives. IL and DL allow for this lifelong learning because they enable individuals at all stages of their lives to effectively search, evaluate, use and create information aiming at achieving their personal, social, educational and professional goals, as a basic human right in a digital world while promoting the social inclusion of all nations [2].

Broadly speaking, IL is a set of skills that allow a person to recognize when he/she needs information and acting efficiently and effectively to obtain it. In this context, there is the effort to identify an informational need, locate, acquire, and critically evaluate the necessary information, organize, and incorporate it into the previously acquired knowledge base so that this information can result in a valid action. In this sense information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for

lifelong learning because they can always find the information needed for any task or decision at hand [3].

DL is based on finding, organizing, evaluating, and creating information by using digital technology. According to American Library Association (ALA) Digital Literacy Taskforce, DL is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills [4].

IL commonly embraces computer, internet, digital and media literacies all together or individually but, as Koltay [5] referred, there seems to be an unanimity in considering the former as the most adequate approach. The review of these concepts made by Bawden [6] endorses the understanding that IL and e-literacy (digital literacy, information technology literacy, computer literacy) are two interconnected but diverse concepts. The author related IL with content and communication and e-literacy with technological infrastructure.

The role of libraries in the development of IL and DL is crucial because they have a wide variety and quantity of information resources, information management systems and trained staff, which are key actors in this process. With proper education and training, information professionals are able to collect, evaluate, organize and provide access to information. Having appropriate knowledge and skills, this trained staff is prepared to be not only information and digitally literate but also able to teach IL and DL to others. In Virkus's opinion [7] for the librarians to be able to perform as suppliers of IL for the community, they have to start by acquiring competences themselves and to have a chance to continuously improve their skills.

This two-fold role is at the core of the discussion within IL when delivering IL education to LIS students is under consideration. Developing student information abilities, either for their course work or for lifelong learning, reflects students' needs as IL 'consumers'. But a great number of LIS students are also going to be IL 'producers' when they graduate, since 'teaching' is now considered as part of the librarian's profile. As Inskip [8] said, "They [LIS students] therefore need '1. To be aware of information literacy as a concept; 2. To become information literate themselves; 3. To learn about some key aspects of teaching information literacy'".

In fact, information professionals, working in all sorts of information services such as university libraries, school libraries, or public libraries, often need to spend time teaching strategies for selecting, accessing, and manipulating databases, distinguishing resource formats (journal, magazine, and newspaper articles, books, free access internet sources) and applying criteria for evaluating all these sources of information. This is even more crucial due to the different ways and speed in which information is being created, disseminated, located, and incorporated to create new knowledge.

According to Inskip [9], the knowledge, competences, and attributes needed to successfully develop and deliver those interventions means LIS students are going to be involved in teaching, marketing and promotion, software development, networking and liaison, budgeting, and communication.

The increase of digital technologies available creates great opportunities to improve quality, access, and equity in education and, as stated by Virkus [10], has influenced

how LIS professionals are educated because students can learn anywhere, at any time, following flexible and individualized pathways.

2.2   Library and Information Science Education and E-Learning

As previously mentioned, the post-graduation under analysis is an online course. It is developed according to a pedagogical model based on the importance of flexibility and interaction. The learning environment, although mediated through technology, values the conversational dimension of learning and the building of a networking classroom.

Following these principles, the course is aligned with key trends with an impact on Higher Education (HE), namely those presented by Horizon Reports (2014, 2015): some of the major challenges pointed out in 2015 report [11] were the improvement of DL and personalized learning. E-learning can materialize those challenges, as Information and Communication Technologies (ICT) are at the centre of the process. The constructivist instructional design of this particular course can lead students towards a learning experience that will enrich their knowledge and deepen their competences. In fact, as it will be shown later in the results' analysis, both the pedagogical and the technological environment provide relevant opportunities for development in learning skills as well as in content understanding. Therefore, distance education and e-learning emerge as an important vehicle for librarians' professional development not only because it allows for more flexibility when working and studying at the same time, but also, and mainly, because of the specific learning experience built in the virtual environment. This experience is based on the stimulation of reflexive autonomy and collaborative participation [12]. Another relevant dimension is related to the construction of a community of inquiry, following the proposals of Swan, Garrison and Richardson [13].

3   Methodology

The case study method has been used by researchers from a wide range of disciplines and has been gaining increased popularity in educational research in recent years. The central feature of the case studies is the fact that these studies aim to achieve a holistic understanding (systemic, integrated, and comprehensive) of the systems under analysis [14]. Thus, this study falls within a mixed methodology and assumes an interpretative approach [15].

Within this research method and to meet this study's objectives, we have structured a questionnaire with a set of closed questions that focused on the three areas of analysis already referred to: training in information sciences; the e-learning education system; IL and DL. Having these areas in mind, three sets of questions on the following areas were presented: (1) motivation/reason for attending this course in information sciences; (2) specific skills developed in e-learning; (3) level of proficiency in IL and DL.

The first two sets asked for prioritization of options, offered in closed answers (1 to 8 and 1 to 6 items, respectively), and the last set used a Lickert scale. The questionnaire also included an open question where a review about the work done during the course and the learning method (positive and negative aspects) were asked for. The

questionnaire included other issues, but these three sets and the open question were the items selected for analysis, within the scope of this paper.

4   Results and Discussion

Forty seven students participated in this study corresponding to 85.6% (11 male and 36 female) of those who have completed the four editions of the course (2011−12 to 2014−15). With regard to age distribution, the situation was as follows: 70.2% (n = 33) were over 40 years old; 25% (n = 12) were between 30 and 40 years old and 4.2% (n = 2) were under 30 years old.

Regarding professional experience, a large part of the students had quite a lot of experience in the area of the course. With the exception of two respondents who did not answer this question, the results were as follows: 44.5% (n = 20) had more than 10 years of work experience; 31% (n = 14) had between 6 and 10 years and only 24.5% (n = 11) had between 1 and 5 years of work experience.

Considering students' previous experience in online education it was possible to differentiate two sub-groups: while 63% (n = 29) had already had experience in e-learning, 37% (n = 18) had no previous experience. This differentiating element had implications on the answers to some of the questions.

4.1   Motivation

The first set of questions on the questionnaire aimed at assessing the motivations that led these students to attend the course. From the eight given reasons, the need for "professional skills" was the preferred option, revealing the concern for increasingly improved performance in their professional activity. The desire for "personal valorization" and interest in "deepening theoretical knowledge" were close to equal in results (14.9% and 14.7%, respectively). These choices show the recognition of the academic knowledge while a process for self-valorization. In this sense, the learning factor emerges as a strong reason for the continuation of studies in a formal system, though not in attaining an academic degree, as is the case of this post-graduate course.

"Career progression" was the option that came in fourth place, which caused some surprise since due to today's Portuguese context (EU/IMF economic intervention in the country since 2011) career progression is not achievable in the short-term. Having the age level of the respondents as a reference, the valuation of this item can be explained by today's longer working life span. Thus, there is the possibility of a return to this investment in a professional career that is, nowadays, longer. On the other hand, answers to the open question revealed respondents' desire to occupy other roles in the information services, having as a means to this end the possibility of attending a course in this area as a differentiating element in the assessment of their CV.

Those who chose the "online learning", did it more due to the flexible nature of e-learning (12.2%) than due to the valorization of this specific learning regimen when compared to face-to-face education (9.3%). The valorization of flexibility appears both in the group of respondents with experience in e-learning and in those without this

experience. We can infer that since these respondents have a learning tradition in face-to-face education, the previous online learning experience was not a negative one as they have once more chosen this mode, yet it is motivated by the flexibility factor that it enables.

Although "curriculum relevance" and "integration of professional practice component" items were less valued as reasons that influenced the choice for attending this course, the content analysis done to the answers provided in the open question showed a different perspective. In fact, at the end of the course, students pointed out the relevance of the curricula structure as well as the benefits of developing work in a professional context. This apparent contradiction shows that initial priorities changed by the end of the course as students seemed to realize that curricula contents were also a value to be considered.

4.2   Competences Developed in an E-Learning Environment

Considering student profiles for this course – professionals who already held knowledge and competences in the information sciences field – it was particularly interesting to analyze the achievements of this post-graduation in what refers to skills students considered having further developed while using this pedagogical model. It should be emphasized that these results will also have to be crossed with the online education experience of the respondents, as what was assessed was the "development of skills". Therefore, the two groups departed from different competence levels.

As Table 1 shows, from the six listed skills, which are developed in a training program based on e-learning, the competence that was pointed to as being more developed was "critical thinking". This fact is linked to the virtual pedagogical model and confirms the relevance of the dynamics and pedagogical strategies developed by teachers of the course. In fact, the virtual learning environment focuses on a permanent debate, which requires critical thinking on the resources that are available. This practice, that students must have, encourages reflective autonomy and collaborative participation, being these key pedagogical dimensions to distance education today [11]. The most commonly used strategies in the course, such as forum discussions and group work, encourage individual and joint reflection, leading to the desired construction of knowledge necessary in the consolidation of a learning community.

Table 1.   Most developed competences

Skills	%
Critical thinking	19.2
Searching/retrieving information	18.6
Organizing ideas	17.5
Building knowledge together	15.7
Debating thematic contents	15.3
Sharing resources	13.7

The skill "searching/retrieving information" came second and we can consequently establish a relationship between the digital environment in which learning occurs and with students showing an attitude of constant demand for resources in the environment in which they are immersed, while learners.

As many of the interactions are in written form, students need to have previously prepared them. As it is known, writing requires a clear organization of ideas and this is a particularly sensitive point in the interaction among the elements of the group. If, in face-to-face education, the oral component allows for some discursive disarticulation, in written communication the competence "organizing ideas" is essential, and that is why it was placed in the top three skills most developed in this form of learning.

"Building knowledge together" and "debating thematic contents" are two skills that were evaluated with the same level of development, meaning that these two aspects are closely related with the nature of the different curricular units.

The ability for "sharing resources", a recurring action in e-learning, was the option less valued which seems to indicate that it was the less developed skill. As this result was not expected, we decided to analyze it taking into account the answers given by each of the groups: (a) students who had attended online courses before and (b) students who had never experienced this mode of learning. There was a distinctive behavior, having the inexperienced group valued much more significantly the ability for "sharing resources": 2.8 average for group (a), and 5.2 average for group (b) in a scale between 1 (less developed) and 6 (most developed). This differentiation enables us to explain that the level of development of this skill was evaluated by the experienced group (a), probably already more skilled, as not having had a significant progression.

4.3   Development of IL and DL Competences

In the third area of this study, which deals with the perception of students regarding the development of their skills in IL and DL, we can highlight the very positive valorization of all items listed (see Table 2).

Table 2. Perceived development of IL and DL competences

Competencies	1 (No evolution)	2	3	4	5 (Strong evolution)
Using digital tools	5%	10%	20%	30%	35%
Searching/retrieving resources from Web	5%	0%	25%	35%	35%
Applying digital marketing strategies	0%	10%	15%	55%	20%
Evaluating quality/reliability of internet resources	0%	5%	10%	50%	35%
Ethical use of information	5%	5%	15%	30%	45%
Interacting in virtual contexts	5%	0%	10%	45%	40%

These results are particularly significant in the context of this study, as they confirm the underlying design perspective of this post-graduation course, as stated at the beginning of this paper. As it is an e-learning course based on a Learning Management System

(LMS), it is expected that the course not only develops IL and DL but also enables the deepening of these skills due to the learning environment itself.

As was expected, "interacting in virtual contexts" was one of the two most valued abilities, together with "evaluating quality/reliability of web resources", which is an essential skill in the scientific area of this course. The "ethical use of information" was also considered a crucial skill, and this is a subject that has a specific approach in the "ambiance module" that precedes the beginning of the course.

The "searching/retrieving resources from the Web" ability was referred at the same level as the skill "searching/retrieving information", reflected in Table 1. The development of the ability for "applying digital marketing strategies" results mainly from a curricular unit contents, being the evaluation of this skill closely related with the academic success in that specific area. It is, thus, a more restricted skill, because it has specific contents and purposes.

The ability for "using digital tools" was the lowest in percentage although the differences between this result and those assigned to the other skills was small. Moodle platform, where the whole learning process takes place, is itself, a digital tool that includes the virtual classroom of each curricular unit. The LMS offers a number of digital tools such as wikis, web conference, resources for preparing questionnaires and quizzes, which are used in the learning process with various purposes (collaborative work, simulation of digital libraries, e-marketing, web-seminar). The fact that these tools are inside the Moodle platform, therefore easily accessible, could justify the value assigned to the development of this skill, as these digital objects become common in the daily life of this group, being either students or librarians.

Individual opinion on the course, asked for in the open question, confirmed and reinforced, generically, the already identified strengths. The majority of the students' feedback was about the need to develop skills to meet the new demands that arise in the profession, as well as to deepen theoretical knowledge to enable them to develop projects with more confidence. Although this mode of learning was a very positive experience, it was the "flexibility" factor that was mentioned as an added value. The development of autonomy in the learning process that is promoted by this model was also referred to.

Students also mentioned having developed other specific skills as a result of e-learning such as more reflected interactions, which need some critical thinking instead of being present as a listener in a traditional class. They also pointed out the development of the organization and method ability, particularly in times that required individual study, before participating in the discussion forums. The usage and mastery of new technologies was a recurring comment in this open question, associated with the importance given to the evaluation of the existing resources on the web, in order to verify their reliability. This is a very important point, on the one hand, for anyone who is attending a course that uses exclusively digital learning resources, and, on the other, to whom is in charge of libraries and has the collections' development and management as a duty. It was also emphasized as positive the fact that the group worked as a learning community, and that it could, in the future, turn into a community of practice, because the current interactions were already close to the dynamics of these communities that work in virtual environments.

5   Conclusions

The results obtained show that at the end of the course, students, most of them already inserted in the libraries' labor market, consider having significantly improved their IL and DL skills, which directly influences their daily work practices. We can add that there was a consistency of results taking into account that, in this study, respondents from the four editions of the course were involved. Therefore, the several editions of the course were not a significant variable, as already stated in another study involving the analysis of other parts of the questionnaire in use [16].

In relation to the design of the course, it was considered that it promotes the creation of virtual learning communities, in which the levels of interaction and sharing of ideas have a significant weight. This situation provides, according to respondents, more diverse and better quality experiences, also representing a factor of motivation for the student/librarian [17]. Respondents' answers also revealed that learning in a virtual community significantly develops the ability to interact in virtual contexts.

Learning within the e-learning model, designed, and implemented in Universidade Aberta, improved skills for critical thinking and promoted the joint construction of knowledge. As a conclusion we can say that the design of the course and the environment in which it was developed contributed significantly to a better performance of students in their workplaces. Furthermore, we can also say that, as librarians, these professionals deal directly with information, including information in digital format, and this training was relevant to particularly potentiate the development of DL.

References

1. Pereira, A., et al.: Modelo Pedagógico Virtual da Universidade Aberta [The Virtual Pedagogical Model of Universidade Aberta]. Universidade Aberta, Lisbon (2007)
2. IFLA/UNESCO: Alexandria Manifesto on Libraries, the Information Society in Action (2005). http://www.ifla.org/en/publications/alexandria-manifesto-on-libraries-the-information-society-in-action
3. ALA: Presidential Committee on Information Literacy: Final Report (2010). http://www.ala.org/acrl/publications/whitepapers/presidential
4. ALA Digital Literacy Taskforce: Digital Literacy Definition, ALA Connect (2011). http://connect.ala.org/node/181197
5. Koltay, T.: A new direction for library and information science: the communication aspect of information literacy. Inf. Res. **12**(4), 1 (2007). paper colise06. http://InformationR.net/ir/12-4/colise06.html
6. Bawden, D.: Information and digital literacies: a review of concepts. J. Doc. **45**(2), 218–259 (2001)
7. Virkus, S.: Information literacy in Europe: a literature review. Inf. Res. **8**(4), 1–56 (2003). paper 159. http://informationr.net/ir/8-4/paper159.html
8. Inskip, C.: Information literacy in LIS education: exploring the student view. J. Inf. Literacy **9**(2), 94–110 (2015). http://dx.doi.org/10.11645/9.2.1977
9. Inskip, C.: Mapping Resources to Competencies: a Quick Guide to the JISC Developing Digital Literacies Resources (2013). http://www.sconul.ac.uk/publication/mapping-resources-tocompetencies

10. Virkus, S.: Challenges of Library and Information Science (LIS) Education. Tallinn University, Institute of Information Studies (2012). www.unica-network.eu/sites/default/files/Sirje%20Virkus_0.pdf

11. Johnson, L., Becker, S.A., Estrada, V., Freeman, A.: NMC Horizon Report: 2015 Higher Education Edition. Austin (Texas), The New Media Consortium. https://net.educause.edu/ir/library/pdf/HR2015.pdf

12. Anderson, T., Dron, J.: Three generations of distance education pedagogy. Int. Rev. Res. Open Distance Learn. **12**(3), 80–97 (2011)

13. Swan, K., Garrison, D.R., Richardson, J.C.: A constructivist approach to online learning: the community of inquiry framework. In: Payne, C.R. (ed.) Information Technology and Constructivism in Higher Education: Progressive Learning Frameworks, pp. 43–57. IGI Global, Hershey (2009)

14. Denzi, N., Lincoln, Y.: The Sage Handbook of Qualitative Research. Sage Publications, Thousand Oaks (2005)

15. Flick, U.: An Introduction to Qualitative Research, 3rd edn. Sage, London (2006)

16. Bastos, G., Vasconcelos, A.I.: E-learning e Desenvolvimento Profissional de Bibliotecários: Entre o Global e o Local. In: Estrela, T. et al. (ed.): Educação, Economia e Território – O Papel da Educação no Desenvolvimento. Atas do XXI Colóquio da Secção Portuguesa da AFIRSE., pp. 270–279. Lisboa, EDUCA/Secção Portuguesa da AFIRSE (2014)

17. Shin, N.: Transactional Presence as a Critical Predictor of Success in Distance Learning. Distance Education **24**(1), 69–86 (2003)

Teaching Methods and Instruction

Investigating the Guided Inquiry Process

Lee FitzGerald[✉] and Kasey L. Garrison

School of Information Studies, Charles Sturt University, Wagga Wagga, Australia
{lefitzgerald,kgarrison}@csu.edu.au

Abstract. Guided Inquiry (GI) is "a way of thinking, learning and teaching that changes the culture of the classroom into a collaborative inquiry community" [1, p. xiii]. GI tasks and scaffolding are emerging in American and Australian contexts, based on the ISP and GID processes. However, there is a need for research in schools on the ways students use and transfer the GID process. This mixed methods study investigated the use and transfer of the GID process for Year 7 students in an all girls' Catholic school in a capital city in Australia as they engaged in two projects in History and Geography. Overall, findings indicate that students were able to improve their practice of the GID process from the first project to the second and that they felt more confident using it the second time. They also show diverse interpretations and preferences towards integral elements of GI including choice of research topic.

Keywords: Guided inquiry · Information search process · Guided inquiry design process · Reflection · Inquiry circles

1 Introduction

1.1 Information Literacy

While recognising the variety of approaches to information literacy [2–4], for the purposes of this paper, our understandings are informed by the GI approach to information literacy, which presupposes a "… holistic approach to information literacy that prepares students for the reflective thinking that leads to wise information seeking and use in the dynamic global information environment" [5, p. 97]. The definition of information literacy proffered by Kuhlthau in her keynote address at the European Conference on Information Literacy (ECIL) in 2015 builds on Bruce [2] and underlies this paper, that is, "Information literacy is the ability to use information to construct knowledge for wise action" [6]. Defined thus, information literacy powers the essential information to knowledge journey which is the aim of GI.

GI theory and practice is developing rapidly from the work of Kuhlthau, Maniotes and Caspari [1, 7] into a fully-fledged pedagogy, which originates from Kuhlthau's Information Search Process (ISP), and is enriched by its mirror image, the Guided Inquiry Design (GID) process, and the concept of Third Space [7, 8]. Third Space links the world of the student (first space) and the curriculum (second space) in order to create a third space where learning is motivated by curiosity and interest. ISP has a strong body of research supporting its practice in information seeking behaviours [9–17]. GI has characteristics of Fullan's "deep learning" [18] where students lead the direction of their

own learning, with its focus on Third Space [7, 8], developing inquiry questions, working in inquiry circles, and using continuous reflection to develop metacognition. However, there is a need for empirical research into the ways in which students engage with and transfer the GID process and skills. ISP is a research model with challenging terminology. It refers to the way an individual researcher thinks, acts and feels when motivated by interest. GID is intended to be used by learning teams to create, schedule, implement, and assess an inquiry unit. It also describes what the inquiry community (the class) is doing at any given point, while giving students simple verbs to describe the stages in their process including Open, Immerse, Explore, Identify, Gather, Create and Share, and Evaluate.

Some developments in GI theory and practice focus on Third space [8]. Other concepts elaborated on in recent GI publications [1, 7] include focusing student research in inquiry learning, branded GI. Features of the emerging GI pedagogy include:

- Leadership from a learning team of teachers/teacher librarians and specialist teachers;
- Five types of learning – (Information literacy, learning how to learn, curriculum content, literacy competence and social skills);
- Six Cs of construction (Collaborate, Converse, Compose, Choose, Chart, Continue);
- Concepts-based information literacy curriculum based on three tightly elaborated central concepts:
  - Organized information provides access to facts, ideas and multiple perspectives,
  - Valuable information prompts curiosity, reflection and enlightenment, and
  - thoughtfully interpreting information over time leads to deep learning [7, pp. 74–77]; and
- A set of inquiry tools – Inquiry community/inquiry circles/inquiry charts, journals and logs.

The research described in this paper employed these concepts in the design and implementation of two GI units utilizing the stages of the GID process.

1.2   Research Questions

The purpose of this study was twofold. First, the researchers sought to investigate how students interpreted and used the GID process whilst engaged in a research unit in history or geography. Second, researchers examined the students' transfer of the GID process and skills to the second unit in the opposite subject. The two specific research questions were addressed across the year in two phases:

1. How do students interpret and use the GI process whilst engaged in a research project? (Phase 1 & 2)
2. How do students transfer the GI process to another similar research project later in the year? (Phase 2)

2   Methodology

Using a mixed methods design [19], the research was completed in two phases at the end of each semester in 2015. Quantitative data included marks from research booklets documenting the students' GI process and reflections throughout their projects as well as marks from their final projects for both units. Qualitative data included two focus group interviews conducted at the end of each project, students' comments in their research booklets, and comments about the process of the students made by the teacher librarians whilst marking the research booklets.

2.1   Setting and Participants

This study was conducted at a Catholic, independent, girls' school in a capital city in Australia. The school is not selective on ability, but may be economically selective, in that enrolment is keenly sought amongst a population of committed ex-students and parents who are professionals. It is moderately expensive to attend, and has a clear ethos centred in the belief that women can excel, with an emphasis on social concern and student leadership.

All 127 students in Year 7 were invited to participate in this study as all girls took part in the two GI units across 2015. Half of the class were enrolled in History in semester 1, and the other half enrolled in Geography. In the second semester, those who had taken History in semester 1, took Geography, and vice versa. Thirty-three students volunteered to take part in this research, participating by allowing researcher access to their two research booklets completed in the two GIs and documenting their information process and reflections through the unit of work. Additionally, they undertook two focus group interviews, one at the end of the first GI unit (Phase 1) and one at the end of the second GI unit (Phase 2). Complete data was collected from 15 students; the students chose their own pseudonyms.

2.2   The GI Units

The two GI units included research projects focused on important aspects of the History and Geography curricula. The Geography inquiry communities (classes, teachers and TLs) explored World Heritage Sites together while their History counterparts' inquiry investigated New Kingdom Egypt. The overarching inquiry questions included for Geography, Why is it important to know about and cherish World Heritage Sites? and for History, Why was New Kingdom Egypt a golden period in ancient history? Students undertook identical steps throughout the eight stages of the GID process in the two inquiry projects. This progression is described in Table 1.

Students were introduced to the GID process by teacher librarians, and posters of the process were displayed prominently in libraries and classrooms to remind students of the GID stages. Students were assisted throughout the process by a learning team consisting of class teachers, and teacher librarians. Feedback was provided by teacher librarians on the first and second research booklets. The research booklets the students completed while engaged in the GID process documented these steps and provided

scaffolds to help the girls stay on task. They had brief descriptions of each of the stages and offered blank spaces for reflection and note-taking during the process.

Table 1. Activities within the GI units

Stages	Activities
Open	Engaging with the inquiry
Immerse	Viewing/listening to teacher-led content
Explore	Investigating broadly on topic
Identify	Joining an inquiry circle interested in the same aspect and exploring together to find intriguing information, finding a focus, and creating an inquiry question
Gather	Sharing the work of deep searching to find the answer to the inquiry question, and of notetaking and recording a bibliography
Create and Share	Creating a mind map of the answer to the inquiry circle's inquiry questions
	Jigsaw group discussions to share their information on their parts of the topic
	Answering the overarching question of the GI in an essay using the PEEL method (an organisational scaffold- Point, Evidence, Explanation, Link)
Evaluate	Concluding with reflections on achievements and thoughts on process

The research booklets were filled in by all students, and constituted 50% of the grades students achieved in History and Geography for the two projects.

2.3   Focus Groups

After the completion of each unit, the researchers conducted the focus groups. Approximately five to ten students at a time participated in each 20–30 min focus group interview after the research projects in the first and second semester of the 2015 school year. As the inquiry units were the first time the students had used the GID process, the first focus group interview guide asked them to consider the different activities within each of the GID stages and how they felt these activities contributed to their overall learning in addressing their individual inquiry questions. This first focus group was focused on the first research question investigating students' interpretations and use of the GID process. The second focus group interview was less structured to allow students more freedom in their reflections about the GID process and targeted the second research question inquiring about the participants' transfer from the first to the second unit.

We used a deductive approach [19] to analysing transcripts from the focus group interviews, with each researcher reading the transcript and noting potential themes and patterns, then discussing together what these common themes might be. The questions

from the interviews served as general organising structures, but other themes emerged as students reflected, particularly in the second focus group. As freedom of choice and room to explore are hallmarks of GI [7], it was suitable for us to allow the themes to emerge naturally from discussion. As a result of this process, the following codes developed as shown and defined in Table 2, organised by research question. The findings are discussed using these codes and relevant sub codes addressing each research question.

Table 2. Codes from the Data Analysis

Research questions	Codes	Definitions & Sub codes
1	Stages	Referring to the use of stages as a whole part of the overall process
		Noting positive and negative aspects to specific stages
	Choice	Being able to choose research topics and design inquiry questions for personal interest
	Rewards	Indicating rewards from gaining experience in GI to take away including:
		Learning for learning's sake
		Elements of fun in learning
		Using skills for future learning
	Reflection	Commenting on the use of reflections throughout and culminating the GI process
2	Change	Referring to use of GID process
		Use of GI tools – Inquiry logs (notetaking) and charts (mind map)
	Transfer	Being able to transfer learning about GID process
		From History to Geography, or vice versa
		To future assignments and learning
	Preferences	Indicating match between GID and own learning preferences

3   Findings

3.1   Interpreting and Using the GI Process

The first research question was exploratory in nature, eliciting students' perceptions on how they interpreted and used the GID process during the two units. Emergent themes from the focus group interviews included the stages of GID, the idea of choice, rewards, and reflection.

Stages of the GI Process. During the focus group interviews, students noted the usefulness of the stages of the GID process and having it broken down into steps. Freddo noted that it is "like stickers in your brain," an effective visual cue for the GID. Madalyn explained that the division of the stages "help[ed her] to organise and set out each section" of the project. She said, "I am splitting it up so I can get each little part done as efficiently as possible."

Participants reflected on specific stages of the GID process, and their impact. The Open and Immerse stages were noted as valuable as they allowed students to get interested in the broader area of their topics. Sleeping Beauty noted that the Immerse stage "helped me reflect on what I already knew…[and]…what to go for." Having time to get an idea of the broad scope of the topic and then finding a subtopic is an interesting feature of GI. The latter stages Create and Share were also identified as important by Eternity, "because you could get to find out about more, not just your area of focus…I found that really fun."

Choice. Allowing students choice of an aspect of the topic to pursue and following their own interests is a central part of GI, an aspect that was muddied in the first GI by some teachers allocating areas of the topics without allowing choice, therefore predetermining membership of inquiry circles and inquiry questions. By the second run of the units, teachers understood much better that free choice of sub topic and inquiry question is essential to student engagement, and the impact of Third Space (where students' interests are aligned with curriculum) on student engagement. Students were clear that choice to research personal interests is an essential part of successful research. Sleeping Beauty's comment that "creating your own question meant we could kind of explore our interests and decide what we wanted to find out about those places" indicates how important personal choice was to her.

Students echoed these sentiments in regards to creating their own inquiry question. Cinderella noted that, "it was good that we were able to make our own [question] because sometimes that can make more sense than what you are given because it is what you think rather than what you are told to." Sleeping Beauty felt similar sentiments in saying, "I found that creating your own question meant we could kind of explore our interests and decide what we wanted to find out about those places." The comments from Sleeping Beauty and Cinderella were further expounded by Dudley's comment:

> So I think it's a really great idea that we get to choose what we want to learn about that particular topic instead of just being given the question. You can kind of interpret it in the way you want. I think we should be allowed to change our question if we find you can't get the answer.

Rewards. Rewards arising from the GID process centred on aspects of learning – learning for interest and fun and learning new skills for future assignments. Poseidon thought that the Gathering stage of the GI process was quite rewarding in order to gain a "deeper understanding of…what…we were researching" and to learn "more about World Heritage Sites as a whole as well as the individual one" they each chose.

Rewards also included developing skills from this GI to use in future research tasks, noting particularly searching skills and resources to use in future tasks. Ariel and Hawaii 101 both noted enjoyed using primary sources in their research, and would like to do this again. Ariel thought that primary sources were "interesting" and "not something you would usually think about putting in your essay" while Hawaii 101said that "[primary sources] actually have a whole lot of different information." Royal commented on the skills she learnt in searching, and using specific sources she did not know about before (particularly Destiny Quest, the new library catalogue.)

I found many more websites and things I could look at in other subjects as well so not just history and this area but I've learnt to do it in English and other subjects, and learning about more reliable sources.

Building searching skills and evaluating sources are essential skills for lifelong learning, the ultimate goal of GI.

Reflection. Another theme prominent in focus group discussions and the research booklets was the use of reflection. Students reflected during the process in order to further understand their own learning and to seek feedback from the learning team. At the end of the GI, students reflected on their completed research, looking at what they learnt and what they will take from this experience to their next assignment.

Focus in the discussion groups was on placement of reflection in the stages, particularly whether or not they preferred reflecting during or after an assignment. Sleeping Beauty notes, "I find that reflecting during the process is easier than reflecting at the end, because when you reflect at the end, you can't really remember what you did at the start." Conversely, other students showed a preference for reflection at the end of the project as a way to wrap it all up together. As Anastasia says, "I liked reflecting at the end, because…really Guided Inquiry, you can't do one step without doing the rest of them so the reflecting on the whole process kind of brought the whole thing together." Madalyn felt the same way and her comment particularly singles out the GI process as empowering her to become a reflective learner:

Well, before I did the GI, I didn't really do reflections but now I think, I like doing them at the end because it's thinking back to what you've done and at the end of an assignment, it's kind of just ok I finished now just what did I do? What worked, what didn't for next time? So it's kind of reflection for me.

There were some who did not like reflecting. Holly Bell felt reflection was "annoying" and did not understand its value in developing metacognition. Eternity was vocal in aligning reflecting with therapy, an interesting conclusion:

I also really, really dislike reflecting mainly because I think it's totally therapeutic and I don't like those sort of things that you get in a therapy session… oh, now reflect on how you are feeling… No! No, that was one of the things I didn't like…

This comment highlights the fact that past experiences of researching and reflecting can colour the experience of research (and in this case, GI) in a negative light, also indicating how different learners can be in their approach to research. The data noted here reinforces the importance of explaining the GID process clearly at the beginning, specifically including why reflection is a good thing in helping the student understand their own ways of learning.

3.2   Transfer of GI Process

The second research question sought to investigate how the students transferred their skills from the first GI unit to the second. Process marks were allocated to students by teacher librarians, in a process involving reading the research booklets for the first and second GI and applying marking criteria. Process marks improved from an average of

19/25 marks for the 15 students to an average of 21.8/25 marks, an increase of 2.8 marks. This increase suggests increased engagement and fluency with the GID process in the second GI unit and is further supported from the focus group interviews. Eternity said, referring to using the GID process the second time: "I thought it was a bit easier because let's admit it, lots of things are easier the second time around, like tying your shoe laces."

Comments made by teacher librarians on the second GI project show detail on students scoring the highest marks (Eternity) and the lowest marks (Hazel Grace). Eternity was a thoughtful member of the focus group, who showed herself as one confident of her own research process, and of the opinion that there are too many stages in the GID process. She scored 21/25 marks for her process booklet on the second GI unit, an improvement of 4 marks from the first GI unit. The teacher librarian who marked her assignment noted, "You've shown yourself to be a thorough researcher in this your second Guided Inquiry. You are perceptive about your own learning process, showing yourself as a fluent reflector."

Conversely, Hazel Grace reported feeling inadequate and anxious in her inquiry circle (a pair) for the second GI. Her process mark actually went down five marks from 19/25 in the first GI project to 14/25 in the second GI project, one of only three students who decreased in total marks. This decrease raises a question about the effect of membership of inquiry circles on student process. The teacher librarian who marked her assignment commented:

> You need to develop your inquiry skills further in developing an inquiry question, and then using it in your notes. You had some issues with working in your inquiry circle, and need to be more confident of your own abilities. You seemed to run out of energy towards the end.

Change in Understanding and Use of GID Stages.   The participants indicated varying understandings in using the tools and stages of the GID process in their research.

Use of Inquiry Log (Notetaking).   An unexpected idea related to the GI tools was with the use of the inquiry log to aid in notetaking. Some students noted a perception they can not really learn (described by them using the term "memorise") unless they handwrite notes, not type them. It was interesting that students felt they had to memorise at all, because it was not part of the GI unit or process. It may be because the culminating activity to both GIs was a written response under exam conditions, answering the overarching inquiry questions. Hawaii 101 said:

> I thought the note taking was really good because when you type, you don't really memorise it - it's a scientific fact. When you type you don't remember it, but when you write you do which I thought was way better. We got told that in Science.

Inquiry Chart (Mind map).   Students also noted the usefulness of the mind maps they created in the Create and Share stage which were a visual representation of the information they had collected for the project. Hazel Grace commented:

> My partner and I utilised the mind map very well. We had to split it into two sections to answer our question, one for our natural site and one for our cultural site and it just organised things so well and worked better for us to answer our question.

Transfer from Subjects. Despite differing opinions and timing of the subjects the students engaged in their GI projects, overall, students reported that it was easier to use the GID process in the second go, no matter if they took history or geography. This was noted as being related to the effect of repetition of the GID process. Eternity sums this up this eloquently:

> Because we had done it before, I had already established the skills that were needed to finish the GI process so I already had a bit of practice from the history and so when it came to the geography, I was able to use my learning from that in this one. I thought it was a bit easier because let's admit it, lots of things are easier the second time around, like tying your shoe laces.

To Future Assignments. Because students did not develop facility with the names of the stages of the GID, but rather associated stages with the activities that happened at each stage, responses on what they would take to future assignments focused on the actual tasks completed during the project including notetaking, recording sources, Jigsaw and PEEL. Students also noted developing stronger organisational skills from using the GI process and the booklets.

Preference. There were some responses indicating a match between personal preferences for learning and using important elements of GI. Madalyn was a student who made such a connection, reflecting that:

> …it helps me to organise and set out each section of my work so when I get an assignment I'm not sure looking at one big block of work and doing it all at once, I am splitting it up so I can get each little part done as efficiently as possible.

 Ariel also revealed good feelings towards the activities and learning in GI, musing that:

> I really liked the GI actually, I found it was really refined. Well the second time around, but so using it to create questions and stuff that I feel as if, it's more the way to kind of be a part of it… makes you feel more connected to the project.

3.3   Limitations

There are inherent limitations to these findings due to the school environment and aspects of the research design and implementation. First, teachers had limited knowledge and understanding of GI, which led to some classes in the first GI being allocated topics and inquiry questions, thus taking away the element of freedom of choice so important to GI. This has subsequently been addressed with professional development sessions for the teachers and teacher librarians to enhance their practice and for future research with this group. Further, after the two GI units were completed, it became evident that a lack of collaboration in the design of the tasks between teachers and teacher librarians created a lack of teacher ownership for the unit. New GI tasks at the school, the subject of further CSU research, are currently underway and have been collaboratively designed by the teaching and researcher team. Further, there are inherent limitations in generalising the data from this study to other populations of students, specifically notable is the general high academic motivation of students at this school, an all girls' independent Catholic school in an affluent suburb of a capital city in Australia. It would be interesting to carry

out a similar study in a school with dissimilar demographics and reputation to better gauge the effect of school setting.

4   Conclusions

Rich qualitative responses to both of our research questions have been tabled, indicating that students found the first run of the GI confusing and difficult, probably resulting from a less than perfect understanding of the process and activities, on the part of both teachers and students. However, there was clear indication that most students improved in their use of the GI process from the first to the second GI, possibly from the effects of repetition. Students displayed much more understanding of the elements of the task in the second GI. There is, however, no evidence to show that they understood that the GI process is intrinsic to research, as there were comments about wanting to leave various stages out and adjusting it to their own research style. It is clear that students need further input and teaching on the process itself, as instinctive information seeking and handling behaviour.

The way forward for this school lies in further professional development for teachers and TLs, and more input for students on the GID process. Future tasks need to be created by the teaching team collaboratively, to foster shared ownership of the GI, and to ensure that student choice of the topic, as well as the freedom to create the inquiry question at the base of the inquiry unit. With these integral elements of GI incorporated into forthcoming units, students will be empowered to further develop their information literacy skills by repeated practice of taking charge of the direction of their own learning.

References

1. Kuhlthau, C.C., Maniotes, L.K., Caspari, A.K.: Guided Inquiry Design: A Framework for Inquiry in Your School. Libraries Unlimited, Santa Barbara (2012)
2. Bruce, C.: The Seven Faces of Information Literacy. Ausling Press, Adelaide (1997)
3. Limberg, L., Sundin, O., Taija, S.: Three theoretical perspectives on information literacy. Hum. IT **11**(2), 93–130 (2012)
4. Lloyd, A.: Trapped between a rock and a hard place: what counts as information literacy and how is it conceptualized. Library Trends **60**(2), 277–296 (2011)
5. Kuhlthau, C.C.: Rethinking the 2000 ACRL standards: some things to consider. Commun. Inform. Lit. **7**(2), 92–97 (2013)
6. Kuhlthau, C.C.: Rethinking information literacy in the 21st century. In: Keynote Address, European Conference on Information Literacy (2015)
7. Kuhlthau, C.C., Maniotes, L.K., Caspari, A.K.: Guided Inquiry: Learning in the 21st Century. Libraries Unlimited, Santa Barbara (2015)
8. Maniotes, L.: The transformative power of literary third space. Ph.D. Dissertation, University of Colorado, Boulder (2005)
9. Kuhlthau, C.C.: A process approach to library skills instruction. Sch. Libr. Media Q. **13**(1), 35–40 (1985)
10. Kuhlthau, C.C.: An emerging theory of library instruction. Sch. Libr. Media Q. **16**(1), 23–28 (1987)

11. Kuhlthau, C.C.: The information search process of high-, middle-, and low-achieving high school seniors. Sch. Libr. Media Q. **17**(4), 224–228 (1989)
12. Kuhlthau, C.C.: Information search process: a summary of research and implications for school library media programs. Sch. Libr. Media Q. **18**(5), 19–25 (1989)
13. Kuhlthau, C.C., et al.: Validating a model of the search process: a comparison of academic, public and school library users. Libr. Inform. Sci. Res. **12**(1), 5–32 (1990)
14. Kuhlthau, C.C.: Inside the search process: information seeking from the User's perspective. J. Am. Soc. Inform. Sci. **42**(5), 361–371 (1991)
15. Kuhlthau, C.C.: Implementing a process approach to information skills: a study identifying indicators of success in library media programs. Sch. Libr. Media Q. **22**(1), 11–18 (1993)
16. Kuhlthau, C.C.: Students and the information search process: zones of intervention for librarians. In: Godden, I. (ed.) Advances in Librarianship, pp. 57–72. Academic Press, New York (1994)
17. Kuhlthau, C.C., Heinstrom, J., Todd, R.J.: The information search process revisited: is the model still useful? Inform. Res. **13**(4) (2008)
18. Fullan, M., Langworthy, M.: A Rich Seam: How New Pedagogies Find Deep Learning. Pearson, London (2014)
19. Patton, M.: Qualitative Research and Evaluation Methods. Sage Publications, Thousand Oaks (2002)

Teacher Perspectives on Whole-Task Information Literacy Instruction

Iwan Wopereis[(✉)], Jimmy Frerejean, and Saskia Brand-Gruwel

Faculty of Psychology and Educational Sciences,
Open University of the Netherlands, Heerlen, The Netherlands
{iwan.wopereis,jimmy.frerejean,saskia.brand-gruwel}@ou.nl

Abstract. This paper presents results of an explorative study on perceived merits of contemporary holistic approaches to designing information literacy instruction in a university setting. Seven teachers in educational sciences evaluated their premaster's course on conducting a literature review designed according to a modern design approach, named Four-Component Instructional Design (4C/ID). They noted their perceptions on course quality by means of a standardized course evaluation questionnaire and a SWOT analysis. Results of the questionnaire showed that teachers were positive on whole-task information literacy instruction, confirming the results of an earlier study on 4C/ID-caused instructional effects. The SWOT analysis indicated that teachers recognized the value of applied 4C/ID principles like whole-task-centeredness, structured guidance, and scaffolding. We added suggestions on enhancing the positive effects of whole-task instructional design based on identified educational weaknesses such as relatively poor constructive alignment and threats such as imperfect curriculum coherence.

Keywords: Information literacy · Instructional design · Whole-task models · 4C/ID-model · University teachers

1 Introduction

Contemporary approaches to the design of instruction for complex skills learning aim at developing sequences of whole, authenticity-based learning tasks [1–3]. The rationale behind this view on instructional design says that transfer of learning is enhanced when constituents of a complex skill (i.e., the underlying skills, knowledge, and attitudes) are learned in conjunction with each other. As such, the instruction handles persistent educational problems like compartmentalization of instructional materials, fragmentation of learning, and the transfer paradox [4]. Problems like these have been recognized in higher information literacy (IL) education but, as of yet, have not resulted in large-scale implementations of well-integrated whole task-centered instruction in curricula [5]. Although coherent IL-programs emerge [6, 7], it is still the compartmentalized, fragmented 'one-shot' IL-instruction that dominates the university learning landscape [5]. Past research shows that students benefit from whole task-centered instruction [8–10]. However, this research and ensuing good practice mainly stems from domains other

than IL such as statistics education [11], science education [12], and medical education [13]. In order to validate findings from other disciplines, we initiated a research project in the domain of university IL-instruction. In that project we explored the effects of the whole task approach on learning how to conduct a literature review, a central IL-skill in academia.

We developed an IL-course (see [15], for a blueprint of the course) following the Four-Component Instructional Design (4C/ID) model of Van Merriënboer [4, 14], one of the most praised models for designing whole-task instruction [3]. An earlier study showed that the new 4C/ID-based course was effective as all students passed it [15]. Besides, students rated highly course features like whole learning tasks, guidance, and feedback, all indicators of good quality. However, we questioned the efficiency of the course as time on task was relatively high. The present study builds on these findings and analyses in-depth course characteristics that might affect course effectivity and efficiency. In order to triangulate findings presented in the previous study [15], we decided to focus on the teachers' perspectives on course quality. Since teachers are pivotal in the educational process, we expected them to provide unique insight in the nature and quality of the whole-task instruction they delivered [16].

We used a standard course evaluation questionnaire from the Open University of the Netherlands [17] to measure the teachers' views on course quality (i.e., studiability, feasibility, and practicability) as stated in Research Question (RQ) 1. Questions focused on (perceived) quality of course constituents, instructional guidance, and instructional support. Instruments like these are frequently used for research purposes [15]. Since we used the same instrument to measure students' perceptions on course quality in the earlier study, it was possible to compare students' and teachers' views as stated in Research Question (RQ) 2. This comparison is of value for instructional designers as it contrasts perceptions of 'consumers' (i.e., students) and 'producers' (i.e., teachers) of whole-task instruction, two important groups of actors in the educational process [18]. In addition, it contributes to a comprehensive 360 degree overview of course quality aspects. We added an analysis of strengths, weaknesses, opportunities, and threats (SWOT), as stated in Research Question (RQ) 3 to analyze the course quality aspects in depth. This type of analysis is increasingly used in education to systematically explore various constituents of instructional quality and to provide information for quality improvement [19, 20].

In sum, our study aimed to reveal teacher perceptions on the quality of whole task-centered IL-instruction. We compared findings with a previous study on student perceptions and scrutinized strengths, weaknesses, opportunities, and threats of the IL-course by means of a SWOT-analysis. The research questions were as follows:

- RQ1: How do teachers perceive the quality of whole task-centered instruction?
- RQ2: Does perceived quality differ between teachers and students?
- RQ3: What are important strengths, weaknesses, opportunities, and threats of the IL-course that relate to course quality?

We analyzed answers to these questions to determine the usefulness of the 4C/ID-model to design high quality whole task-centered IL-instruction.

2 Method

2.1 Participants

Seven university teachers of the distance premaster's program in Educational Sciences at the Open University of the Netherlands (OUNL) participated in this study (M_{age} = 41.9, SD = 8.7; 4 male). At the time of the data collection, each teacher had supervised, on average, 46 students in the literature review course (M = 45.9, SD = 24.7; Mdn = 55). Teachers considered themselves expert on information literacy (M = 8.1 on a 10-point scale; SD = 1.6) and advanced beginners in instructional design (M = 6.3; SD = 2.6) and the 4C/ID-model (M = 6.00; SD = 2.6). Three teachers had previously applied the 4C/ID-model to design instruction.

2.2 Materials

Course. The online course, 'Information skills for social scientists,' is part of the premaster's program in Educational Sciences of the OUNL. It teaches the fundamentals of conducting a literature review through a sequence of five learning tasks. The learning tasks are based on authentic tasks and feature the full process of conducting a literature review. Therefore, students learn the process from defining research questions to presenting the results of the review in a paper. The *completion strategy* is applied to guide students through the sequence of tasks [21, 22]. This means that students gradually practice steps of the literature review task by themselves. Since this is done in reverse order this guidance principle is called 'backward fading' [15, 23]. Table 1 presents the structure of the course and the application of the completion strategy to guide the learning process. For detailed information on the blueprint of the course we refer to Wopereis et al. [15]. The course is presented to the students in OpenU, an institutional learning and working environment of the OUNL [24].

Table 1. Course overview

	Learning Task 1	Learning Task 2	Learning Task 3	Learning Task 4	Learning Task 5
Define question(s)	Worked-out	Worked-out	Worked-out	Worked-out	Execute*
Search for sources	Worked-out	Worked-out	Worked-out	Execute*	Execute
Select sources	Worked-out	Worked-out	Execute*	Execute	Execute
Process information	Worked-out	Execute*	Execute	Execute	Execute
Present information	Worked-out*	Execute	Execute	Execute	Execute

*= focus of instruction

Teachers reported to have spent 9.8 h (SD = 3.6) on the course. This is less than the study load hours indicated for the students (i.e., 14 h). We found significant differences between the way teachers and students perceived course quality (see Table 3).

Table 2. Opinion on global course features by teachers (n = 7) and students (n = 48).

Statement	Agreement on statement (in %)	
	Teachers	Students
Practical level of the course is adequate	100	98
Scientific level of the course is adequate	100	98
Course is challenging	100	81
Learning goals are met	100	100

Table 3. Ratings course constituents (scale 1 to 10; 1 = poor, 10 = excellent) by teachers (n = 7) and students (n = 48).

	Mean		Mode		Skewness	
	Teacher	Student	Teacher	Student	Teacher	Student
Course overall	6.9 (0.9)	7.4 (0.9)	6	8	0.4	−0.5
Learning tasks	6.7 (1.3)	7.4 (1.1)	7	7	−0.7	−0.5
Assessment task	7.0 (1.0)	7.6 (1.0)	7	8	−1.4	−0.5
Supportive info	6.4 (1.1)	7.1 (1.1)	7	7	−0.2	−1.5
Teacher support	6.7 (1.4)	7.9 (1.3)	8	9	−0.4	−0.3
DLWE (OpenU)	7.1 (0.4)	7.4 (0.9)	7	7	2.6	0.3
Forum	5.4 (2.3)	6.2 (1.5)	6	7	−1.3	−1.3

Note: Standard deviations between brackets; DLWE = digital learning and working environment.

3.2   Differences on Course Quality

Mann-Whitney tests on teachers' and students' ratings (see Table 3) showed a difference only on perceived teacher support (i.e., cognitive feedback). Students rated teacher support more highly (Mdn = 8) than teachers (Mdn = 7), U = 90.5, p = 0.045, r = −0.27. Figure 1 presents a bihistogram of the distribution of the ratings. It shows that the seven teachers had different opinions on the quality of this variable. Interestingly, the teachers who were more involved in the design of the course seemed to be more positive on the feedback than the teachers who served merely as instructors and coaches.

3.3   SWOT Analysis

The teachers generated 63 statements, identifying 16 strengths, 24 weaknesses, 11 opportunities, and 12 threats. Analysis of statements resulted in 4 main themes about strengths, 4 about weaknesses, 3 about opportunities, and 3 about threats. Table 4 presents the main themes for each SWOT category.
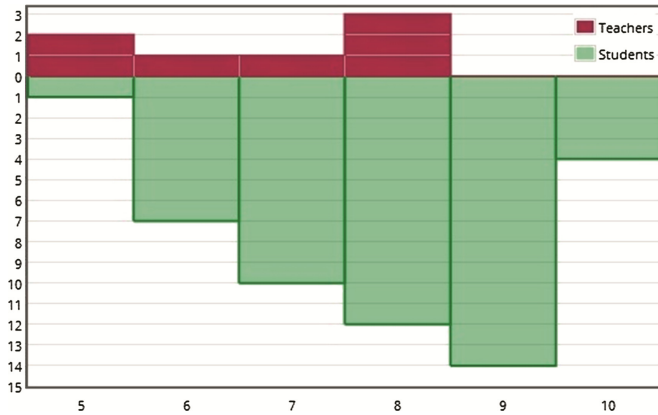
Fig. 1. Bihistogram ratings for teacher support

Table 4. Main themes SWOT analysis.

Strengths (n = 16). Main themes:	Weaknesses (n = 24): Main themes:
• *Whole task approach.* Students learn the complex skill by solving authentic 'whole-task' problems • *Scaffolding.* Gradually decreasing instructional support and guidance and increasing self-activation • *Guidance.* The learning process is guided by partially completed process work sheets • *Feedback.* Students receive extensive cognitive feedback on task performance after the fourth learning task	• *Constructive alignment.* No perfect alignment between learning goals, content, and assessment • *Curriculum coherence.* Skills like reading and writing (academic) texts are wrongly considered prior knowledge • *Materials update.* Adapting course materials can be costly and labor-intensive when specialist skills are lacking • *Feedback.* Cognitive feedback on the fourth task is labor-intensive
Opportunities (n = 11); Main themes:	Threats (n = 12): Main themes:
• *IL skills education.* Course might be a starting point for the development of a learning-teaching trajectory for learning (academic) IL skills • *Academic skills education.* Integrating (academic) IL skills into a broad academic skills curriculum • *Collaborative learning.* To improve learning and to address problems related to scalability CSCL-formats could be implemented	• *Plagiarism.* The open nature of the course makes it possible to exchange and copy student work • *Scalability.* An increase of students might hamper adequate teacher support (i.e., providing feedback) • *Curriculum coherence.* Autonomy of teacher teams may result in poorly aligned curricula

We identified four main themes related to *strengths*. They all related to distinctive design guidelines of the 4C/ID-model. The first theme emphasized the importance of whole, authentic tasks as points of departure in the design process. One teacher, for instance, stated that "[in the course] students practice the systematic approach to problem solving [i.e. conducting a literature review] in its entirety." The second theme aimed at course structure and stressed that instructional support within a sequence of learning tasks should decrease

over time. A teacher said: "Throughout the course the students increasingly perform parts of the whole task themselves." The third theme underlined the importance to apply process worksheets to learn the complex literature review skill. A concise teacher statement on strengths read: "Use of process worksheets." The fourth theme stressed the power of feedback. One teacher appreciated the "… extensive formative feedback that students receive after the fourth learning task", which was considered an additional "… excellent learning experience."

Feedback was not only a strength. It was also one out of four main themes related to *weaknesses*. Or, as formulated by one teacher: "Providing feedback [in this course] is demanding." Another main theme on weaknesses was constructive alignment. "Constructive alignment is rather weak: assessment, practice, and materials are not aligned. For example, academic writing skills are assessed, not taught." This weakness was related to the third main theme, namely curriculum coherence. Some skills like academic reading and writing were regarded as prerequisites while they were not part of the presupposed skill repertoire of students. A teacher said: "For instance, there are course entry requirements [i.e., knowledge and skills] that refer to courses that no longer precede the current course, due to a redesign of the curriculum." The fourth main theme on weaknesses was materials update. One teacher mentioned that "updating [instructional] videos is not easy and requires specialist knowledge and skills."

The category *opportunities* covered three main themes on issues that might be beneficial to course quality. First, the course was regarded a solid base for designing a learning-teaching trajectory on information literacy: "Several task classes [on academic IL instruction] could be developed." Second, the course would be an ideal 'point of departure' for an integrated and broad academic skills curriculum. One teacher said: "This course is suited to provide a basis for more academic skills, such as formulating research questions and critical reading." Collaborative learning was regarded a third thematic issue. According to some teachers both the effectivity and efficiency of learning could be improved when students work together on learning tasks. One teacher, for example, mentioned the surplus value of well-implemented peer feedback both for optimizing learning output among learners and saving time on task for teachers.

The *threats* to course quality were classified in three main themes. The first theme included issues on plagiarism. A teacher wrote: "Learning tasks should be replaced because students are copying each other's work." Scalability was regarded another important threat. As one teacher mentioned: "The current approach is not scalable: a large increase of students will result in a heavy workload for the teachers." The final thematic threat related to curriculum coherence. Teacher teams who work too autonomously create courses that are isolated entities in the curriculum. A teacher suggested that the "… contents of this course should be more aligned with other courses, such as academic writing."

4   Discussion

In this study we analyzed the quality of a whole task-centered IL-course in a university setting to establish the usefulness of a holistic approach to instructional design. We focused on teacher perspectives of course quality and posed three research questions.

Our first research question aimed at revealing perceived course quality. Ratings of teachers showed that Four-Component Instructional Design (4C/ID) can result in a challenging course that is scientifically sound and useful for practice. Beside the acclaimed nature of the course, ratings indicated that teachers appreciated the underlying instructional blueprint. Teachers highly valued course constituents like learning tasks, supportive information (i.e., the theory), and structured guidance (i.e., scaffolding). The SWOT analysis confirmed this.

Our second research question aimed at revealing congruity and diversity in teacher and student ratings. Results of non-parametric tests showed that appreciation of the course was similar between teachers and students. The only difference concerned a more critical stance of teachers towards the feedback they gave. Interestingly students were more positive on the feedback component of the IL-course seen in medium effect size.

Our third research question aimed at revealing the strength, weaknesses, opportunities, and threats of this course as experienced by the teachers. This qualitative, in depth analysis of course characteristics emphasized the strength of the instructional blueprint which confirmed the added value of using the 4C/ID-approach to design effective IL-instruction. However, the SWOT-analysis also revealed that the implementation of a 4C/ID-based blueprint for whole task-centered IL-instruction may lead to heavy workload for teachers (i.e., provision of adequate feedback and regular update of study materials). This is mainly seen as a threat when the number of students will rise. Another threat is the lack of curriculum coherence. Strong autonomy of teacher design teams may result in discontinuous IL-learning-teaching trajectories [25] that hamper student learning. Education should emphasize the design of (constructively, well aligned) coherent IL-trajectories that also address critical thinking skills [26, 27]. The present IL-course might be an interesting starting point for the development of a large-scale IL-trajectory, embedded in a broader academic skill learning context. The 4C/ID-approach can help to design such large-scale curriculum.

5   Conclusion

This study showed that teachers appreciate whole task-centered IL instruction that is 4C/ID-based. Affirmed by previous studies [15, 28] we therefore can conclude that the 4C/ID-model is most suitable to designing IL-instruction. It provides teachers, librarians, and other designers of IL-instruction with the necessary design guidelines and instruments to frame a good quality instructional blueprint. However, the study also indicated that sufficient time needs to be allocated to the development, implementation, and maintenance of instruction in order to prevent constructive misalignment of learning goals, content, and assessment within and across courses [29]. This emphasizes the importance of building curriculum design teams that have a good overview on IL-learning-teaching trajectories and other components of the curriculum [25].

Future research should aim at framing guidelines for designing, developing, and implementing coherent whole task-centered IL-programs that exceed 'one-shot' IL-sessions. Educational design research on 4C/ID-based whole-task IL-instruction might be a useful approach to address this issue [30].

References

1. Van Merriënboer, J.J.G.: Alternate models of instructional design: holistic design approaches and complex learning. In: Reiser, R.A., Dempsey, J.V. (eds.) Trends and Issues in Instructional Design and Technology, pp. 72–81. Pearson/ Merrill Prentice Hall, Upper Saddle River (2007)

2. Van Merriënboer, J.J.G., Kester, L.: Whole-task models in education. In: Spector, J.M., Merrill, M.D., Van Merriënboer, J.J.G., Driscoll, M.P (eds.) Handbook of Research on Educational Communications and Technology, pp. 441–456. Lawrence Erlbaum, New York (2008)

3. Merrill, M.D.: First principles of instruction. Educ. Technol. Res. Dev. **50**(3), 43–59 (2002)

4. Van Merriënboer, J.J.G., Kirschner, P.A.: Ten Steps to Complex Learning: A Systematic Approach to Four-Component Instructional Design, 2nd edn. Routledge, New York (2013)

5. Rosman, T., Mayer, A.-K., Krampen, G.: A longitudinal study on information-seeking knowledge in psychology undergraduates: exploring the role of information literacy instruction and working memory capacity. Comput. Educ. **96**, 94–108 (2016)

6. Moore, C., Black, J., Glackin, B., Ruppel, M., Watson, E.: Integrating information literacy, the POGIL method, and iPads into a foundational studies program. J. Acad. Libr. **41**, 155–169 (2015)

7. Mullins, K.: IDEA model from theory to practice: integrating information literacy in academic courses. J. Acad. Libr. **42**, 55–64 (2016)

8. Brand-Gruwel, S., Wopereis, I.: Integration of the information problem-solving skill in an educational programme: the effects of learning with authentic tasks. Technol. Instr. Cogn. Learn. **4**, 243–263 (2006)

9. Wopereis, I., Brand-Gruwel, S., Vermetten, Y.: The effect of embedded instruction on solving information problems. Comput. Hum. Behav. **24**, 738–752 (2008)

10. Lim, J., Reiser, R.A., Olina, Z.: The effects of part-task and whole-task instructional approaches on acquisition and transfer of a complex cognitive skill. Educ. Technol. Res. Dev. **57**, 61–77 (2009)

11. Van Buuren, H.: Teaching statistics and research methods: an integrated approach (2006). http://iase-web.org/documents/papers/icots7/3H1_VANB.pdf

12. Lansu, A., Boon, J., Sloep, P.B., Van Dam-Mieras, R.: Changing professional demands in sustainable regional development: a curriculum design process to meet transboundary competence. J. Clean. Prod. **49**, 123–133 (2013)

13. Vandewaetere, M., Manhaeve, D., Aertgeerts, B., Clarebout, G., Van Merriënboer, J.J.G., Roex, A.: 4C/ID in medical education: how to design an educational program based on whole-task learning: AMEE Guide No. 93. Med. Teach. **37**, 4–20 (2015)

14. Van Merriënboer, J.J.G.: Training Complex Cognitive Skills: A Four-Component Instructional Design Model for Technical Training. Educational Technology Publications, Englewood Cliffs (1997)

15. Wopereis, I., Frerejean, J., Brand-Gruwel, S.: Information problem solving instruction in higher education: a case study on instructional design. In: Kurbanoğlu, S., Boustany, J., Špiranec, S., Grassian, E., Mizrachi, D., Roy, L. (eds.) ECIL 2015. CCIS, vol. 552, pp. 293–302. Springer, Heidelberg (2015). doi:10.1007/978-3-319-28197-1_30

16. Könings, K.D., Brand-Gruwel, S., Van Merriënboer, J.J.G.: Towards more powerful learning environments through combining the perspectives of designers, teachers, and students. Br. J. Educ. Psychol. **75**, 645–660 (2005)

17. Westera, W., Wouters, P., Ebrecht, D., Vos, M., Boon, J.: Dynamic probing of educational quality: the SEIN system. In: Landeta, A. (ed.) Good Practice eLearning Book, pp. 165–176. ANCED, Madrid (2007)

18. Kunter, M., Tsai, Y.-K., Klusmann, U., Brunner, M., Krauss, S., Baumert, J.: Students' and mathematics teachers' perceptions of teacher enthusiasm and instruction. Learn. Instr. **18**, 468–482 (2008)
19. Romero-Gutierrez, M., Jimenez-Liso, M.R., Martinez-Chico, M.: SWOT analysis to evaluate the programme of a joint online/onsite master's degree in environmental education through the students' perceptions. Eval. Progr. Plan. **54**, 41–49 (2016)
20. Thomas, S., Chie, Q.T., Abraham, M., Raj, S.J., Beh, L.-S.: A qualitative review of literature on peer review of teaching in higher education: an application of the SWOT framework. Rev. Educ. Res. **84**, 112–159 (2014)
21. Van Merriënboer, J.J.G., Krammer, H.P.M.: The "Completion Strategy" in programming instruction: theoretical and empirical support. In: Dijkstra, S., Van Hout-Wolters, B.H.M., Van der Sijde, P.C. (eds.) Research on Instruction: Design and Effects, pp. 45–61. Educational Technology Publications, Englewood Cliffs (1990)
22. Frerejean, J., Van Strien, J.L.H., Kirschner, P.A., Brand-Gruwel, S.: Completion strategy or emphasis manipulation? Task support for teaching information problem solving. Comput. Hum. Behav. **62**, 90–104 (2016)
23. Sweller, J., Ayres, P., Kalyuga, S.: The guidance fading effect. In: Spector, J.M., LaJoie, S. (eds.) Cognitive Load Theory, vol. 1, pp. 171–182. Springer, New York (2011)
24. Hermans, H., Kalz, M., Koper, R.: Toward a learner-centered system for adult learning. Campus-Wide Inf. Syst. **31**, 2–13 (2014)
25. Dolmans, D.H.J.M., Wolfhagen, H.A.P., Van Merriënboer, J.J.G.: Twelve tips for implementing whole-task curricula: how to make it work. Med. Teach. **35**, 801–805 (2013)
26. Brand-Gruwel, S., Wopereis, I., Vermetten, Y.: Information problem solving by experts and novices: analysis of a complex cognitive skill. Comput. Hum. Behav. **21**, 487–508 (2005)
27. Brand-Gruwel, S., Wopereis, I., Walraven, A.: A descriptive model of information problem solving while using internet. Comput. Educ. **53**, 1207–1217 (2009)
28. Testers, L., Gegenfurtner, A., Brand-Gruwel, S.: Motivation to transfer learning to multiple contexts. In: Paper Presented at the 44th Conference of the International Association of School Librarianship (IASL), Maastricht, The Netherlands (2015)
29. Biggs, J.: Enhancing teaching through constructive alignment. High. Educ. **32**, 347–364 (1996)
30. McKenney, S., Reeves, T.: Conducting Educational Design Research. Routledge, London (2012)

Information Literacy Dialogue as a Wittgensteinian Language-Game: Embedding IL into Curricula

Michael Flierl[(✉)]

Purdue University, Libraries, West Lafayette, IN, USA
`mflierl@purdue.edu`

Abstract. Finding common ground on which to communicate with instructors about embedding information literacy (IL) into curricula is a challenging but worthwhile goal. To address this issue of communication, this paper proposes viewing librarian-instructor dialogue about information literacy as a "language-game," a concept from the philosopher Ludwig Wittgenstein, where librarians must first understand the meaning of information literacy from an instructor's disciplinary and cultural perspective. How IL can function as a language-game and librarian perspectives on IL are discussed first. Next, two case studies are analyzed using a language-game approach, highlighting successful and unsuccessful attempts of embedding IL into curricula. Finally, a methodology, similar to a reference interview, is introduced describing how librarians can better understand teacher perceptions of IL in relation to their discipline and pedagogy. A language-game approach to IL can enable librarians to engage in more meaningful dialogue about embedding IL into curricula.

Keywords: Embedding information literacy · Wittgenstein · Language-game

1 Introduction

Many academic librarians have experienced difficulty discussing information literacy (IL) with instructors. This issue of communication can be particularly problematic when a librarian's goal is to embed IL into curricula in support of student learning. The benefits of embedding IL are clear, it leads to greater IL and student learning gains [1–3]. Many disciplines interact with information in unique ways – the electrical engineer, perhaps concerned with the Institute of Electrical and Electronics Engineers standards, might view information as it relates to her discipline differently than the historian. This presents a moving target for librarians – always having to interpret how information is viewed within a discipline or sub-discipline. This issue is further complicated by the various ways in which librarians define and approach IL. The history of the term "information literacy" is one of change and evolution. Given how both parties to IL dialogue may be starting on different intellectual ground, potentially with various assumptions not known or held by the other party, what can a librarian in higher education do to create a common ground, a common conversation? This is our challenge at hand.

To cultivate meaningful dialogue between academic librarians and instructors – this paper will argue that librarians can treat such dialogue as a type of "language-game," a

concept originated by the Austrian philosopher Ludwig Wittgenstein in his work *Philosophical Investigations* [4, p. 15]. While this concept was originally developed to help philosophers think about and define concepts of aesthetics and metaphysics more clearly, it can also be applied to conversations about IL between librarians and teachers. Specifically, we will discuss a language-game focused on how learning may result from an intentional engagement with information. This encompasses librarians hunting for the implicit and explicit rules of the language-game instructors play to define information or IL within their discipline. This method requires librarians to develop and employ intentional questions, not unlike a reference interview, to better understand how IL unfolds within specific courses and disciplines. To clarify, it is not this paper's goal to use Wittgenstein's philosophy as a panacea for communication issues surrounding IL. Rather, this paper will provide a method to see librarian-instructor dialogue in a different, and ideally more productive, light.

We will first describe language-games and how this philosophical idea can be applied to IL dialogue. Next, salient issues pertaining to librarians engaging in IL dialogue with teachers will be discussed. This will be followed by two case studies, one successful and one unsuccessful, providing specific examples of the challenges of IL dialogue and the value of approaching such dialogue as a Wittgensteinian language-game. Lastly we will discuss a template of questions librarians can employ to identify the IL language-game a teacher plays, knowledge which librarians can use to build meaningful communication and embed IL into a curriculum.

2   Language-Games

Language, as described by Wittgenstein in *Philosophical Investigations*, is involved in social and public "language-games" where the meaning of a word, phrase, or gesture will be dependent on culturally, socially, and publicly agreed upon rules. These rules determine what can meaningfully be said within a context. There are many types of language-games; for example, Wittgenstein lists "reporting an event," "cracking a joke," and "translating from one language into another," among others [4, p. 15]. The beginning of the sentence "A person walks into a bar…" will mean something quite different when said by a comedian as opposed to a journalist. The agreed upon rules within a specific context of "cracking a joke" or "reporting an event" give the exact same phrase two different meanings. It is these culturally- and socially-dependent rules which determine what can meaningfully be said when participating in the language-games of "cracking a joke" or "reporting an event."

But why is this so? What exactly is needed for words to perform their intended function of communication? Wittgenstein uses the (apt yet unfortunate) example of "games" (such as chess, basketball, tag) to address these questions [4, p. 36]. "Games" in this section is unrelated and distinct from language-*games*. The example of games provides an example of how meaning is contextually constructed, even when there is seemingly no single characteristic or essence to define what a "game" is.

In *Philosophical Investigations*, Wittgenstein asks "How would we explain to someone what a game is?" [4, p. 37]. Chess and basketball are similar in that both have

a winning and losing side, include elements of territory, and so on. Of course, they have differences – basketball requires some dexterity, while chess requires none. Chess and basketball are both different from the child's game of tag, which does not necessarily have winners and losers, but can employ two teams similar to basketball. Many other types of games exist with various similarities and differences including party games, video games, and educational games. Wittgenstein claims "you won't see something that is common to *all* [games], but similarities, affinities, and a whole series of them at that" [4, p. 36].

Yet, this is not problematic for using the word "games" in common parlance. Communication about the concept can be accomplished because of publicly, conventionally agreed upon rules and the fact that similarities exist between different games. The word "game" will mean something very different in a hockey rink as opposed to a video game store, nevertheless the word is still meaningful in both instances.

One could argue that one could find similarities and differences between a seemingly infinite number of different things or concepts. A physical object like a book and the act of skydiving might have some similarities – is there a book-skydiving language-game? How is this approach helpful to determine what can meaningfully be said?

However, this counterargument misrepresents Wittgenstein's position – he is not merely looking for overlapping characteristics between two things. For Wittgenstein, "language-games points at the rule-governed character of language. This does not entail strict and definite systems of rules for each and every language-game, but points to the conventional nature of this sort of human activity" [5]. The meaning of language is socially, culturally, and context dependent. Wittgenstein is arguing that for communication about "games" to be meaningful, *all that is required* is for some games to share characteristics with others [6].

Communications involving IL can be treated as a type of language-game, where librarians and instructors might have different "rules" for how information plays a role within a course or discipline. Difficulty in communication between librarians and instructors stem from a lack of awareness about the various factors that imbue the words "information" or "information literacy" with meaning in a specific context. The following sections will highlight some of these "rules." This paper will then argue that more meaningful communication can occur between librarians and instructors when dialogue, and the IL language-game, revolves around student learning.

3   Librarian Perspectives on IL

The concept of IL lends itself towards being treated as a language-game, where the historical and cultural context of the phrase is required to understand what it means. Historically, no single characteristic or set of characteristics can encompass this complex concept, akin to the concept of "games." In examining the rules of the IL language-game academic librarianship participates in, we will find that such rules have been changing since the concept of IL was created.

Zurkowski is credited with coining the term "information literacy" in a 1974 report where he stated "People trained in the application of information resources to their work

can be called information literates. They have learned techniques and skills for utilizing the wide range of information tools as well as primary sources in molding information solutions to their problems" [7, p. 6]. The quote points to the rules of IL dialogue involving skills and primary sources to solve problems. Interestingly, Whitworth interprets Zurkowski's position as "one of *economic pragmatism*, wholly situated within a US context" [8, p. 32]. Given that Zurkowski discusses "private sector initiatives" [7, p. 26], "economic goods" [7, p. 12], and "pricing strategy" [7, p. 13], this appears to be a fair assessment. And so IL was viewed in relation to economics as well. Contrast this with Weiner's work from 2014, which ties IL to the workplace and economic well-being, but also to "educational success; workplace readiness; lifelong learning; an informed citizenry; and a competitive workforce" [9, p. 5]. The concept of lifelong learning, for instance, is nowhere to be found in Zurkowski's treatment of IL. The theme of this section is one of an historically expanding conception of IL – indicating that the rules of the intra-librarian IL-language game change over time.

The importance of pedagogy and learning to IL in contemporary discussions about IL is significant. For instance, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) uses the roughly equivalent phrase "media and information literacy" (MIL) and has published MIL curriculums for teachers in 2011, and an assessment framework in 2013 [10, 11]. The scope of IL has also broadened over time – evidenced by large, influential organizations like UNESCO combining the concepts of media and IL.

The fluid nature of IL is also reflected in the many attempts to create IL models and frameworks by various library organizations in the United States, Europe, and Australia. The Association of College and Research Libraries (ACRL), Society of College, National and University Libraries (SCONUL), and Australian and New Zealand Institute for Information Literacy (ANZIIL) each have IL frameworks or standards. In 1999, SCONUL described seven "Pillars" of IL, in 2000 the ACRL described five standards of IL, and in 2001 ANZIIL developed an additional standard from ACRL's list for a total of six standards. These have all since been revised or supplemented. ANZIIL created a second edition of their framework in 2004. SCONUL updated their model in 2011, citing "it was felt that the model needed to be updated and expanded to reflect more clearly *the range of different terminologies and concepts* which we now understand as "Information Literacy" (emphasis added) [12, p. 2]. ACRL created a new framework for IL utilizing threshold concepts which was formally adopted in 2016, citing "information literacy as an educational reform movement will realize its potential only through a richer, more complex set of core ideas" [13. p. 2]. The rules for intra-librarian dialogue concerning IL have continued to evolve for decades, including what can meaningfully be associated with the term, how library organizations use the term, and even how international bodies like UNESCO relate IL to student learning.

There is obviously meaningful communication between librarians, even given the shifting rules for the IL language-games librarians play. Yet, this fact can hinder librarian-instructor discourse. Firstly, there is no single example that can completely elucidate the concept of IL for all disciplines. No checklist or single example exemplifies the information literate person or the information literacy experience. Just as an avid

soccer fan can learn the rules of hockey because of the rough similarity of the games -
both include offside and scoring by putting an object in a net, so can one IL scholar
discuss IL with a scholar from a different school of thought. However, transitioning from
knowing soccer to learning backgammon is an altogether different experience. This is
more akin to the librarian communicating about IL with someone outside the library,
information, and archival science field.

Secondly, librarians can consider innumerable factors like ethical, pedagogical, and
even political elements, amongst others, when discussing IL. To communicate so many
facets with a subject matter expert is difficult. Even a straightforward, procedural, stand-
ards-based approach to IL might include complex concepts like determining the extent
of an information need for a civil engineering project or evaluating the legitimacy of
grey literature for medical research – both of which include important professional and
ethical considerations of information use.

In sum, meaningful dialogue between librarians and instructors cannot take place
solely within the librarian's IL language-game. IL theory and expertise is not enough to
embed IL into the curriculum to support student learning. The common ground sought
after to embed IL meaningfully into curricula, in support of student learning, must take
into account the disciplinary context of the instructor one is working with. Many librar-
ians will recognize this fact – given that we are not working with experts in library,
information, and archival science, we cannot expect a communications professor to
perceive or experience IL in the same way as we do. Approaching such dialogue through
the lens of a Wittgensteinian language-game helps librarians determine what the rules
for a disciplinary IL language-game are, thereby helping the librarian build a common
ground for more meaningful IL discussion.

4   Two IL Language-Games: Librarian-Instructor Dialogue

This section will discuss two case studies highlighting the difficulty librarians and
instructors face in attempting to communicate to the other party. Specifically, we will
discuss how a librarian and teacher can play a different IL language-game, why a
librarian-centric IL language-game can be detrimental to the goal of communicating
about IL, as well as the benefits of using a language-game approach.

First, some context about these examples. The following interactions originate from
Faculty Learning Community meetings in Purdue's IMPACT (Instruction Matters:
Purdue Academic Course Transformation) program. IMPACT is a course re-design and
faculty development program where large, foundational courses are re-designed with
the aim to create more student-centered teaching and learning environments. This is a
program which puts three instructors from various disciplines together in teams with
librarians, instructional developers, and educational technologists (usually teams of six)
over the course of thirteen weeks through a modified backwards design process.

4.1   Case Study #1: Semantic Issues

A librarian was directing an IMPACT Faculty Learning Community classroom session, tasking instructors to reflect about how information or data could be used more intentionally in their course in support of student learning. The phrases "student interaction with data" and "interaction with information" was used by the librarian, carefully choosing the word "interact" to indicate a broad range of possible ways students could work with or use data for a learning activity. The librarian had experienced various ways instructors used information to facilitate student learning ranging from nursing students using publicly available government datasets to non-STEM students critically evaluating statistics in media like newspapers. The word "interaction" was also thought to be a benign, value-neutral word by the librarian. The goal of the exercise and of the wording was to provide teachers a chance to reflect on how information could be used more intentionally to learn.

However, the librarian's wording undermined his goal. An instructor familiar with machine learning found a semantic issue with the phrase "student interaction with data" and was subsequently confused about the meaning of the phrase and of the activity. In machine learning, information is restructured data and the word "interact" implied, for the teacher, not a restructuring of data but of an unwarranted, improper relationship between student and data [14]. The word "interact" to the instructor meant something different than what the librarian intended. In other words, the librarian and instructor were not playing the same IL language-game – the rules for the game were different for each person. The librarian played a library-centric IL language game, and so failed to communicate meaningfully with the instructor about IL. Librarian-instructor communication devolved into semantics – missing the learning goal of the activity and failing to embed IL thoughtfully into the curricula of this particular course.

This activity could have been successful had the librarian been more cognizant of the IL language-game the instructor was playing – specifically focusing such communication around student learning as opposed to the vague concept of "data." This opened a Pandora's box where instructors from various disciplines could interpret the words in multiple ways. This led to a guessing game from the instructor, who rightfully could have thought something like: 'What does the librarian mean by "data"? The context he is using it in does not make sense to me.' The learning activity could have involved discussing more specifically how students learn subject content in the class – and *then* assign instructors to identify (in their own words) how students use, analyze, experience, information or data in their course in support of student learning.

A fair counterpoint might claim that if IL language-games focus around learning, it would be more accurate to say that librarians and teachers are playing a learning language-game. But this is not accurate. The end goal is to find common ground to talk about IL, and instead of talking about how information enables learning, more meaningful communication can come about through talking about learning first, and then drawing out how information plays a role in such learning. In discussing learning, a librarian can better understand the rules of the IL language-game a teacher is playing. In framing IL discussions around student learning first, instructors can better see the relevance of IL in their class.

In this case, the rules surrounding how to correctly use "data" and "information" were stricter for the instructor than the librarian, given the subject expertise of the instructor. Where the librarian felt there was overlap (as between chess and basketball to use an earlier analogy), the instructor felt there was none. Accordingly, miscommunication resulted. Even if such a disagreement is semantic, it still inhibited the librarian's goal of embedding IL into the curricula of the specific class.

4.2   Case Study #2: IL as Personal Financial Literacy

Let us now discuss a successful example of this IL language-game approach for an instructor of a Production Cost Analysis course who also participated in the IMPACT program. This instructor's main concern for his course re-design was to make the course more relevant and interesting for students. The instructor wanted to include more interactive pedagogies to accomplish this, such as open-ended questions to encourage discussion and peer instruction.

However, given the backwards design structure of IMPACT, the instructor was required first to evaluate his learning goals and a librarian worked extensively with the instructor on this project. A few examples of his original goals included: "Use present worth analysis to evaluate alternatives" and "Calculate a project's breakeven rate of return." In discussions throughout IMPACT, including those with a librarian, the instructor decided to revise his previous goals as well as craft new goals. The instructor believed that if students could understand how the concepts of the class could impact their daily lives (like student loan repayment, and credit card interest rates.) students would be more motivated to learn. Therefore, one new learning goal was "Apply economic analysis concepts to personal finance situations."

This was done without discussion about IL – yet it will contribute significantly towards embedding IL into the course. Assuming pedagogical alignment between learning goals, assessments, and learning activities, the IL aspect of the learning goal will be embedded into course assessment and learning activities. In short, students will use personal financial information involving their student loans and car payments in more intentional ways to learn subject content like breakeven rate or rate of return. This was accomplished all while addressing the instructor's main concern of making his class more relevant and interesting.

This was realized by centering discussion on student learning. This made whatever was discussed, including more intentional engagement with information, as relevant to the learning goals of the class. Additionally, the librarian was able to determine the type of IL language-game the instructor played in discussions about what the instructor wanted his students to know, do, and value as a result of his course. In this instance, the rules for meaningful dialogue about information and IL roughly equated to personal financial literacy. A more library-centric, or librarian IL language-game would have likely not resonated with the instructor. Discussing how students could pass through the threshold concept of "authority is constructed" was unlikely to be meaningful with an instructor who generally equated information, in the context of this class, to personal financial information. Nevertheless, now students could be tasked with justifying the legitimacy of the information they use to support their claims. The common ground for

a meaningful dialogue was found and IL was successfully embedded into a curriculum by first identifying the IL language-game an instructor played, highlighting the rules for meaningful communication about IL. By being able to discuss IL meaningfully in relation to the kind of learning the instructor wanted, the librarian accomplished his goal of embedding IL at the curricular level.

5   Guiding Questions for Meaningful Dialogue

Three specific, though non-exhaustive questions may guide librarians in utilizing this IL language-game framework. The following are not meant to provide the only way to determine the implicit and explicit rules a teacher abides by in discussing IL concepts. Rather, the intent is to display one method to achieve this goal and explain the reasoning behind such an approach. More important than the specific questions themselves are the types of questions and their logical progression, first identifying the teacher's learning goals, next discussing the instructor's perspective on IL in relation to student learning, and then finally bridging the gap between the librarian's IL language-game and the instructor's. The questions are:

1. What do you want students to know, do, or value as a result of your class?
2. How do students use or engage with information in your class to accomplish learning goals?
3. Should student engagement with information be distinct from or integrated with course content?

Let us discuss the questions in turn. The most important aspect of question #1 is that it does not ask or mention in any way "information" or IL. The goal here is for the librarian to determine how information supports or facilitates student learning *as defined by the teacher*. A librarian and instructor might very well be playing different language-games, and so what a librarian might consider to be IL, an instructor might not. Accordingly, it is better for a librarian to strategically listen to how an instructor discusses student learning and then assess how students engage with information to learn. It is plausible for an instructor to be blind to what a librarian would consider to be a significant IL element such as an affective component like valuing critical information use [15].

The teacher's answer to the first question should provide enough context for a librarian to ask the second question and offer a specific example the teacher has already mentioned to help clarify. For instance, after asking the second question, a librarian could follow up with an example involving a summative project the instructor mentioned. While this project may or may not involve the gathering of supporting evidence, many do. This could lead to a discussion about the value of vetting information, or the ability of students to find and use reputable information. This is an attempt to build a common ground between teacher and librarian, to align the two language-games about information being played. Note, the point is not to draw out all or most IL elements within a course, assignment, assessment, or learning activity, but to identify and discuss one IL element *strategically*. There may be many cultural, contextual, or even administrative elements at play in librarian discussion with teachers about student

learning and IL, and so it is important to be deliberate in choosing a student learning goal or activity that has potential to build a bridge between a librarian's understanding of IL, and an instructor's.

The third question's purpose is to determine if the instructor perceives meaningful overlap between the disciplinary content of her class and aspects of IL. If not, then more discussion concerning the second question might be necessary. If so, there is some assurance that the librarian and instructor are playing the same, or similar, IL language-game. Now, a librarian can have productive communications about IL in light of student learning. The librarian can ask how more creative, intentional, or reflective engagement with information can yield greater student learning [2]. Perhaps students are asked to interact with a wide swath of data but are given little guidance about it. A librarian could argue that just as students cannot be expected to participate in team-based learning without practice and guidance about functioning in teams, so too students cannot effectively engage with information and data without intentional instruction and practice [16]. The much sought after common ground between instructor and librarian is reached if the instructor views student engagement with information as integrated into student learning of subject content. In terms of embedding IL into curricula, this is where productive librarian-instructor dialogue lives.

6   Conclusion

Communicating with instructors about IL is an important and worthwhile challenge for many librarians. This paper has approached this issue of communication through the framework of Wittgensteinian language-games, where the rules for meaningful communication are determined by various cultural, conventional, and disciplinary factors that librarians can discover through deliberate questioning. If librarians can understand such rules and the IL-language games teachers play, librarian-teacher dialogue can be improved, facilitating embedding IL meaningfully into curricula in support of student learning.

References

1. Booth, C., Lowe, M.S., Tagge, N., Stone, S.M.: Degrees of impact: analyzing the effects of progressive librarian course collaborations on student performance. Coll. Res. Libr. **76**(5), 623–651 (2015)
2. Bruce, C.S.: Informed Learning. American Library Association, Chicago (2008)
3. Head, A.J., Eisenberg, M.: Truth be told: how college students evaluate and use information in the digital age. Project Information Literacy Research Report, University of Washington's Information School (2010)
4. Wittgenstein, L., Anscombe, G.E.M. (trans.), Hacker, P.M.S. (trans., ed.), Schulte, J. (trans., ed.): Philosophische Untersuchungen (English). Wiley, Malden (2009)
5. Biletzki, A., Matar, A., Zalta, E.N. (eds.): Ludwig Wittgenstein. In: The Stanford Encyclopedia of Philosophy (2014). http://plato.stanford.edu/archives/spr2014/entries/wittgenstein/
6. Allen, R., Turvey, M. (eds.): Wittgenstein Theory and the Arts. Routledge, London (2001)

7. Zurkowski, P.G.: The Information Service Environment Relationships and Priorities. Related Paper No. 5. National Commission on Libraries and Information Science, Washington (1974)
8. Whitworth, A.: Radical Information Literacy: Reclaiming the Political Heart of the Il Movement. Chandos, London (2014)
9. Weiner, S.: Who Teaches Information Literacy Competencies? Report of a Study of Faculty. College Teaching, pp. 5–12 (2014)
10. Wilson, C., Grizzle, A., Tuazon, R., Akyempong, K., Cheung, C.: Media and Information Literacy Curriculum for Teachers. United Nations Educational Scientific and Cultural Organization, Paris (2011)
11. Kasinskaite-Buddeberg, I., Boade, G., Grizzle, A. (eds.): Global Media and Information Literacy Assessment Framework: Country Readiness and Competencies. United Nations Educational Scientific and Cultural Organization, Paris (2013)
12. SCONUL Working Group on Information Literacy: The SCONUL Seven Pillars of Information Literacy: Core Model. Society of College, National and University Libraries (2011)
13. Association of college and research libraries: framework for information literacy in higher education. Association of College and Research Libraries (2015)
14. Thomson, R., Lebiere, C., Bennati, S.: Human, model and machine: a complementary approach to big data. In: HCBDR 2014 Proceedings of the 2014 Workshop on Human Centered Big Data Research, pp. 27–31. ACM, New York (2014)
15. Krathwohl, D.R., Bloom, B.S., Masia, B.B.: Taxonomy of Educational Objectives: the Classification of Educational Goals. Handbook II, the Affective Domain. David McKay Company, New York (1956)
16. Michaelsen, L.K., Knight, A.B., Fink, L.D. (eds.): Team-Based Learning: A Transformative Use of Small Groups in College Teaching. Stylus, Sterling (2004)

Motivating Learners Through Information Literacy

Clarence Maybee[✉] and Michael Flierl

Purdue University, Libraries, West Lafayette, IN, USA
{cmaybee,mflierl}@purdue.edu

Abstract. This paper introduces a model for creating information literacy learning activities that motivate students. The model draws from informed learning, an approach to information literacy that emphasizes the role that information plays in fostering learning about a subject. Self-determination theory, a motivational theory that focuses on enabling self-determined learners, is applied within the informed learning framework. The results of the investigation outline characteristics of motivating learning activities that enable learning subject content through engagement with information. The model is intended to be used by librarians when working with classroom teachers to foster greater student learning gains through creative and reflective engagement with information.

Keywords: Informed learning · Self-determination theory · Student motivation

1   Introduction

Information literacy is but one of many educational ideas that higher education teachers are asked to consider addressing in their courses. Student motivation is often considered important for enabling learners to succeed in higher education. This paper introduces a model for creating information literacy learning activities that motivate students. The model is intended to be used by librarians when working with classroom teachers to foster greater student learning gains through creative and reflective engagement with information. Informed learning, an approach to information literacy that emphasizes the role that information plays in fostering learning about a subject, provides the foundation for the model [1]. Self-determination theory, a motivational theory that focuses on enabling self-determined learners [2], is applied within the informed learning framework. The results of the investigation outline characteristics of motivating learning activities that enable learning subject content through engagement with information. To illustrate how these characteristics play out in higher education classrooms, examples are provided of motivating informed learning activities designed by two teachers in consultation with one of the authors.

2   Information Literacy and Motivation

Scholars have recognized that there is a relationship between student motivation and the attainment of information literacy skills. Motivation has been shown to be related to

information literacy self-efficacy [3], and perceived competence, an aspect of motivation, has been associated with an internalized interest in research [4] and better performance on information literacy skills tests [5]. Select motivational concepts and models have been used to suggest ways of creating information literacy instruction that motivates students to learn information skills, such as search techniques, evaluation of sources, and so forth [6–8]. There is a key difference between earlier studies focused on the role of motivation in the attainment of information literacy skills, and our investigation. Our work examines the role of motivation in designing activities in which learning to use information is directed towards understanding subject content. Using an approach called informed learning [1] (described in the following section), our investigation is focused on identifying the characteristics of motivating activities that enable learning subject content through engagement with information.

3 Informed Learning

Informed learning is an approach to information literacy that emphasizes *learning* as an outcome of engaging with information [1]. Informed learning suggests that using information in the context of learning in the classroom is more likely to prepare students to successfully engage with information in other learning contexts, such as their future work, personal, and civic lives. It is grounded in the findings from several studies examining teachers and students' experiences of information literacy. These studies reveal that when learners engage with information to learn about a disciplinary subject, they tend to use information with more versatility and complexity [9–12]. For example, the findings from a study examining informed learning lessons in an undergraduate course suggest that content-focused learning outcomes are influenced by the way learners use information. Rather than students searching for evidence to support pre-existing or instructor-identified views of a topic, the teacher tasked students to learn about language and gender issues by tracing the evolution of their chosen topic [13]. This approached went beyond students only using information to justify a position, but instead allowed students to *learn* subject matter (language and gender issues), *through* intentional engagement with information.

There are several characteristics associated with informed learning [14]. One characteristic is that designing for informed learning is a shared responsibility amongst teachers with disciplinary knowledge and librarians, who have expertise regarding how students engage with information. Like other contemporary approaches for designing learning environments, informed learning tends to employ active learning techniques, such as independent learning, problem-solving, and evidence-based practice. Informed learning typically has students use information as they would in a real-life setting; thus students tend to be engaging in academic and professional information practices.

From an informed learning perspective, information could be anything considered to be informing [1]. For example, students in an environmental engineering course used the demographic data for various cities to determine the impact of environmental issues occurring in those cities. A introductory technology course had students conduct in-person interviews with people on campus, to identify potential problems, such as traffic

hazards, lack of recycling, and so forth, for which they then explored technological solutions. In an informed learning approach, the information needed is determined by what students are learning in the course. While students may use select databases provided by the campus library, they may also need to critically engage with information outside of the library, like blogs, interview data, and so forth.

Three principles guide informed learning: (1) learning should build on students' prior experiences, (2) students must learn new things about using information and subject content, and (3) they should learn about using information and subject content at the same time [14]. These principles may be used to design informed learning activities. Recognizing that the learning activities that take place in a class session need to contribute to the overarching learning goals for the course, teachers designing informed learning activies must determine:

1. what students should know or be able to do regarding subject content, and
2. how students need to use information to learn about the subject content (beyond what they already know how to do).

The key challenge for teachers and librarians in creating informed learning activities is to first consider what students should learn about a subject and then determine in what ways students need to engage with information in order to learn as intended [13]. While still addressing the principles of informed learning, specific details of how students actively engage in gathering, analyzing and applying information to learn may vary in different instructional situations. As with any instruction, the choices a teacher makes in the design of activities can influence student motivation for informed learning.

4   Self-determination Theory

Thoughtfully crafted learning activities can produce little learning without students who are engaged and motivated. Learning activities are rarely done out of intrinsic motivation, so the key is to focus on making extrinsic motivation more self-directed, and thereby more motivating. Self-determination theory focuses on how extrinsic motivation can motivate students to learn [2]. In other words – how can students *internalize* extrinsic learning goals developed by the instructor and move further away from amotivation (lack of motivation) and closer to intrinsic motivation? This is particularly challenging because extrinsic motivation can yield both non-self-determined and self-determined behavior. Thus, it can enable or retard efforts to create a learning environment where students are motivated.

Similar to informed learning [1], self-determination theory emphasizes the agency of learners [2]. Accordingly, another way to ask our previous question about internalizing extrinsic learning goals is the following: how can students take ownership over their own learning? As outlined in Fig. 1, to become more self-determined and motivated, learners need to avoid feeling as if their actions are controlled (external regulation) or performed to avoid feeling guilty or anxious (introjection). Rather, if learners can identify the personal importance of an action (identification) or internalize the reasons

for an action (integrated regulation), then learners will feel more volitional and motivated to learn.

NON-SELF DETERMINED   **SELF DETERMINED**

Amotivation   External   Introjection   Identification   Integrated   Intrinsic
               Regulation   Regulation   Motivation

INCREASING SELF-DETERMINATION
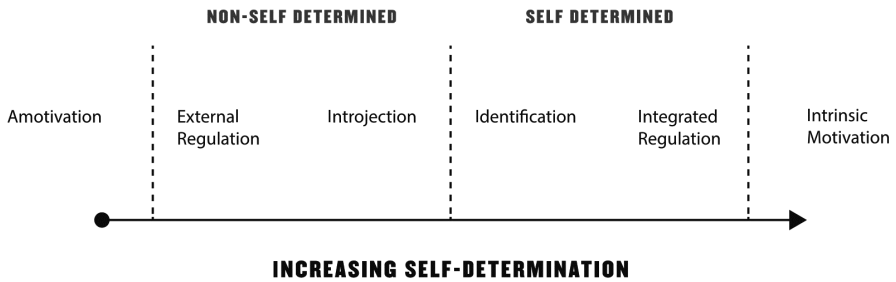
Fig. 1. Role of motivation in increasing self-determination (Source: IMPACT Annual Report 2015, Part 1 & 2, p. 6 – http://docs.lib.purdue.edu/impactreps/6/)

Self-determination theory suggests that intrinsically motivated activities satisfy three basic and interrelated psychological needs: autonomy, competence, and relatedness. Learning environments which support these psychological needs have positive effects on student dedication, engagement [15], and achievement [16]. Crafting teaching and learning environments that facilitate students moving closer to self-determined behavior (and away from amotivation) requires focusing on these three psychological needs [2]. Autonomy is defined as feelings of volition and choice within a structure, where students "feel that actions emanate from themselves" [2, 17]. Relatedness is defined as a sense of belongingness and connection to others, such as fellow students and the instructor, as well as to the subject content. Competence is defined as feeling able to understand content and having the relevant skills to succeed. In short, students are more likely to adopt and internalize learning goals, and therefore become more self-directed and motivated, if they feel:

- autonomous (volitional over what they do),
- related (related to others and the subject content), and
- competent (able to succeed) [2].

5   Methods

The purpose of our work is to develop a model for designing motivating information literacy activities that simultaneously enable the learning of subject content. The questions guiding our exploration are: (1) what are the characteristics of motivating information literacy activities that enable the learning of subject content? and (2) what are considerations when designing motivating information literacy activities that enable the learning of subject content? After reviewing the literature, informed learning was selected as an approach to information literacy that emphasizes learning as an outcome of engaging with information [1]. Self-determination theory, which has been used to explain the role of autonomy, relatedness and competency in educational settings [2], was selected to define the characteristics of motivating learning environments. Although

underpinned by different learning theories, the variation theory of learning for informed learning and constructivism for self-determination theory, aspects of the two frameworks can be drawn together to inform the characteristics and design of motivating information literacy activities that enable learning subject content. For example, both theories give priority of learning agency to the learner, as opposed to the instructor. Described in the following section, the development of the new model involved determining how the concepts of autonomy, relatedness and competency would support an informed learning environment.

6   Designing Motivating Informed Learning Activities

In designing informed learning activities, teacher intentions concerning what students should learn about the subject, as well as how they will use information should be identified before considerations of student motivation. Creating motivating informed learning activities requires considering the psychological needs of autonomy, competence, and relatedness [2]. Students need to perceive that they have meaningful choices, feel connected, and are capable of successfully engaging with information to learn from the activities. When these needs are met, students will feel less coerced and more self-directed within the informed learning framework. In other words, it is more likely that students will be motivated to use information intentionally to learn.

Self-determination theory emphasizes the importance of instructors crafting learning activities which allow students to internalize learning goals and feel volitional about their own learning [2]. In many university courses, students are given little guidance concerning how to use information when completing college-level assignments [18]. Students' perception that they have too many (or too few) choices, may be detrimental to their engaging with information to learn. For example, if students in a writing and rhetoric course with no background knowledge in the subject are told they may select any discourse community to research for their final paper, they may not know how to make a relevant selection [19]. In this case, too many choices may also impact their perceptions of how competent they are to complete the task.

Students must also perceive their relatedness to the materials and teacher and students involved in their experience of using information to complete coursework. If a student is not interested in a topic, or sees no reason that they need to know about the topic, they will be less motivated to learn. This is equally true of students learning to use information in new ways, who may feel that their current information practices learned in high school or previous university courses will suffice. Additionally, students need to feel competent that they will be able to complete the learning activities required of them that involve engaging with information. While locating information on a given topic is typically not a problem for students, using it in ways necessary for completing college-level work has been shown to be challenging [19]. This highlights the need to scaffold learning experiences for students involving new types or novel engagement with information – supporting student perceptions of confidence and competence.

Designing informed learning activities that are motivating involves determining how to address the three basic psychological needs of autonomy, relatedness and competency

as they relate to (1) learning subject content (2) through engagement with information. The specific information sources and the ways information may be used to learn about the topic can vary within a given learning situation. Using the framework outlined in Table 1, librarians and teachers can work together to identify specific ways of using information to foster the learning of subject content. Then, they can design activities for enabling this type of learning that are supportive of learners' perceptions of the three basic psychological needs within the learning environment.

Table 1. Relating self-determination theory to informed learning

Informed learning	Self-determination theory		
	Autonomy	Relatedness	Competency
Subject content learning	Student perceives choices in what they learn	Student feels connected to the subject content and/or peers/instructor	Student feels capable of learning subject content
Engagement with information, e.g., academic, disciplinary, or professional information practices	Student perceives options in how they use information to learn	Student feels connected to students, instructor, and/or subject material through intentional engagement with information	Student feels capable of using information in the way needed to learn

Adopting an informed learning approach, the teacher of the first-year writing and rhetoric course in which students lacked motivation to write a paper would start by determining specifically what the students were intended to learn about course content, such as being able to identify the "characteristics" of a specific discourse community. The librarian and teacher could then determine how the students needed to engage with information to learn about the characteristics of a discourse community, as well as strategies for investigating one. The teacher might have students reflect on what discourse communities they are aware of on campus, elements of discourse communities they have discussed in class, and then work with them to identify questions they have about a specific discourse community on campus. This set of activities, or something similar, may provide the students with enough structure, yet also offer them the ability to make meaningful choices about what they want to learn.

Informed learning suggests that students learn information practices that may be relevant to their lives outside college [14]. Doing so may foster student perception of a stronger connection to course content and fellow students. For example, the instructor of an environmental studies course could have students compose blog posts or podcasts to share issues about which the students feel passionate. Working together in groups to gather and explore information on an issue, such as global warming or electronic waste, may further build feelings of relatedness as the course content moves beyond something one must memorize to something that could affect change in the world. Students must also feel competent to use information in the ways required of them in college. Minimally, the teacher could provide more guidance about the types of sources and how to

use them to complete an assignment. However, it is important that students get practice and feedback about using information to learn in the way intended in the class. An example can be drawn from the teacher of the course mentioned previously, that aimed to have her students understand a language and gender topic by tracing its evolution through scholarly discourse [13]. This teacher dedicated one class session to a "thesis workshop," in which the students peer-critiqued one another's thesis statements to determine if the statements reflected an insight based on the student's analysis of research articles revealing how the topic evolved over time.

There is a great deal of variability in constructing activities where students feel volitional about how and what they learn, related to others and the subject content, and competent to complete the learning tasks. Determining the right informed learning activities may often require trying new class activities, gathering feedback from students, and revising the activities until the desired result is achieved. The following sub-sections provide examples describing how two teachers developed motivating informed learning activities. Although very different from each other, the activities address specific motivational needs within the learning context of each course.

6.1   Statistical Literacy on Social Media (Example 1)

The first example of motivating informed learning activities is drawn from a large, introductory-level statistical literacy course with over 400 students. Each semester, three sections of the course are offered: traditional (lecture) (over 300 students), online (approximately 80 students), and flipped (approximately 60 students). The goal of the course is to teach the students to become informed consumers of statistics and to understand how statistics are used in their daily lives. Aligned with the learning goal of being able to understand statistical concepts, each student shares a popular news source in a Facebook-like social media platform and makes a post evaluating the veracity of research studies described in the news item. The teacher and other students in the class post comments with feedback for the original poster to consider. Examples may include suggesting lurking variables that have not been considered, or the appropriateness of the sample population for answering the research question. This is an example of informed learning, because the students are learning about statistical concepts (subject content) by applying them in a practical way (engagement with information) that may be applicable in their personal lives.

As outlined in Table 2, the teacher's design for the activities supports students' feelings of volition by allowing them to investigate any topic, so long as they could locate a news article or video on that topic which described a research study. Within these parameters students were able to explore a wide range of topics, such as breast cancer or the health effects of eating chocolate. While providing a structure for the students to give one another constructive feedback, the familiarity of communicating through a social media platform may support the students' perceptions of competency. Perhaps more importantly in a large class, where it may be difficult for students to feel connected to the teacher and their fellow students, the social media platform provides a space for students to relate to one another and their common struggle to grasp the concepts being introduced in class. A survey of the students in the class conducted in 2013 (response

rate of 96.2%, n = 405) suggests that although the learning activities provide a positive experience for the students, their search strategies tended to focus on finding news sources that report on a research study [20]. That is to say, the students search news resources for terms like, "research studies" or "experiment," (53.2%), rather than exploring an interesting topic. After learning this, the teacher decided to place more emphasis on students being able to find a topic of interest, which may increase students' perceptions of autonomy and relatedness to the content when engaged in this learning activity.

Table 2. Motivational elements of informed learning activities in a statistics course

Informed learning	Self-determination theory		
	Autonomy	Relatedness	Competency
Subject content learning	Students have choices in demonstrating proficiency of statistical concepts	Teacher and students discuss statistical concepts Students learn about self-selected topics of interest	Statistical concepts learned previously in class Teacher and students provide feedback to one another regarding statistical concepts
Engagement with information, e.g., academic, disciplinary, or professional information practices	Students select news article on any topic that reports on statistics from a research study Students have choices in how they apply statistical concepts	Students provide feedback to one another about application of statistical concepts Teacher provides feedback to students about application of statistical concepts	Students apply statistical concepts learned previously in class Students are familiar with information sources, e.g., news blogs, videos etc. Students are familiar with social media platforms

6.2 Biology that Matters (Example 2)

The second example is from a introductory biology course with 50 students, which uses a peer-led team learning approach in which students complete homework tasks individually, then discuss problematic aspects of the homework in small groups of four students that then share their consensus answers in class. In this course, the teacher had previously assigned homework tasks that included students learning to find biological information, and analyze research articles to understand how biologists answer questions relevant to the field. However, the teacher felt that the students were not motivated to complete these exercises. Drawing from the six frames of information literacy model [21] that is part of the informed learning framework [1], the teacher decided to adopt an approach that enabled the students to perceive personal relevance in relation to what they learned. While still having the students complete the information-related homework tasks, the teacher first had them identify a topic that was meaningful to them personally. When completing homework assignments that involve gathering and analyzing

biological information, the students focused their efforts so that they were simultaneously learning about their topic. Outlined in Table 3, the team interactions that are part of peer-led team learning encourage perceptions of relatedness. However, allowing students to choose a topic with personal meaning fosters volition through relatedness to the subject content, as well as through perceptions of autonomy that result from being able to make purposeful choices related to learning. The topics students chose were wide ranging, with one student investigating alcoholism to better understand a relative with that disease, and another exploring herbal medicine, saying that he had always wanted to know more about it. After modifying the activity to have the students select a personal topic, the teacher was satisfied with the level of student engagement in the information literacy-focused homework assignments.

Table 3. Motivational elements of informed learning activities in a biology course

Informed learning	Self-determination theory		
	Autonomy	Relatedness	Competency
Subject content learning	Students have choices in applying subject content learning to inform a personal interest	Students relate subject content to personal interests. Small groups of students discuss biological concepts and theories	Course builds on the content learned during the 1st course in the sequence
Engagement with information, e.g., academic, disciplinary, or professional information practices	Students have choices in selecting a topic that can be explored from a biological perspective	Students provide feedback to one another about using biological information. Teacher provides feedback about using biological information	Homework tasks are scaffolded across the semester. Team members and teacher provide feedback

7   Conclusion

Considerations of autonomy, competence, and relatedness have a role to play in designing informed learning activities. The proposed model demonstrates how librarians can collaborate with instructors to craft motivating learning experiences for students that enable the learning of subject content through intentional engagement with information. The next phase of this work will involve conducting classroom research to study informed learning activities that have been designed to support student self-determination in various educational contexts.

References

1. Bruce, C.S.: Informed Learning. American Library Association, Chicago (2008)
2. Ryan, R.M., Deci, E.L.: Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. Cont. Edu. Psy. **25**, 54–67 (2000)

3. Ross, M., Perkins, H., Bodley, K.: Academic motivation and information literacy self-efficacy: the importance of a simple desire to know. Lib. Info. Sci. Res. **38**, 2–9 (2016)

4. Arnone, M., Reynolds, R., Marshall, T.: The effect of early adolescent's psychological needs satisfaction upon their perceived competence in information skills and intrinsic motivation for research. Sch. Lib. Worldwide **15**, 115–134 (2009)

5. Reynolds, R., Arnone, M., Marshall, T.: Perceived competence and reading enjoyment as contributors to information skills and digital technology knowledge. Proc. Am. Soc. Info. Sci. Tech. **46**(1), 1–26 (2009)

6. Jacobson, T., Xu, L.: Motivating students in credit-based information literacy courses: theories and practice. Portal Lib. Acad. **2**, 423–441 (2002)

7. Jacobson, T., Xu, L.: Motivating Students in Information Literacy Classes. Neal-Schuman, New York (2004)

8. Small, R.V., Zakaria, N., El-Figuigui, H.: Motivational aspects of information literacy skills instruction in community college libraries. Coll. Res. Lib. **65**, 96–121 (2004)

9. Limberg, L.: Experiencing information seeking and learning: a study of the interaction between two phenomena. Inf. Res. **5**(1), 1–5 (1999)

10. Lupton, M.: The Learning Connection: Information Literacy and the Student Experience. Auslib Press, Adelaide (2004)

11. Lupton, M.: Information Literacy and Learning. Auslib Press, Adelaide (2008)

12. Maybee, C.: Undergraduate perceptions of information use: the basis for creating user-centered student information literacy instruction. J. Acad. Lib. **32**, 79–85 (2006)

13. Maybee, C., Bruce, C.S., Lupton, M., Rebmann, K.: Designing Rich Information Experiences to Shape Learning Outcomes. St. in Hi. Ed. (in-press)

14. Bruce, C.S., Hughes, H.: Informed learning: a pedagogical construct for information literacy. Lib. Info. Sci. Res. **32**, A2–A8 (2010)

15. Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K.M., Deci, E.L.: Motivating learning, performance, and persistence: the synergistic effects of intrinsic goal contents and autonomy-supportive contexts. J. Per. Soc. Psy. **87**, 246–260 (2004)

16. Boggiano, A.K., Flink, C., Shields, A., Seelbach, A., Barrett, M.: Use of techniques promoting students' self-determination: effects on students' analytic problem-solving skills. Motiv. Emot. **17**, 319–336 (1993)

17. de Charms, R.: Personal Causation: The Internal Affective Determinants of Behavior. Academy Press, New York (1968)

18. Head, A.J., Eisenberg, M.: Assigning Inquiry: How Handouts for Research Assignments Guide Today's College Students. Project Information Literacy Research Report, University of Washington's Information School (2010)

19. Head, A.J., Eisenberg, M.: Truth be Told: How College Students Evaluate and Use Information in the Digital Age. Project Information Literacy Research Report, University of Washington's Information School (2010)

20. Gundlach, E., Maybee, C., O'Shea, K.: Statistical literacy social media project for the masses. J. Fac. Dev. **29**, 71–80 (2015)

21. Bruce, C.S., Edwards, S.L., Lupton, M.: Six Frames for Information Literacy Education: A Conceptual Framework for Interpreting the Relationships Between Theory and Practice. ITALICS **51**, 1–18 (2006)

Mastering Information and Teaching Controversies: An Exploratory Study

Orélie Desfriches Doria[1(✉)] and Madjid Ihadjadène[2]

[1] Laboratoire Elico, Université de Lyon, Lyon, France
`orelie.desfriches-doria@univ-lyon3.fr`
[2] Laboratoire Paragraphe, Université Paris 8, Saint-Denis, France
`madjid.ihadjadene@univ-paris8.fr`

Abstract. Our contribution aims at presenting an exploratory study of an experimental course focused on teaching controversies for mastering various dimensions of Information literacy. We will begin presenting the theoretical framework of the Actor-Network Theory approach. Then we will introduce our work-in-progress methodology for controversies analysis. Then, two case studies of teaching controversies will be presented aiming at supporting the acquisition of skills in mastering Information. We will conclude with the first results of our exploratory study based on participant observation, and on a qualitative survey on the knowledge acquisition by the students.

Keywords: Information literacy · Controversy analysis · Exploratory study · Critical thinking · Evaluation criteria

1 Introduction

Even if this concept emerged in the 70s, the field of Information Literacy still produces an extensive scientific literature on an international scale, especially since the emergence of the web. Indeed, this period is characterized by a new profusion of available information. Some literature reviews such as [1, 2] mention numerous approaches and projects on this subject. Even UNESCO and OECD (Organisation for Economic Cooperation and Development) take part in this field.

Since the French universities adopted the LMD reform (Licence-Master-Doctorat) in 2004, education for mastering information gradually became a central issue. Information literacy is widespread in France at different levels of education. For example, in primary or secondary school, a standard evaluation grid is applied to deliver a certificate called B2I (Computer and Internet Certificate)[1]. In this article, we will focus on high school students.

Teaching about information sources and classical information management skills are not sufficient to reach the required evolutive objectives in the actual digital context, especially for Y generation students. In fact, this digital context implies a hyperconnected and fragmented world, where trust and authority are questioned. We claim

---

[1] Brevet Informatique et Internet.

that the ability to carry out a critical reflection and to achieve reflexivity with self-sufficiency should become the aim of these educational programs, particularly for the master's degree.

Among the extensive literature about Information Literacy, we found three main axis of reflection. The first one consists in defining the concept of information literacy, and the extent covered by this field e.g. [3–6]. This literature raises issues about the convergence of various literacies: information literacy, computer literacy, critical literacy, library literacy, media literacy, digital literacy, visual literacy, and transliteracy [6]. The second axis focuses on the development of tools, standards and methods for evaluation of skills in Information literacy, such as [7, 8]. The third axis concentrates on a critical vision of both of the previous approaches, including reflections about didactics for information literacy [9–12]. Inspired by this third axis, our contribution aims at presenting an exploratory study of an experimental course on teaching controversies for mastering various dimensions of information literacy.

In this paper, we will begin by presenting the theoretical framework of the Actor-Network Theory approach. Then we will introduce our work-in-progress methodology for controversies analysis. Then, two case studies of teaching controversies will be presented aiming at supporting the acquisition of skills in mastering information. We will conclude with the first results of our exploratory study based on participant observation, and on a qualitative survey on the knowledge acquisition by the students.

2   Teaching Controversies and Actor-Network Theory

Among the most innovative projects on this subject, teaching controversies is probably one of the most promising ways to pursue this aim of critical reading and use of information. Based on theoretical research work from Latour and Callon (Actor-Network Theory), each grande école in France such as SciencePo, some engineering schools as ESIEE Paris and Telecom ParisTech, and some universities as in the Social Science department of Paris 8 University, have developed this kind of class. We also consider this type of class as additional to more classic teaching.

To define the notion of controversies, we refer to the Medialab researchers (SciencePo): "The cartography of controversies is the exercise of crafting devices to observe and describe social debate especially, but not exclusively, around techno-scientific issues" [13].

Among the controversy subjects, one can find examples such as: Do robots need to resemble human beings?; Will digital books replace traditional books?; and Does the society gain modernity in authorizing euthanasia? In this context, a variety of digital tools are available and used, for example, Murraly, Freemind, Pearltrees, and GraphCommons.

The Actor-Network Theory (ANT) is a branch of the movement of the "Sociologie des épreuves". This theory arises from studies about the connection between the scientific fields and innovation process. In this context, the focus is on interactions and mediations between human actors and non-human actors, which form a group: a network where human and non-human actors are considered as equal and qualified as agents or

as mediators. They form a complex socio-technical organisation, where they are inter-dependent [11]. In terms of scientific paradigm, rather than pretending to consider subjects objectively, it consists, on the contrary, of considering agents subjectively [14].

In the application of ANT to analysis of controversies, as described by Venturini [13, 15] and Martin and Lezon-Rivière [16] the process begins by the construction of the corpus of texts. Then it continues by applying programs for creating bibliometric and scientometric measures. Finally, maps or cartographies are generated to reveal facts based on these measures, with a visualisation tool, like Gephi[2].

The skills targeted in this type of course are focused on improving the understanding of epistemology and of the methodologies for the production of scientific knowledge, and not specifically on information literacy. From our point of view, applying a standard grid of evaluation cannot assess the skills the students acquire throughout this process.

3   Work-in-Progress Methodology of Analysis of Controversies

3.1   Overview of the Original Methodology

Our methodology of analysis of controversies is inspired by ANT to the extent that we also consider human and non-human actors as agents, but we develop different views which can be described as follow: this course aims at improving the understanding of the complexity of analysis of controversies, considered as a sui generis phenomenon, that reveals characteristics of the ability of a society to carry out a public debate, including all possible sorts of actors. This conception raises questions about the organisation of social roles and the distribution of powers and authority in the society. This definition is also inspired by the sociology of Thevenot [17] and Chateauraynaud [18].

The students are thus playing the role of mediators of the knowledge, required to be capable of taking part in the debate, for the public area. This mediator role implies questions about the position to adopt, the necessary distance with their potential opinions, the vigilance about the potential distortion of different actors' points of view, and how to avoid these problems.

As mentioned in our introduction, we are influenced by the third axis emerging from the literature, which focuses on providing a critical vision about information literacy. Among this literature we agree with the sociotechnical vision of the field proposed by Tuominen et al. [9], as we consider that the nature of a controversy can have effects on its analysis and representation. We will detail these aspects further on. Thus, like these authors, we disagree with "The predominant view of information literacy [that] tends to conceive of IL as a set of attributes … that can be taught, evaluated, and measured independently of the practical tasks and contexts in which they are used" [9]. Moreover, in the French field of literature Le Deuff [10] proposed a vision of information literacy in relation to citizenship and to mastering technical knowledge. According to him, the technical knowledge composes a culture, which is understood as Simondon's [19] approaches as related to power struggles. Le Deuff's vision is also inspired by Stiegler's approaches [20]: the citizenship dimension of information literacy is based on awareness

---

[2] https://gephi.org/.

of the dual dimension of technical objects that are described as "pharmaka". Therefore, technical objects can be considered potentially as solutions as much as obstacles. Finally, we are also following Simonnot [11] who introduced the notion of "digital culture", that implies the awareness of cultural codes at hand in the digital world. These cultural codes format the access to information and its interpretation. It is very important to notice that we agree with these conceptions, and that we thus consider irrelevant to assess information literacy by means of a very precisely defined and strictly applied set of skills. This conception has an effect on the present exploratory study especially on the methodology, which is presented in part 4.1.

3.2 Presentation of the Course's Sequence

Our proposal supplements models and reflections about information literacy, which emphasize the importance of teaching evaluation of sources, but we consider providing methodological tools for critical dimensions important as well.

The global educational objectives of this class can be described as follows:

- Seek for information, detect a controversial subject, and inquire about it;
- Gradually grasp the questions in this controversy;
- List the arguments and their authors, and analyse them;
- Make cartographies about actors, questions, arguments, and design a model of this content;
- Present the results of this process for a specific public: the students have to remove their opinions, and to arrange graphical materials in a consistent way and to clarify this arrangement of chronology, geographical aspects (if relevant), heuristic maps of actors, concept maps or semantic maps about questions, arguments, and viewpoints about specific elements in the controversy, for example: viewpoint by actors' types, viewpoint by quantified involvement of actors in the debate, or by type of arguments. Another possible way is to qualify some specific objects taking place in a specific debate, for example, risks or differing interests.

The following table presents the course's sequence, divided in distinct sessions, which correspond with the different stage of the methodology that we are designing.

In Table 1, four specific tools are recommended:

- Freemind[3]: this tool is used specifically to produce heuristic maps to represent the actors that take part in a controversy, as for example industrialists, scientists, and politicians;
- CmapTool[4]: this tool allows to design concept maps, in order to represent the main questions of a controversy. The main difference between heuristic and concept maps is that concept mapping enables to specify wordings for the relations between nodes;

- Timeline JS[5] is an online tool for generating online chronology based on a file template avalaible on GoogleDocument;
- Graphcommons[6] is an online tool, enabling the creation of semantic maps, that is to say, cartographies with a model including entities (agents), relations, and their properties, as presented in part 3.1. of this paper.

Table 1. Presentation of the course's sequence

Steps	Subject and content	Educational objectives
Session 1	İntroduction: Theoretical course about stakes of controversies	Understanding of the complexity of the process of analysis in controversies
Session 2	İnformation seeking and training on sorting out information sources with Pearltrees	Defining information need, queries, finding and defining a controversy issue, create information search strategies, quick reading, sorting out of sources
Session3	Theoretical course about the methodology based on models and properties	Understanding of the complexity of the process of analysis in controversies, appropriating the methodology presented
Session 4	Training on heuristic maps, and concept maps with Freemind and CmapTool	Designing heuristic maps of actors in the controversy at hand, and designing concept maps to represent the main questions
Session 5	Training on designing a chronologic view of the controversy with Timeline JS	Choosing and ordering in time the main events of the controversy for producing a chronologic view
Session 6	Theoretical course about object-oriented modeling and training on semantic mapping with GraphCommons	Designing maps of arguments and viewpoints in the controversy at hand, modeling agents, relations, and arguments
Session 7	Pursuit of the work-in-progress with self-sufficiency, and preparation of the final presentation	Structuring the different maps and others supports, communication skills
Session 8	Final presentation	Contextual evaluation

The Fig. 1 presents an example of a semantic map made by students with the tool GraphCommons. The different colors correspond to the different types of agents in the model of entities for this controversy about "patent and living things".

---

[5] https://timeline.knightlab.com/.
[6] https://graphcommons.com/.
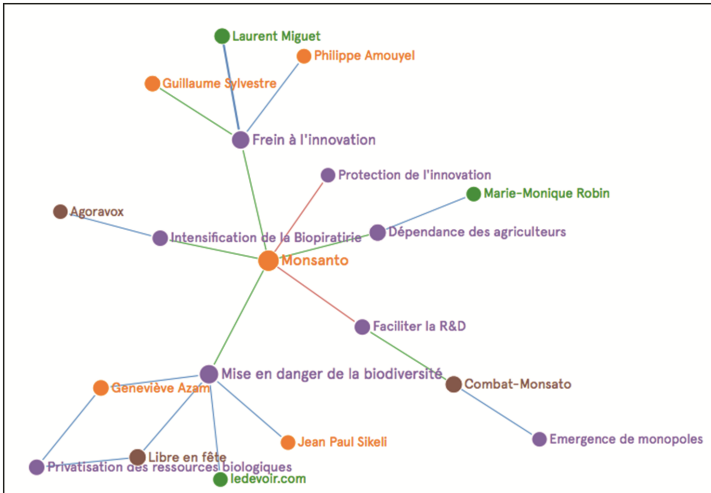
Fig. 1. Example of a semantic map made by a student with GraphCommons

4   The Exploratory Study

This section aims to present the exploratory study, its methodology, its conditions, and the preliminary results obtained.

4.1   Methodology of Study

This study is structured in two steps and composes mainly a qualitative study. The first step consists of participant observation during the course's sessions, with note-taking about elements arising during the class, how students manage to fulfill the different tasks described in Table 1, their specific questions, difficulties or ideas, the ways they manage to appropriate the different guidelines, methods and tools. It is completed with our analysis of the final presentations and its graphical materials. The second step is based on a qualitative survey by means of an online questionnaire sent to the student few weeks after the end of the course.

The participant group is composed of two different sub-groups of students. The content of the course is the same for both groups but the teaching conditions are different.

The first group can be characterized as follows: it is composed of 11 students all studying design in two different schools (ENS Cachan and ENSCI-Les ateliers). This course takes place in the frame of an experimental project for testing new forms of teaching[7], the SPOC Controverse. This course is a Small Private Online Course, which means that a part of the course was taught online. This experimental project was organized over ten days of teaching from October 2014 to January 2015, and supported by a

---

digital workspace for the supervision of the different deliverables commanded to the students. The scope of the full project was larger than for the second group, but concerning the similar content presented in this study, for both groups, the duration was equivalent. Nevertheless it can be interesting to notice that the first group students were not familiar with the educational objective of the Session 2 mentioned in Table 1, and formulated as: "Defining information need, queries, finding and defining a controversy issue, create information search strategies, quick reading, sorting out of sources". On the other hand this group benefited from more time to choose their controversy subject. This group founded 4 sub-groups of students, their controversy subjects were the followings:

- Medical auto-diagnosis
- The development of digital technologies and employment
- Do robots need to resemble human beings?
- The customer responsibility, the mobile phone case

The second group is organized in a more traditional way. They were 12 students in Master's degree in the Information and Communication Science Department at University Paris 8. They all benefit from a pre-existing knowledge previously mentioned corresponding to the Session 2 in Table 1. The course was dispensed during a week in January 2015. They formed four sub-groups of students and their subjects were the followings:

- Assisted reproduction and surrogate motherhood.
- Will digital books replace traditional books?
- Patent and living things
- Euthanasia

4.2 Preliminary Results

From the participant observation process, some interesting elements emerge that can be confirmed by the questionnaire sent to the students. Some of the preliminary results of the questionnaire have been extracted and are presented in Tables 2, 3 and 4.

The first significant aspect emerging from the observation is about the teacher's position in this kind of course. Actually, we think he has to moderate the constraints about applying the methodology, and also on the use of the different types of maps. Indeed, even if the teacher can adopt an incentive attitude towards students to appropriate the methodology, we suggest considering that the students gradually become experts of the subject of the controversy at hand. Moreover, we suggest considering that the proposed experimental methodology can be improved by the practice of the students. Thus, some aspects of the methodology are left vague to provoke the involvement of them in a creative process, especially concerning the analysis and representation of arguments. What follows from the previous statements is that the role of the teacher is less oriented towards a vertical transmission of knowledge than towards an educational support with fluctuating goals because the different groups have various paces of progression.

Table 2. Extract of results from the questionnaire about maps

Which of these tools did you discover during the class ?	% of the responses
Boolean queries	15.4%
Heuristic maps	30.8%
Concept maps	76.9%
Semantic maps	76.9%
Which of these tools do you think you will use again in the futur ?	
Freemind	61.5%
CmapTool	92.3%
GraphCommons	76.9%
For which of these tasks did you use the maps ?	
Rank Informations	100%
Summarize	76.9%
Compare viewpoints	69.2%
Read and discover the subject	61.5%
Analysis of Information	53.8%
Detect Information needs	38.5%
Take notes	30.8%

Table 3. Extract of results from the questionnaire about mastered domains

Did the class provided you a better mastery in these domains ?	% of positive responses
Production of synthesis	92,3%
Methods for knowledge acquisition	69,2%
Peers confrontation	46,2%
Oral presentation	23,1%

Table 4. Extract of results from an open question from the questionnaire about the characteristics of controversy

Extracted elements from the responses	Number of mentions
Multiplicity of viewpoints	5
Question concerning the whole society	5
Public debate, public arena	5
Multiplicity of actors	4
Argumentative dimension	4
Different opinions	3
Complexity of the problem at hand	2
Critical vision	2
Different ideologies	2
İncertainty	1
Polemic	1
Divergent values or interests	1

The second significant aspect of this experimental session is focused on the use of the maps produced by students. In the Medialab course about controversies, it seems that the maps (network graphs) are the expected results requested to the students. As shown in Table 2, even if a majority of students responding to the questionnaire discovered the concept mapping, the semantic mapping, and the related tools during the class, they are interested in re-using them in other contexts. This is consistent with the results presented in Table 3, which show that this kind of course can benefit the students on other dimensions of IL, for example, in production of synthesis or in knowledge acquisition.

Concerning the use of mapping, Table 2 reveals various uses of mapping, for example, for ranking and summarizing information, or for comparing viewpoints. These various uses of maps reveal that the maps are not only used for presenting results, but also serve as analysis tools. In Table 4, the results consist of an extraction of terms from the responses of students to an open question formulated as follows: "what are the characteristics of a controversy?"

It can be interesting to notice that the analysis of the responses shows a large diversity of understandings about the characteristics of a controversy. This is consistent with an observation realized during the courses, which can be summarized as follows: depending on its subject, a controversy presents various characteristics, as for example, a high degree of technical nature or of opacity, a focus on problems of definition, a low degree of maturity, a characterization by binary oppositions, or by the temporality or geographical aspects. Consequently, we consider that evaluation criteria of the analysis provided by students should take into account this diversity in characterization of each controversy.

5   Conclusion

Information literacy has become an important field of study and gains gradually in independence. We consider that classical courses for information literacy remain insufficient for new generations. The previously presented observations are still a work in progress, and we will pursue this study with an increasing number of students. Nevertheless, it seems that teaching analysis of controversies proves to be relevant for including critical thinking in information literacy. This course benefits students on different dimensions of information literacy that have to be evaluated with appropriate approaches.

References

1. Chevillotte, S.: Bibliothèques et Information Literacy. Bulletin des Bibliothèques de France **2**, 42–49 (2005)
2. Virkus, S.: Information Literacy in Europe: A Literature Review. Information Research 8(4) (2003)
3. Elmborg, J.: Critical information literacy: implications for instructional practice. J. Acad. Librarianship **32**(2), 192–199 (2006)
4. Loicq, M.: Les Enjeux éducatifs de la Culture Informationnelle. Les Cahiers du Numérique **5**(3), 71–84 (2009)

5. Koltay, T.: The media and the literacies: media literacy, information literacy, digital literacy. Media Cult. Soc. **33**(2), 211–221 (2011)
6. Le Deuff, O.: Littératies Informationnelles, Médiatiques et Numériques: de la Concurrence à la Convergence? Etudes de Commun. **1**, 131–147 (2012)
7. Bruce, C.: Information literacy as a catalyst for educational change. A background paper. In: Danaher, P.A. (eds) Proceedings of the Lifelong Learning: Whose Responsibility and What is Your Contribution? The 3rd International Lifelong Learning Conference, pp. 8–19, Yeppoon, Queensland (2004)
8. American Library Association: Information Literacy Competency Standards for Higher Education (2000)
9. Tuominen, K., Savolainen, R., Talja, S.: Information literacy as a sociotechnical practice1. Libr. **75**(3), 329–345 (2005)
10. Le Deuff, O.: Penser la Conception Citoyenne de la Culture de l'information. Les Cahiers du Numérique **5**(3), 39–49 (2009)
11. Simonnot, B.: Culture Informationnelle, Culture Numérique: Au-delà de l'utilitaire. Les Cahiers du Numérique **5**(3), 25–37 (2009)
12. Cordier, A.: Et si on Enseignait l'incertitude pour Construire une Culture de l'information? Commun. Organ. **2**, 49–60 (2013)
13. Venturini, T.: Diving in magma: how to explore controversies with actor-network theory. Publ. Underst. Sci. **19**(3), 258–273 (2010)
14. Genard, J.L.: À Propos de Pragmatique…. In: Vrancken, D., et al. (eds.) Penser la négociation, De Boeck Supérieur, «Ouvertures Sociologiques», pp. 97–107 (2008)
15. Venturini, T.: Building on faults. Public Underst. Sci. **21**(7), 796–812 (2012). SAGE Publications, UK and US
16. Martin, S., Lezon Rivière, A.: Culture Informationnelle et Enseignement des Controverses. In: Ihadjadene, M., Baltz, C., Saemmer, A. (eds.) Culture Informationnelle. Vers une Propédeutique numérique: Former les citoyens à l'ère de l'Internet. Hermann, Paris (2015)
17. Thévenot, L.: La Connaissance dans l'action, L'action au Pluriel, Paris, La Découverte, «TAP/ Politique et société», p. 312 (2006)
18. Chateauraynaud, F.: La Contrainte Argumentative. Les Formes de l'argumentation Entre Cadres Délibératifs et Puissances d'expression Politiques. Revue Européenne des Sciences Sociales **XLV**(136), 129–148 (2007)
19. Simondon, G.: Du Mode d'existence des Objets Techniques. Aubier, Paris (1989)
20. Stiegler, B.: Prendre soin: Tome 1 De la Jeunesse et des Générations. Flammarion, Paris (2008)

"Bibliostory—Educational Comic Stories." A Social Constructivist Approach to Media and Information Literacy Education for Children and Adolescents

Ewa A. Rozkosz[1(✉)] and Zuza Wiorogórska[2]

[1] University of Lower Silesia, Wroclaw, Poland
`ewa.rozkosz@dsw.edu.pl`
[2] University of Warsaw Library, Warsaw, Poland
`z.d.wiorogorska@uw.edu.pl`

Abstract. Our paper presents a theoretical background for a Polish comic book "Bibliostory—educational comic stories" (Pl. *Bibliostory—edukacyjne historie komiksowe*). The comic targets children between 9 and 12 years of age and youths from 13 to 16 years of age. Each story illustrates one issue, such as information searching, organization of information, plagiarism, and information problem solving strategy. *Bibliostory* is based on two constructivist pedagogical concepts: the zone of proximal development (ZPD) and case-based learning/teaching. These concepts, on application level, are first of all associated with designing educational situations and relationships between teachers and students (educators and learners). The aim of our paper is to present the possibilities of application of these concepts in the educational comic books. We describe the general assumptions of two concepts, then we focus on elements applied in *Bibliostory* project. We also provide a review of literature on the educational potential of comic books.

Keywords: Bibliostory · Case-based learning · Cultural-historical theory · Zone of proximal development · Media and information literacy · Educational comics · Poland

1 Introduction

This paper presents theoretical background for creating a comic Polish book "Bibliostory—educational comic stories" (Pl. *Bibliostory—edukacyjne historie komiksowe*). The comic book was developed within the framework financed by the Ministry of Culture and National Heritage Program "Education. Media and Information Education" and published in 2015. The Regional Public Library and Culture Animation Centre in Poznan was the coordinator of this project.

The comic book consists of 24 stories. It targets children between 9 and 12 years of age and youths from 13 to 16 years old. Each story illustrates one issue, such as information searching, the organization of information, plagiarism, and information problem-solving strategy. One page is dedicated to one story only. "Bibliostory" is available online in Polish (http://wbp.poznan.ekursy.eu/course/view.php?id=30)

under the Creative Commons Attribution–NonCommercial–ShareAlike 3.0 license. A sample of comic stories have been translated into English (http://wbp.poznan.ekursy.eu/mod/page/view.php?id=861). The project, therefore, sets an example of a professional Open Educational Resource (OER) which can be used by children and youths. Comics may also be used by parents and librarians in furthering the development of media and information literacy (MIL) among children and adolescents. "Bibliostory" is based upon two constructivist pedagogical concepts: (1) the zone of proximal development (ZPD), (2) case-based learning/teaching. On the application level, these concepts are associated primarily with the design of educational situations and the pupil-teacher relationship. In our texts, we show the possibilities of their application in the educational comic project. First, we present general principles of both concepts and then focus on elements used in the "Bibliostory" project. We also review the literature on the use of comics in education.

2 The Educational Potential of Comics

2.1 Educational Comics

According to McCloud, comics are juxtaposed pictorial and other images in deliberate sequence, intended to convey information and/or to produce an aesthetic response in the viewer [1]. Comics' narrative and images facilitate learning [2]. Comics have an influential visual aspect, and are impressive and easily-remembered as well [3]. From the user-experience point of view, comics create an experience through the representation of the "reality" of information via the symbol systems which is easily understandable by an audience [4]. Comics reflect the importance of visual communication in modern culture; they are an important medium in the daily reading experience of students [5]. The comic book – reflecting the maxim that "a picture is worth a thousand words" – can, in fact, convey substantial amounts of information, even in its relatively short format [6, p. 117].

The educational potential of comics – especially of the new comic book form that arose in the 1930s – was recognized early on. Educational comic books are essentially as old as the comic book form itself [6]. According to Nyberg [7], the educational comic was a response to the criticism of comic book reading, made by the guardians of children's culture, teachers, and librarians, who feared the contamination of children's culture by comic books. Educators from the beginning condemned comic books as undesirable reading material [p. 29]. Publishers responded to their critics in a number of ways [p. 30]. The educational comics have been published since before World War II [8, p. 73]. In 1941 in the U.S. a series True Comics started, offering biographies of "real life heroes". Booker [6] recalls Maxwell C. Gaines, one of the US pioneers of the comic book industry, who was so convinced of the promise of comic books as a scholastic tool that, in 1944, he named his enterprise "Educational Comics." Popular comics can be used, for particular types of audience, as a tool to communicate scientific information to a large population in an understandable, memorable and enjoyable way [2, p. 207].

According to the learning theories, creative activities make the learning process more efficient [3, p. 1447]. Using humor and comics as teaching aids not only livens up the

lessons, but also encourages the students to participate in the training process to create the information and the comment by themselves (Erdem as cited in [3, p. 1449]). The constructive training approach of comics, which are funny, questioning as well as educational, affects students' academic achievements in a positive way [3, p. 1451]. Images reinforce understanding and help commit it to memory. Humor is used effectively in some comics to capture the reader's attention and make the message more memorable [9, p. 54]. In the 21st century classroom, teachers recognized the inherent value of comic narratives and sought to incorporate them into their lesson plans for history and social studies units [10]. In 2015, Digital Humanities Quarterly published a special issue on comics as scholarship (http://www.digitalhumanities.org/dhq/vol/9/4/index.html). Comic arts have gained popularity and credibility in recent years also because of their increasing quality and variety [11, p. 46]. Besides, as Upson et al. [14] write, comics stimulate the parts of the brain that handle visual elements as well the parts that handle language, they can potentially give the brain more opportunities to connect with the content that one would have with a strictly text-based book [p. vii].

2.2   Pop Culture in Education. Examples of Educational Comics

Behen [12] poses a rhetorical question: If the popular culture of today's teen is what drives their behavior and motivates them, why not use it to connect with them? [p. 2]. One of the best-known examples of educational comics is Art Spiegelman's Maus, describing the World War II and Holocaust experience of author's parents. Maus was the first comics to win Pulitzer Prize in 1992 [13]. Humphrey [8] recalls comics published by US government bodies in the 1950s to teach adults and children about topics including fire safety, civil defense, and economics. He states that each year in the US more than 30 educational comics are published. Also, the Disney Company, known for its animated films, engaged in the comic publishing market during the 1940s, issuing a series of Mickey Mouse comics with an educational aspect, for example, presenting the health advantages of drinking milk [6]. Vassilikopoulou et al. [5] enumerate several educational comics that influence classroom teaching in the U.S. In France, La Cité internationale de la bande dessinée et de l'image – provides several educational comics on its website (http://www.citebd.org/). Negrette [2] presented an example of the use of comics to communicate information about the sustainable use of the Mayan nut to low literacy rural communities in Mexico. In this country, comics is one of the preferred communication media which provides reading access for inhabitants. Tuncel and Ayva [3] recall four Turkish examples of the use of comics in education: (1) in teaching of social sciences at primary school; (2) in teaching history; (3) in the training of science and environment; (4) in the teaching of human rights. The last example is their study which showed how the use of comics in the classroom increased learning success because it created a positive change in the approach of students to the lesson. Duke Center for the Study of the Public Domain offers an educational comic book with intellectual property as the main subject titled Bound by Law (http://web.law.duke.edu/cspd/comics/). The British publisher, Icon Books, offers an Introducing… Graphic Guide series, where philosophers or social topics are presented in

a comic-approach way (http://www.iconbooks.com/introducing2/). McNicol [9] describes the importance of health education comics, which deal with topics such as AIDS, sexual health, or diabetes.

The current trend in educational comics is to let students become the authors of their comics [5]. In 2001 in the US The Comic Book Project was founded, challenging students to produce their comic books [10]. In 2009–2010, the EduComics project was held within EU Comenius program. The project's outcomes are training material for teachers accessible online (http://www.educomics.org/). The exemplary tool for comics creation is ComicLab, produced by ItIsArt.Ltd (http://www.webcomicbookcreator.com/).

3 Comics in Information Literacy Education

The comic is an art based on criticism. Criticism is forming a discussion platform which provides thinking, questioning, identifying the negations, finding an alternative point of view to the problems [3, pp. 1447–1448]. The activities, which promote critical ways of thinking, should be placed more than usual during the lesson [3, p. 1451]. Moreover, as McCloud writes, when you enter the world of cartoon – you see yourself (…); we don't just observe the cartoon, we become it! [1, p. 36]. Comics create an interactive experience for an audience that allows them to interact in the world of the information presented [4, p. 92]. According to Paziuk [10], in the 1990s in the US educators strongly advocated the inclusion of comic books in childhood education, in both the classroom and the library. As Farmer [11, p. 35] writes, graphic novels increase the librarians' "cool factor" and street cred. Behen [12], in her book 'Using Pop Culture to Teach Information Literacy' advocates for a practical approach to reaching teens in the library with methods that spark their curiosity and interest andto change students' expectation that library is boring. Upson et al. [14] propose a graphic guide to student research, titled Information Now. Its publication in Chicago coincided with the publication of Bibliostory in Poznan. Moreover, both comic books are complementary – while Bibliostory's target groups are children and teenagers, Information Now addresses the information needs of undergraduate students. Librarians wrote both. In the preface, the authors write about their motivations: we decided to make this book as a comic because we believe that comics can more efficiently teach concepts and skills than traditional prose, thanks to their use of engaging combinations of text and images and appropriate utilization of metaphor and relevant context [p. vii].

4 Theoretical Framework. Application of the Social Constructivist Approach to the "Bibliostory" Project

The constructivist, more precisely a social constructivist approach formed the theoretical foundation of the "Bibliostory" project. Two concepts were used for the project: the zone of proximal development, and case-based learning/teaching. In this section, based on selected stories, we set the most significant assumptions and show the manner of their application in the "Bibliostory" project.

4.1   Instruction in the Zone of Proximal Development

The Zone of Proximal Development. ZPD, the Vygotskian cultural-historical theory, assumes the following: (1) learning is the activity of the learner and the assisting individual, (2) learning means mastering cultural tools, especially language, (3) learning is a social process, (4) reflection and the sense of agency are important in learning process, (5) learning/teaching strategies: scaffolding and mediated learning experience, (6) learning occurs through action, in an authentic, real context [cf. 15]. ZPD defines the differences between tasks which the learner can solve with or without the assistance of a more experienced person (scaffolding). For example, two children may solve a task well, yet have different potential to solve a more arduous task with the assistance of another person. As Gołębniak and Zamorskaemphasize, ZPD is not a range of tasks, but a zone in which higher mental functions grow from the maturing functions ("seeds"); the assistant's task is to provide the conditions and challenges to support the growth of the learner's potential, which may but does not need to develop [19]. A teacher or a competent peer may be the assisting person [17]. Tudge and Rogoff [18] underline how important it is for the learner and the assisting person to maintain a partnership and work together. The assisting person should include the learner's ZPD in interactionand recognize their needs. Vygotsky names such relations intersubjective relationships. Such a relationship, in a narrower sense, may be interpreted as a tool to transmit such amount of information which will allow the learner to perform a set task and not overwhelm them at the same time.

Media and Information Literacy and the Zone of Proximal Development. Vygotsky's concepts are the subject of interest within the MIL field. Limberg et al. [21] provided the foundation for the understanding of information literacy from the socio-cultural approach, which is a theory of Vygotsky. Wang et al. [20] have shown the possibilities of using ZPD in MIL academic training based on an educational project. They drew attention to the role of dialogue and lean on existing relationships in the group.

The Application of the Zone of Proximal Development in the "Bibliostory" Project. Interaction is seen as a means of development and more broadly, as a means by which a person enters into the culture via learning, that is, takes over the intellectual tools of the society [18]. Learning takes place through instruction and imitation. Gołębniak and Zamorska underline that meaningful imitation does not necessarily involve mechanical copying. It is a process of active transmission of tools used by the assisting person [19]. The stories in the "Bibliostory" project are static. It means that the figures of the virtual assistants are not supposed to follow the reader (a child) or match them. Nonetheless, there are stories that build frustration when for example, the protagonist does not possess the necessary tools. The story titled "How to prevent invasion of the Little Red Riding Hoods: and advanced search in the library catalog" sets a good example (Pl. *Jak zapobiec inwazji czerwonych kapturków: czyli wyszukiwanie zaawansowane w katalogu bibliotecznym*). The protagonist is a fantastic His Catalogueness (PL: *Jego Katalogowatość*). The moment the readers recognize him, he is in despair because cannot find the "Little

Red Riding Hood" book. There are multiple book publications, however he seeks a particular one. A schoolgirl assists him. She appears in a role of the assisting adult who shows how to handle the catalog. This particular story is underpinned by the assumption that a simple search in the library database is a general ability. Because of this, the story tells of an impossible task since the character is not capable of narrowing his search results in the catalog. The comic book shows a rule which cannot be mechanically applied by clicking the same buttons presented in the graphics. Imitating the girl's action requires object reflection.

Forman and Cazden [22] studied how children of nine years of age or alike cooperate when performing different tasks (*peer tutoring*). They observed that two peers cooperate more efficiently when working together than on their own. During problem-solving, they take different yet complementary roles: the observer and the performer (they may swap roles). In the course of the social interaction, they may develop a problem-solving strategy. Subsequently, the strategy is internalized [22]. The studies show the interactions among peers in the zone of proximal development. They have become an inspiration for posting peer cooperation topics in the "Bibliostory" project. The comic story "Where do I know this pic from? Uncle Google and image search" (Pl. *Skąd ja znam tę fotkę: czyli wujek Google a wyszukiwanie obrazem*). The main characters are two boys searching for the author of certain graphics. One of the boys takes the role of a performer and step by step explains how to determine the author. This story has two levels: (1) the instruction of how to use the Google Images search engine, (2) the material that presents the structure of a social situation that reveals the manner of solving the problem, which can then be internalized by the parties concerned. The first level allows the readers to learn a task (solve the information problem). The second level educates them on how to organize their learning and reasoning processes [16].

Vygotsky pays lots of attention to the adult-child relations. It is hard to discern in which relationship (adult-child, child-child) the child gains more and which relationship better supports their development. On one hand, in the task as a discussion on any subject, interaction with a peer gives more freedom. On the other hand, implementation of tasks that require specific skills may need adult assistance. The evaluation of benefits depends, to some extent, on the type of a task. The task may involve competence not popular among adults, and which more experienced peers have [18]. The tasks associated with the activity of the youth, often relate to MIL education. Nonetheless, the stories of the "Bibliostory" project relate not only to the relationship between peers, but also to the broadly discussed, by the cultural and historical theory, child-adult relationship. The story titled "The Old World Swallowtail: that is, what can I do with someone else's text about a Polish butterfly" sets a good example (Pl. *Paź królowej: czyli co mogę zrobić z cudzym tekstem o polskim motylu*). The action takes place at school's biological laboratory. Two girls are supposed to prepare the description of the Old World Swallowtail (butterfly) to present in the booklet about Polish butterflies. They present the results of their work, but it turns out that they have paraphrased the article about the butterfly from Wikipedia without giving a source. The adult assisting in this story is a biology teacher. The teacher does not begin with a negative assessment of the lack of sources. Instead, she navigates questions in such a way to help the girls understand the meaning of paraphrasing and the reason why providing the source is meaningful. She adapts to the

situation (ZPD of the girls) by providing them with as much information as necessary to help them understand what has happened and let them identify and solve the problem on their own. The example questions that she poses are: "Does the description refer to the results of your observations?" "Did you measure those butterflies?" Such actions let the girls delve into self-reflection and cope with the situation by the necessary information. When the clues seem insufficient, the teacher assists in solving the problem by providing them with the information. She suggests inserting a hyperlink to Wikipedia source below their article (Fig. 1).

Fig. 1. Excerpt of comics "The Old World Swallowtail: that is, what can I do with someone else's text about a Polish butterfly", being a part of "Bibliostory—educational comic stories"

ZPD gives the flexibility regarding its use in the development of learners of all ages. This concept focuses on problems unsolvable without the assistance of an individual who is at least a step ahead or an individual who has knowledge or experience. The readers of the stories of the "Bibliostory" project are children aged 9–16. The level of their ZPD may vary: it may not be the same among peers or be the same among individuals of different ages. With this in mind, no age marks have been introduced into the "Bibliostory" project. The readers are free to chose stories and instructions therein that are within their ZPD.

The "Bibliostory" project includes pop-culture elements, evocations of places or situations that may be within the reader's recognition potential. It builds a shared context, the narrator/protagonists of the stories share the meanings given to these objects with the readers. Moreover, the project motivates readers to constantly search for new discoveries. For example, in comic titled "Photo contest, or: Why it's not worth messing up with Imperator" (pl. *Konkurs fotograficzny, czyli dlaczego nie warto zadzierać z Imperatorem*) Imperator, a hero of a popular science fiction saga "Star Wars", appears. The "Bibliostory" readers will associate Imperator with unethical behaviour (in "Star Wars" saga Imperator represents "Dark side of the Force"). In the excerpt of the comic story presented below Imperator appears to the boy who used someone else's picture to win the photo contest (Fig. 2).
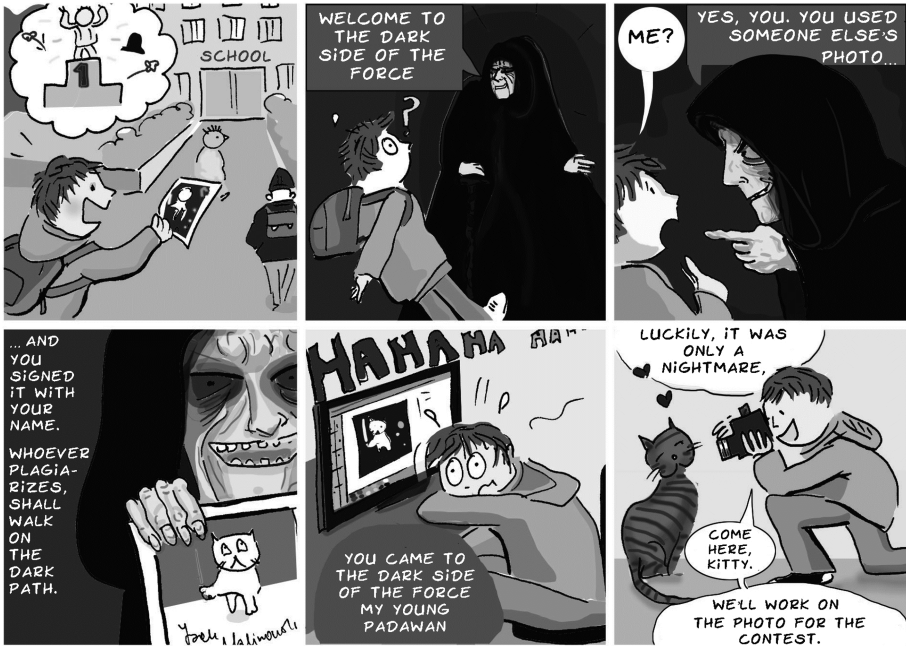
Fig. 2. Excerpt of comics "Photo contest, or: Why it's not worth messing up with Imperator", being a part of "Bibliostory—educational comic stories"

4.2 Case-Based Learning/Teaching

The case method of instruction is a Socratic approach that took root at the Harvard Business School in the 1920s and has spread to business schools around the world [23]. Spackman and Camacho [23] describe cased-based library instruction, claiming that it might be an effective pedagogical approach that can be adapted to a library instruction context. The case itself consists of a brief problem statement built around a narrative structure. This storytelling element captures student interest and accentuates the inductive and constructivist nature of learning through cases. The focus is to identify the information that would meet the needs of the case and explore the library and Internet resources to obtain such information. The objective is not to teach students how to conduct an analysis, but how to gather and assess the information they would need for analysis [23].

The Harvard Business School was the pioneer in case method teaching. Barnes et al. [24] presented theses that were central to an understanding of their efforts to help instructors work more efficiently in case discussion classes.

> First, we believe that when educational objectives focus on qualities of mind (curiosity, judgment, wisdom), qualities of person (character, sensitivity, integrity, responsibility), and the ability to apply general concepts and knowledge to specific situations, discussion pedagogy may well be very effective. [p. 3]

Barnes et al. [24] underlined the importance of learner empowerment in this pedagogical approach, that is, students taking responsibility for their education simultaneous with teacher's role as a facilitator who supports them in constructing their knowledge. The examples provided by the teacher help the learners use new texts in practice and at the same time relate them to their experience. According to Barnes et al. [24], such an approach supports the culture of innovation.

The primary assumption of the case-based learning is the teacher's need to identify the problem and demonstrate its solution based upon example. The "Bibliostory" project depicts solutions to information problems. Each solution requires an action such as the application of an adequate source of information or understanding the effects of a presented action. The story "Wolne Lektury: this is where I will find Stas and Nel but not Harry Potter" (Pl. *Wolne Lektury: tam znajdę Stasia i Nel, ale nie znajdę Harry'ego Pottera*) sets a good example. The main protagonist is a student who has to read a young adult novel "In Desert and Wilderness" by Polish novelist, the Nobel Prize laureate, Henryk Sienkiewicz. This popular novel tells the story of two children Stas and Nel. The protagonist wants to borrow the book from a library, it turns out, however, that it is unavailable. The librarian explains that the book is in the public domain because its copyrights have expired. She points to Wolne Lektury (the Polish digital library run by the Modern Poland Foundation), from where he can legally download a free copy. The boy opens Wolne Lektury website and finds the book he was searching for. The problem is solved. This comic story portrays a method of problem-solving - the source of public domain books. This example potentially teaches the readers how to solve an information problem of similar nature.

The cases presented in the "Bibliostory" project relate to daily activities typical of children and teenagers. The idea of using such a construction was to encourage the readers to reflect upon their mode of actions and refer the examples to these actions. This forms the basis for constructing new knowledge.

5   Role of "Bibliostory" in Information Literacy Education

The "Bibliostory" project embraces different methods of using comic books. The comic book contains valuable tips for librarians which may inspire them to use it as an MIL education tool both in the passive and active way. The passive one means displaying or presenting printed stories on the library's walls, or publishing stories on the library's website or in social media Instagram, Facebook). The examples of an active way of "Bibliostory" usage are ready-to-use scenarios of classes for different age groups that librarians and teachers may use. Bibliostory authors propose the scenarios at the beginning of the book they base on comic stories.

Promotion of "Bibliostory" Among Polish Librarians. "Bibliostory" was published both in electronic and print version. Since it was a Ministry-funded project, the print versions were free of charge. The Regional Public Library and Culture Animation Centre in Poznan sent printed versions to the libraries in the region. The country promotion of "Bibliostory" took place on the Internet. An independent portal for librarians, Pulowerek.pl each week published a different story from the book. This promotional

campaign lasted six months. According to Pulowerek.pl's statistics, each story had 188 displays on average. Parallel, the Regional Public Library and Culture Animation Centre in Poznan was publishing the stories on its website.

In January 2016, IL Committee of Polish Librarians' Association announced a "Bibliostory" contest for libraries. The library that wanted to participate, had to send an idea of comic stories application during media and information literacy class. The printed versions of "Bibliostory" were drawn among participants.

6   Conclusions

Our paper has discussed the pedagogical framework on which an educational comic book was developed. Two constructivist pedagogical concepts, the zone of proximal development and case-based learning/teaching provided a basis to design "Bibliostory". The key categories, like interactions between learner and more experienced person, and meaningful imitation are reflected in stories, especially in the activities of comic book characters. "Bibliostory" is embedded in the social and historical context of culture, stories reflect current children and adolescents' reality. This makes "Bibliostory" easy to understand and implement in learning media and information competences by children and adolescents.

Our analysis contributes to the broader discussion on the application of pedagogical approaches in MIL education. We agree with Jacobs [25] who claims that "instructional strategies and techniques are an important part of teaching but they must be informed by an understanding of pedagogical theory" [p. 257]. Therefore, we claim that it is not sufficient to base only on information and media practices while designing educational materials. We present how the social constructivist understanding of learning and teaching process influences decisions on design the comic stories.

References

1. McCloud, S.: Understanding Comics: The Invisible Art. Harper Perennial, New York (1994)
2. Negrete, A.: Constructing a comic to communicate scientific information about sustainable development and natural resources in Mexico. Procedia – Soc. Behav. Sci. **103**, 200–209 (2013)
3. Tuncel, G., Ayva, O.: The utilization of comics in the teaching of the "human rights" concept. Procedia – Soc. Behav. Sci **2**, 1447–1451 (2010)

4. Figueiredo, S.: Building worlds for an interactive experience: selecting, organizing, and showing worlds of information through comics. J. Vis. Lit. **30**, 86–100 (2011)
5. Vassilikopoulu, M., Retalis, S., Nezi, M., Boloudakis, B.: Pilot use of digital educational comics in language teaching. Educ. Media Int. **48**, 115–126 (2011)
6. Booker, K.M.: Educational comics. In: Booker, M.K. (ed.) Comics Through Time: A History of Icons, Idols, and Ideas, pp. 117–121. Santa Barbara, Greenwood (2014)
7. Nyberg, A.K.: "No harm in horror": ethical dimensions of the postwar comic book controversy. In: McLaughlin, J. (ed.) Comics as Philosophy, pp. 27–45. The University Press of Mississippi, Oxford (2005)
8. Humphrey, A.: Beyond graphic novels: illustrated scholarly discourse and the history of educational comics. Media Int. Aust. **151**, 73–80 (2014)
9. McNicol, S.: Humanising illness: presenting health information in educational comics. Med. Humanit. **40**, 49–55 (2014)
10. Paziuk, G.N.: Educational comics. In: Booker, M.K. (ed.) Comics through Time: A History of Icons, Idols, and Ideas, pp. 1459–1464. Santa Barbara, Greenwood (2014)
11. Farmer, L.S.J.: Information architecture and the comic arts: knowledge structure and access. J. Vis. Lit. **34**, 23–49 (2015)
12. Behen, L.D.: Using Pop Culture to Teach Information Literacy Methods to Engage a New Generation. Libraries Unlimited, Westport (2006)
13. Carrier, D.: The Aesthetics of Comics. The Pennsylvania State University Press, University Park (2000)
14. Upson, M., Hall, M.C., Cannon, K.: Information Now: A Graphic Guide to Student Research. The University of Chicago Press, Chicago (2015)
15. Filipiak, E.: Rozwijanie zdolności uczenia się: Z Wygotskim i Brunerem w tle. Gdańskie Wydawnictwo Psychologiczne, Sopot (2012)
16. Wood, D.: How Children Think and Learn: The Social Contexts of Cognitive Development. Blackwell Publishing, Oxford (1989)
17. Vygotsky, L.S.: Mind in Society: The Development of Higher Psychological Processes. Harvad University Press, Cambridge (1934/1978)
18. Tudge, J., Rogoff, B.: Peer influences on cognitive development: Piagetian and Vygotskian perspectives. In: Bornstein, M.H., Bruner, J.S. (eds.) Interaction in Human Development, pp. 17–40. Lawrence Erlbaum Assoc, Hillsdale (1989)
19. Gołębniak, B.D., Zamorska, B.: Nowy profesjonalizm nauczycieli: Podejścia, praktyka, przestrzeń rozwoju. Dolnośląska Szkoła Wyższa, Wrocław (2014)
20. Wang, L., Bruce, C., Hughes, H.: Sociocultural theories and their application in information literacy research and education. AARL **42**, 296–308 (2011)
21. Limberg, L., Sundin, O., Talja, S.: Three theoretical perspectives on information literacy. Hum. IT **11**, 93–130 (2012)
22. Forman, E.A., Cazden, C.B.: Exploring Vygotskian perspectives in education: the cognitive value of peer interaction. In: Wertsch, J.V. (ed.) Culture, Communication and Cognition: Vygotskian Perspectives, pp. 323–347. Cambridge University Press, Cambridge (1985)
23. Spackman, A., Camacho, L.: Rendering information literacy relevant: a case-based pedagogy. J. Acad. Libr. **35**, 548–554 (2009)
24. Barnes, L.B., Christensen, R.C., Hansen, A.J.: Teaching and the Case Method. Harvard Business School Press, Boston (1994)
25. Jacobs, H.L.M.: Information literacy and reflective pedagogical praxis. J. Acad. Libr. **34**, 256–262 (2008)

Assessing Awareness of Library Services: An Ethnographic Examination of Bachelor Students at Two Czech Technology Universities

Alena Chodounská[✉] and Stephanie Krueger

Czech National Library of Technology, Prague, Czech Republic
{alena.chodounska,stephanie.krueger}@techlib.cz

Abstract. In this paper, the authors present interim research results from an ongoing ethnographic examination of eight engineering undergraduate students from two technology universities in Prague, Czech Republic. A multi-layered data gathering strategy was employed, including semi-structured in-person interviews as well as *in situ* and virtual observations of participants interacting with learning environments. This data enabled the authors to examine whether or not students are aware of library services. "Library services" are here broadly defined to include not only traditional support services but also new, emerging areas of activity which can be categorized under the broader concept of undergraduate student support [1]. Findings indicate very poor awareness of library offerings although participants were aware of the library as a study space. The authors additionally touch briefly upon the concept of "backward design" [2] for service development, in which research data is gathered and considered prior to service design and launch.

Keywords: Ethnography · Engineering undergraduates · Student-centered information literacy · Backward instructional design

1   Introduction

At the Czech National Library of Technology (NTK), because of many twists and turns of history which extend beyond the scope of this paper [3], we are in the unique position of being able to redesign all of our academic support services, both physical and virtual.

What this means in practical terms is that the NTK academic services team has set as a purposeful internal goal the use of data about our patrons and *potential future patrons* before we create, launch, or reconsider any service offering, including information literacy initiatives. In addition to traditionally-generated library utilization metrics, we are keenly interested in gathering contextual data using ethnographic strategies—including emerging forms of virtual observation—because such data provide emic depth and richness to our understanding of patrons and their needs.

In this introductory section, the authors conduct a brief literature review and discuss the origins of this research project. Section 2 formally presents the research questions and describes research methods and design. Section 3 is devoted to a description of data

gathered during the project. Section 4 provides data analysis in relation to our research questions (very brief, because of space limitations) followed by the conclusion in Sect. 5.

1.1 Literature Review

Research studies which consider the perhaps unique educational service needs of Millennial generation engineering undergraduates are quite rare and are often, as outlined importantly by [4], focused on how students interact with the online environment and technological devices rather than on library offerings. Library-focused studies such as [5, 6] are already several years old. A full review of literature specifically about information literacy in engineering technologies is provided by [7] with the conclusion across the literature that "'one shot' instruction does not work" [p. 163]. [8, 9] describe the needs of international students studying in English-language engineering environments, an area of special interest to the authors because several participants in this study must work with materials in English and not in Czech, their native language.

Ethnographic strategies have been increasingly used in recent years to examine library environments; see a survey of such studies across many disciplinary areas at [10]. Additionally useful descriptions of ethnographic research techniques appear in [11–15] provides a critical discussion of the application of anthropological methods to library and information science research.

This study is the second of its kind, following methodological considerations laid out in [16], to include elements of virtual ethnography in the form of screenshots taken by research participants in order to capture *moments of time* in which they interact with information online. In the future, the authors would be like to additionally use video screen captures and/or mobile video; an interesting non-library example of the latter is provided by [17].

1.2 Origins of Research

The original research the authors describe here is part of a broader, ongoing study being conducted by one of the paper's authors about the research and study patterns of engineering undergraduates at the University of Chemistry and Technology, Prague (UCT Prague) and the Czech Technical University in Prague (CTU), two institutions which physically surround our library. Because of space limitations for this paper, the authors provide only an interim set of results and brief discussion of their potential applicability to service offerings at NTK.

The description of the in-process project provides a model for others interested in transcending the boundaries of traditional quantitative research approaches at their institutions. Micro-level studies such as this one can enrich the small corpus of literature about Millennial engineering undergraduates and, importantly, inspire future analyses about the needs of the post-Millennial students.

2   Methods

In this section, the authors define research questions and describe methodology and design of the research project.

2.1   Research Questions

The first research question (RQ1) considered in this paper is: How are selected undergraduate engineering students at two technology universities in Prague interacting with libraries (if at all)? We also ask (RQ2): Do these students feel libraries can play a role in their overall educational process? Finally, the authors discuss (RQ3) how instructional/information literacy support services might be potentially developed in relation to interim research findings.

2.2   Research Methodology

Ethnographic strategies were employed as part of the broader in-process study. The authors' goals beyond providing insight into the aforementioned research questions for this paper: an examination of the lifeworlds of eight undergraduates, both in-person and online, as a starting point for enhancing our understanding of their learning processes and possible support needs as well as to identify areas for future research (both quantitative and qualitative) over additional populations.

   The following section describes specific aspects of how ethnographic techniques were employed in this study, including types of data gathered during the research process, recruitment of participants, and ethical considerations.

2.3   Research Design

Gathering Data. Ethnographic research can generate a rich amount of data over time to be analyzed and considered. This, the authors feel, is advantageous—but it does mean researchers interested in conducting such a project must be prepared to devote a serious investment of time into data gathering and analysis.

   Because we were interested learning about both the in-person and virtual lifeworlds of our research participants, data was gathered in both realms of social interaction, as seen in Tables 1 and 2. The semi-structured interview protocol was modeled loosely on that described in [6, pp. 7–15].

Recruitment of Research Participants. The paper's first author recruited eight students for this project in order to provide a manageable set of data with which to work because of an autumn 2016 deadline. This population (n = 8) is not representative nor random in the statistical sense; this is not necessary in such a qualitative ethnographic study as long as findings are not generalized beyond the specific purposes of this paper and the larger research project. [2, pp. 10–11] provides interested readers with a useful discussion of how to consider ethnographic generalization as opposed to "abstract" survey approaches.

Table 1. Data gathered/to be gathered in-person (fieldwork)

Mechanism	Purpose	Data type
Semi-structured interviews	To ask specific questions related to research project; length of each interview varied: 39 to 141 min	Mobile phone recordings, transcribed to text documents
In-person observation of campus activities	To supplement interview information; included visits to open houses but not classes	Fieldwork notes, text

Table 2. Data gathered/to be gathered virtually (online fieldwork)

Mechanism	Purpose	Data type
Online information about participant schools	To learn more about participant study programs and learning environments	Notes about findings, text
Resources mentioned in interviews	To understand tools used commonly by participants in their study	Notes about findings, text
Screenshots taken by participants	To observe virtual information interactions of research participants. Task: Over 14 days, take screenshots of information-related activities you feel would be illustrative of your studies and learning online	Image files stored to Google Drive, by participant
NTK web, social, and resource statistics	To analyze behavior of students using these resources and compare to interview data	Text and numerical data
Photos taken by participants ("photo diary")	To illustrate research participant lifeworlds. Task: Take pictures of anything you feel represents your life as a student	Image files

In recruiting participants, the paper's first author contacted several professors at CTU and UCT Prague and also used NTK's Facebook channel. In the end, all participants were recruited via modified snowball sampling (see definition in [18, p. 49] and commentary in [19]): three friends of the paper's first author suggested potential participants who, in turn, recruited additional participants. Because of this, students from only four schools ("faculties") are included here. Future studies should include all campus schools in order to be fully representative of the environment.

One participant has begun Master-level studies and here was asked to comment exclusively on his undergraduate experience. Table 3 below provides an overview of project participants, including their "year" of bachelor studies. All participants were born in 1990 or later.

Table 3. Project participants (n = 8; five females and three males)

Participant/gender	University/field of study	Year of study
1/female	CTU/information technology	1
2/female	CTU/civil engineering	4
3/female	UCT Prague/food and biochem. technology	3
4/female	UCT Prague/food and biochem. technology	3
5/female	UCT Prague/food and biochem. technology	3
6/male	CTU/civil engineering	3
7/male	CTU/information technology	BSc. completed/MSc. 1
8/male	CTU/information technology	2–3

Ethics and Privacy. The American Anthropological Association's *Statement of Ethics: Principles of Professional Responsibilities* [17] were used to guide this study because neither NTK nor the Division of Information and Library Studies (KISK) of the Faculty of Arts at Masaryk University in Brno, Czech Republic (the larger study sponsor) have an institutional review board. All personal information has been removed for discussion of participants, who have been made aware of the purposes of this research as well as possible publication outputs and are able to cease participation at any time.

3   Results to Date

This section provides an overview of data gathered in the project to date.

3.1   Data Description

As of the date of submission of this paper, all in-person and virtual fieldwork has been completed; some transcription and coding is still in progress.

Table 4. Semi-structured interview data

Participant/gender	Date of interview	Interview duration (minutes)
1/female	9.3.2016	39
2/female	9.3.2016	61
3/female	16.3.2016	141
4/female	6.4.2016	(Still being transcribed)
5/female	6.4.2016	(Still being transcribed)
6/male	6.4.2016	41
7/male	20.4.2016	43
8/male	24.5.2016	68
		Average length (of 6 transcribed): 66

Semi-structured Interviews. Eight semi-structured interviews were conducted in the Czech language. These interviews were recorded on mobile phones and are in the process of being transcribed and coded for analysis. Because of space limitations, the interview protocol is not included here, but authors will provide it upon request (Table 4).

Screenshot Data. Research participants provided 141 screenshots illustrating their own interpretations of "use of information for their studies" over the course of two weeks. This task which was purposefully broad to let students define both "information" and "use" from their own perspectives (Table 5).

Table 5. Screenshot data

Participant/ gender	Date screen- shots provided	Number of screenshots
1/female	29.5.2016	30
2/female	24.5.2016	14
3/female	19.5.2016	27
4/female	16.5.2016	3
5/female	28.5.2016	5
6/male	29.5.2016	7
7/male	20.5.2016	47
8/male	26.6.2016	8
		Total screenshots provided to date: 141

Photo Diary Data. To date, six participants have provided 80 photo diary images documenting various aspects of student life from their points-of-view (Table 6).

Table 6. Photo diary data

Participant/ gender	Date photos provided	Number of photos
1/female	26.6.2016	13
2/female	22.7.2016	15
3/female	8.6.2016	15
6/male	25.6.2016	13
7/male	20.6.2016	10
8/male	26.6.2016	14
		Total photos provided to date: 80

4   Data Analysis and Discussion

4.1   RQ1: Interaction with the Library

How are these undergraduates interacting with the library? Data analyzed to date both reveal a low level of interaction with the library online, with awareness of the library

for these students limited to the *physical place to study* and not as a complementary partner in their studies for exploring potential research resources or learning about specialized software or tools.

One participant, for example, when asked if they would consider asking a librarian for help with their Bachelor thesis, responded: "Maybe as a last resort. I do not want to bother anyone. What's on the Internet is best." Even when the library's individual consultancy services were then explained to this student, they stated they would "probably not" use them—they would go first to their professors and peers (typically over social media outlets, including closed/private groups) as well as online discussion forums (those provided by schools or, for information technology students, specialized forums like Stack Overflow), video tutorials (YouTube), and documentation (for example, Linux man pages). One student noted they would ask their parents for assistance prior to reaching out to anyone else (Fig. 1).
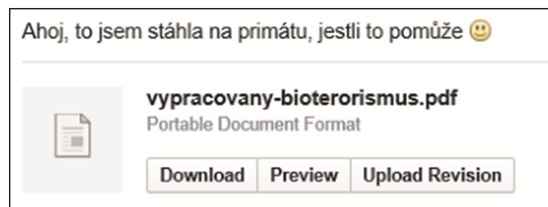
Fig. 1. Sample Facebook secret group commentary (Source: Screenshot data; cropped for privacy reasons)

Remark 1. This figure illustrates peer assistance, with a student sharing a document for peers via a secret Facebook group: *Greetings, I downloaded this from the student information portal, Primat, if it helps.* Primat.cz is a commercial portal which includes *skripta*, study booklets written by professors for students, often used in this context textbooks and other materials.

Only one student in this study illustrated use, according to screenshot data, of a library website and/or database (including one advanced search); all other participants exhibited simple keyword searching via Google with a mixture of searches in Czech and English, depending on the topic of interest to them. All Google queries were plain keyword searches with no quotation marks or Boolean operators used (for example, *jak psát abstract*, or: how do I write an abstract?). One student noted they were unaware of Google Scholar (Fig. 2).
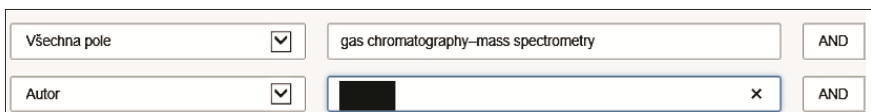
Fig. 2. Sole example of an "advanced" search, NTK discovery tool (Source: Screenshot data)

Remark 2. In this search, the student used a query for `gas chromatography-mass spectrometry` together the last name of an author (name blackened for privacy), which yielded over eighty results because the student did not limit their search to full text.

Students noted they visit the physical library when they are waiting for classes and/or to meet their peers, because it is centrally-located. No students here consider the library to be a place to browse physical books or journals serendipitously. CTU students, who are not currently registered automatically with the library, do not feel it necessary to be "officially" registered because they can enter the building and use eduroam [20] for connecting to the Internet without registering (Fig. 3).
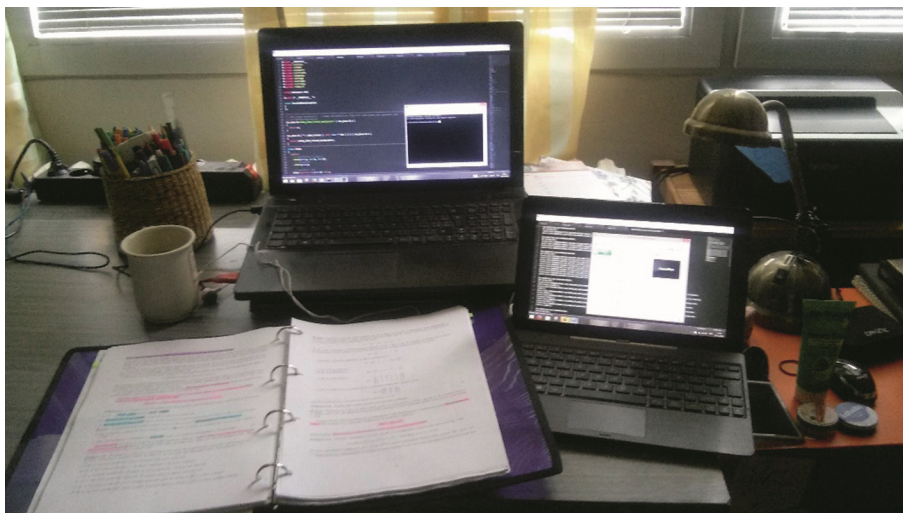
Fig. 3. Student study materials at home (Source: Photo diary data)

Several students commented that "all the good books are checked out"—instead of reserving materials or using e-Books, they then use study materials provided by their professors or schools or materials posted for shared use to downloading sites like uloz.to.

Students in this study did not know where they might find sample Bachelor theses for review; one student noted that their school does not publish undergraduate theses because of an unwillingness to publish proprietary software code. No student had any awareness that databases such as ProQuest or institutional repositories at other universities (within or beyond the Czech Republic) which might provide examples for them to use.

4.2   RQ2: Perceived Role for Library in Educational Process

Do these students feel libraries can play a role in their overall educational process? The resounding answer, for interview data analyzed to date, is *no*. For the students participating in this study, passing exams—both those offered by their schools and those provided by commercial entities offering specialized certification like Cisco

Certification Exams [21]—was their primary focus, followed by completion of their Bachelor theses. The one student who had already completed his Bachelor thesis conveyed how difficult the process was for him, particularly selecting and narrowing down his topic and writing mechanics (spelling and proofreading). Such findings for RQ2 raises many interesting questions in terms of the promotion and development of existing support services.

4.3   RQ3: Applying Findings to Service/Instruction Development

How instructional/information literacy support services might be potentially developed in relation to interim research findings (applied) library services? To answer in a nutshell: very carefully, because our already-existing promotional system is not working, despite NTK's prominent campus location and marketing efforts over various in-person, web, and social channels. Offering new courses before raising awareness of current services would be putting the cart before the horse and would not address larger issues clearly highlighted by this study: lack of integration of library offerings with course syllabi and lack of promotional activity at the point of need such as links to library content in online student discussion forums.

We must clearly address these issues in parallel to step-by-step mapping of each Association for College and Research Library (ACRL) Information Literacy Standard for Science and Engineering/Technology [22] to an appropriate, aggressive strategic response. These standards will serve as learning outcomes from which we will systematically create methodologies following curricular "backward design" as described by [23, pp. 20–28]. This process must be accompanied by the development of deeper relationships with campus partners regarding undergraduate services as described by [1]. The response must not only include in-person instructional service development but also highly creative interventions into the virtual space already inhabited by students.

5   Conclusion

In this brief paper, the authors have shown that research participants are largely unaware of NTK's undergraduate support services and information literacy concepts such as advanced query building. Deeper building of campus partnerships as in [1] as well as meeting students virtually at their point of need will be crucial in the future to addressing issues identified here. The study's findings cannot be generalized over all CTU and UCT Prague undergraduates because the population considered was small, but the authors will conduct additional investigations to expand their analysis.

References

1. Seal, R.: Resource sharing begins at home: opportunities for library partnerships on a university campus. Presented at: 14th Interlending and Document Supply Conference, Istanbul, Turkey. Loyola eCommons, Chicago (2015). http://ecommons.luc.edu/cgi/viewcontent.cgi?article=1036&context=lib_facpubs

2. Dourish, P.: Reading and interpreting ethnography. In: Olson, J.S., Kellogg, W.A. (eds.) Ways of Knowing HCI, pp. 1–18. Springer Science+Business Media, New York (2014)
3. About NTK – Czech National Library of Technology History. https://www.techlib.cz/en/2749-about-ntk#tab_history
4. Jorhi, A., Teo, H.J., Lo, J., Dufour, M., Schram, M.: Millennial engineers: digital media and information ecology of engineering students. Comput. Hum. Behav. **33**, 510–523 (2014). doi:10.1016/j.chb.2013.01.048
5. Gabridge, T., Gaskell, M., Stout, A.: Information seeking through students' eyes: the MIT photo diary study. Coll. Res. Libr. **69**, 510–522 (2008). http://crl.acrl.org/content/69/6/510.full.pdf
6. Foster, N.F., Gibbons, S. (eds.): Studying Students: The Undergraduate Research Project at the University of Rochester. Association of College and Research Libraries, Chicago. http://www.ala.org/acrl/sites/ala.org.acrl/files/content/publications/booksanddigitalresources/digital/Foster-Gibbons_cmpd.pdf
7. Hill, K.H., Best, M.M., Dalessio, A.P.: Information literacy in the engineering technologies at the community college: a literature review. Community Jr. Coll. Libr. **18**(3–4), 151–167 (2012). doi:10.1080/02763915.2012.812920
8. Zhao, J.C., Mawhinney, T.: Identifying challenges faced by Chinese undergraduate engineerng students in acquiring ınformation literacy skills – a report on survey findings. Presented at: 2014 ASEE Annual Conference, Indianapolis, IN (2014). https://peer.asee.org/20578
9. Zhao, J.C., Mawhinney, T.: Comparison of native Chinese-speaking and native English-speaking engineering students' ınformation literacy challenges. J. Acad. Librariansh. **41**(6), 712–724 (2014). doi:10.1016/j.acalib.2015.09.010
10. Khoo, M., Rozaklis, L., Hall, C.: A survey of the use of ethnographic methods in the study of libraries and library users. Libr. Inf. Sci. Res. **34**, 82–91 (2012). doi:10.1016/j.lisr.2011.07.010
11. Seadle, M.: Research rules for library ethnography. Libr. Hi Tech **29**(3), 409–411 (2011). doi:10.1108/07378831111174378
12. Seadle, M.: Project ethnography: an anthropological approach to assessing digital library services. Libr. Trends **49**(2), 370–385 (2000). https://www.ideals.illinois.edu/bitstream/handle/2142/8342/librarytrendsv49i2_opt.pdf?sequence=3#page=157
13. Emary, L.R.: Librarians are already in the field: how and why to begin ethnographic fieldwork. BIBL. Forschung und Praxis **30**(2), 138–142 (2015). doi:10.1515/bfp-2015-0016
14. Goodman, V.D.: Applying ethnographic research methods in library and ınformation settings. Libri **61**, 1–11 (2011). doi:10.1515/libr.2011.00
15. Sandstrom, A.R., Sandstrom, P.E.: The use and misuse of anthropological methods in library and ınformation science research. Libr. Q. Inf. Commun. Policy **65**(2), 161–199 (1995). http://www.jstor.org/stable/4309020
16. Krueger, S.: Beyond the paywall: a multi-sited ethnographic examination of the information-related behaviors of six scientists. Ph.D. dissertation, Humboldt-Universität zu Berlin (2016, forthcoming)
17. Spinney, J.: A chance to catch a breath: using mobile video ethnography in cycling research. Mobilities **6**(2), 161–182 (2011). doi:10.1080/17450101.2011.552771
18. Walsh, J.: The highlight reel and the real me: how adolescents construct the facebook fable. Ph.D. dissertation Boston University, Boston (2014). http://gradworks.umi.com/36/45/3645870.html
19. Goodman, L.A.: Comment: on respondent-drıven samplıng and snowball sampling in hard-to-reach populations and snowball samplıng not in hard-to-reach populations. Sociol. Methodol. **41**, 347–353 (2011). doi:10.2307/41336926

20. Eduroam. https://www.eduroam.org/
21. [Cisco] Exams – Training and Certification. http://www.cisco.com/c/en/us/training-events/training-certifications/exams.html
22. Information Literacy Standards for Science and Engineering/Technology. http://www.ala.org/acrl/standards/infolitscitech
23. Richards, J.C.: Curriculum approaches in language teaching: forward, central, and backward design. RELC J. **44**(1), 5–33 (2013). doi:10.1177/0033688212473293

Erratum to: The Academic Reading Format International Study (ARFIS): Investigating Students Around the World

Diane Mizrachi[1](✉), Joumana Boustany[2], Serap Kurbanoğlu[3],
Güleda Doğan[3], Tania Todorova[4], and Polona Vilar[5]

[1] University of California, Los Angeles, USA
mizrachi@library.ucla.edu
[2] Université Paris Descartes, Paris, France
jboustany@gmail.com
[3] Hacettepe University, Ankara, Turkey
{serap,gduzyol}@hacettepe.edu.tr
[4] University of Library Studies and Information Technologies, Sofia, Bulgaria
t.todorova@unibit.bg
[5] University of Ljubliana, Ljubljana, Slovenia
polona.vilar@ff.uni-lj.si

Erratum to:
Chapter "The Academic Reading Format International
Study (ARFIS): Investigating Students
Around the World" in: S. Kurbanoğlu et al. (Eds.):
Information Literacy: Key to an Inclusive Society,
CCIS,
DOI: 10.1007/978-3-319-52162-6_21

The original chapter was published in *Communications in Computer and Information Science* 2016, 676, pp. 215–227.

After publication of the original paper [https://link.springer.com/chapter/10.1007/978-3-319-52162-6_21] it came to the authors' attention that the Chinese translation of question 10: *I prefer electronic textbooks over print textbooks,* was inverted to read *I prefer print textbooks over electronic textbooks.* Therefore, Figure 3 and the related discussions on pages 220–221 and 227 were incorrect.

| **Amalgamated Results** |
| Agree/Strongly agree
n=1268; 13.7% |
| Neither agree or disagree
n=1619; 17.4% |
| Disagree/Strongly
disagree
n=6392; 68.9% |
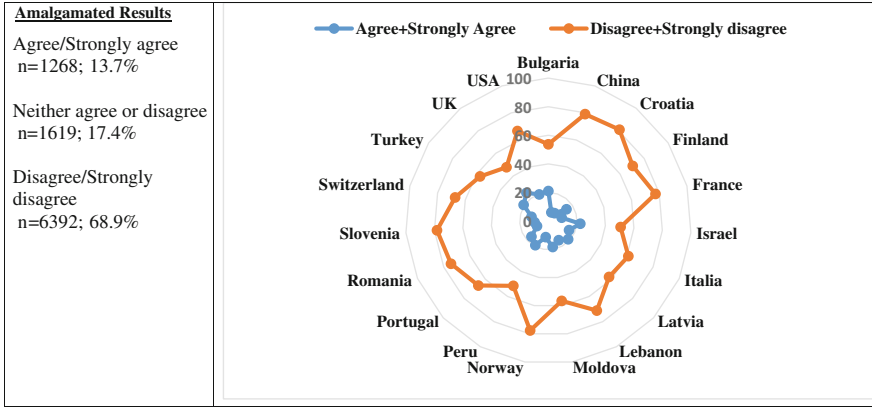
Fig. 3. I prefer electronic textbooks over print textbooks

Electronic textbooks. With more libraries investing in electronic textbooks, it is important to understand our students' attitudes towards using them. Overall, nearly 69% of the students disagreed with preferring e-textbooks. Figure 3 shows amalgamated results and country percentages for Question 10.

Author Index