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Information Literacy in Everyday Life

6th European Conference, ECIL 2018
Oulu, Finland, September 24–27, 2018
Revised Selected Papers

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Preface

The 6th European Conference on Information Literacy (ECIL) was co-organized by the Department of Information Management of Hacettepe University, Turkey, Department of Information and Communication Sciences of Zagreb University, Croatia, the Information Literacy Association (InLitAs), France, and the Department of Information and Communication Studies of University of Oulu. ECIL 2018 aimed to bring together researchers, information professionals, employers, media specialists, educators, policymakers and all related parties from around the world to exchange knowledge and experience and discuss current issues and recent developments.

The main theme of the sixth conference was "Information Literacy in Everyday Life." In all, 241 proposals were submitted to the conference. Contributions came from 43 different countries (Australia, Austria, Belgium, Brazil, Bulgaria, Canada, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, India, Ireland, Italy, Japan, Latvia, Lithuania, Mexico, Moldova, The Netherlands, Norway, Poland, Portugal, Qatar, Romania, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, UAE, UK, and USA).

All submissions were subjected to a double-blind review process. This book consists of a total of 58 selected papers that address many different issues.

Starting with the host organization, the Department of Information and Communication Studies of University of Oulu, we are grateful to many 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 have contributed tremendously to the development of information literacy, for their patronage.

We would like to take this opportunity to thank conference keynote speakers Peter Bath, Karen E. Fisher, and Frans Mäyrä; invited speaker Kristiina Kumpulainen; the authors and presenters of papers, best practices, PechaKuchas, posters, 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 Sonja Špiranec, Yurdagül Ünal, Joumana Boustany, and Maija-Leena Huotari as well as language editors Esther Grassian, Diane Mizrachi, and Loriene Roy should also be acknowledged here. Special thanks for their hard work and valuable editorial contributions.

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

January 2019 Serap Kurbanoğlu

Organization

The European Conference on Information Literacy (ECIL) 2018 was co-organized by the Department of Information Management of Hacettepe University, the Department of Information and Communication Sciences of Zagreb University, the Information Literacy Association (InLitAs), and the Department of Information and Communication Studies of the University of Oulu.

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Contents

Information Literacy, Health and Well-Being

Workplace Information Literacy and Employability

Information Literacy Research and Information Literacy in Theoretical Context

Information Seeking and Information Behaviour

Information Literacy for Different Groups in Different Cultures and Countries

Information Literacy Instruction

Copyright Literacy

Information Literacy and Lifelong Learning

Information Literacy in Different Contexts of Everyday Life

Developing Food and Nutrition Literacy with the Croatian Facebook Group "Homemade Food for Babies"

Drahomira Cupar(✉) and Mate Juric

Department of Information Sciences, University of Zadar, Zadar, Croatia
{dcupar, mjuric}@unizd.hr

Abstract. The aim of this research is to analyze possible food literacy benefits for the members of the Facebook group "Homemade Food for Babies". Food literacy was operationalized as a combination of nutrition literacy and healthy cooking behavior. Methods used were: content analysis of documents from the Facebook group, an interview with the main administrator, and a survey, which was completed by 1081 members. The parents that are often using the group content (recipes, guidelines, advice) are enhancing their perceived food literacy. Active participation and membership duration are a lot less beneficial. Reading the group documents is crucial for nutrition literacy, and using the recipes is important for healthy cooking behavior. Additionally, motivation and using expert advice are predictors of both of those components of food literacy. The administrator is an expert and uses credible sources to give informed advice. The group is highly valued by majority of the members.

Keywords: Facebook group · Parents · Nutrition literacy · Healthy cooking behavior · Food literacy

1 Introduction

"Food literacy" and "nutrition literacy" might look like new buzzwords in the already long list of literacies. However, some studies showed a close connection between nutrition labels reading behavior and healthier food choices [1, 2]. There is a large amount of information about preparing meals at home as many professional and amateur chefs, fitness trainers and doctors join efforts in informing people how to prepare healthy meals. Healthy nutrition is especially important and essential when parents are preparing meals for babies. Parents play a crucial role in supporting healthy eating habits of their children [3, 4]. Since healthier food choices are important in the context of healthy living, exploration of potential changes in parents' food choices for their children under the influence of Facebook groups is worth investigating.

2 Food, Nutrition, Health and Information Literacy

Literacies are manifested through behavior and in a context, so it is often hard to isolate and study only literacy, without taking the actual behavior and context into account. Although the conceptual framework of everyday life information seeking (ELIS) by

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Savolainen [5] is an established field of study, Martzoukou and Sayyad Abdi [6] stated that information literacy is not addressed enough within this field. In order to connect the context of everyday life with information literacy concepts, it is necessary to use context-specific modifications of information literacy.

The concepts of food literacy and nutrition literacy are specific forms of health literacy [7–9]. According to Nutbeam, the "US Institute of Medicine report defines health literacy 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" [9]. Nutrition literacy is focused on knowledge of nutrition information. According to Block et al. [10] food literacy is defined "as more than knowledge; it also involves the motivation to apply nutrition information to food choices" [10, p. 7]. Krause, Sommerhalder, Beer-Borst, and Abel [7] concluded that food literacy, in addition to knowledge, includes applying information on food choices and critically reflecting on the effect of food choice on personal health. Certain aspects of these literacies have been explored. For example, it was found that people make healthier food choices when they possess greater nutrition knowledge [11, 12].

It would be possible to map the components of food and nutrition literacy to the information literacy (IL) core ideas. There are many models and definitions of IL that share common core ideas, for example, the ALA ACRL Framework for Information Literacy [13] and SCONUL [14]. In the contexts of health needs and behavior, specific forms of literacy are emphasized, and health literacy is the more precise term in use. The concepts of nutrition and food literacy are even more specific, but the core IL concepts are also the core of these rather new concepts.

3 Information Literacy and User Activity in Virtual Communities

In the digital environment, participatory networks provide a virtual place for sharing ideas, asking questions and discussing various topics. In the last decade Facebook groups have become active virtual places for those activities.

The theoretical framework that specifically emphasizes the role of the digital participatory networks is metaliteracy. It is a concept developed by Mackey and Jacobson [15] which is closely related to the concept of IL. Metaliteracy expands traditional IL competencies to include sharing and collaborative production of knowledge in participatory digital environments. The ALA ACRL Framework for Information Literacy [13] is largely based on metaliteracy ideas. Also, the focus is shifted from skills necessary to seek, find and evaluate information to the broader ideas of subjective understanding of IL which is dependent on the context. However, behavior as a criterion of literacy is often neglected. In order to get "the whole picture", it is necessary to integrate literacies and manifested behaviors.

Sharing and collaborative production of knowledge in digital environments, as elements of IL [13], require active participation. However, regarding the level of group members' activity in virtual communities, there seems to be a rather large number of virtual community users that are invisible, lurking or receptive participants [16]. They are a silent but persistent audience. Findings in a study by Soroka and Rafaeli [16]

suggest that in order to increase the users' activity, "fostering receptive participation may be as important and constructive as encouraging active contributions in online communities". Reading the community's discourse and becoming familiar with the community's culture is important. Another study by van Uden-Kraan et al. [17] dealing with various benefits of lurking and active participation in online patient support groups revealed that "participation in an online support group had the same profound effect on lurkers' self-reported feelings of being empowered in several areas as it had on posters". Authors concluded that "reading in itself is sufficient to profit from participation in an online patient support group" [17]. Active and silent group members perceived equal levels of "being better informed," "improved acceptance of the disease," "feeling more confident about the treatment," "enhanced self-esteem," and "increased optimism and control" [17]. The only exception was "enhanced social well-being". It can be concluded that in order to benefit from membership in a virtual community it is important to get familiar with the community's culture and to read the content with cognitive and emotional engagement. Similar aspects of user engagement and their relevant literacies are going to be explored in this study.

4 Research on the Role of the Facebook Group "Homemade Food for Babies"

This research is analyzing perceived food and nutrition literacies of parents in the context of their everyday-life information behavior, that is, while using a specialized Croatian Facebook group with more than 108.000 members named "Homemade food for babies" (in Croatian: "Domaće kašice za bebe"). The group follows recommendations of the World Health Organization (WHO) [18] and The European Society for Paediatric Gastroenterology Hepatology and Nutrition (ESPGHAN) [19] on how to start complementary feeding of children. Members contribute with their recipes but also ask for advice and collaboratively discuss nutrition and related topics. They are facing common challenges in seeking, sharing and applying food choices in their daily lives.

The aim of this research is to determine possible benefits for the group members in changing their perceived knowledge, attitudes and perceived behavior related to food and nutrition literacy. The research questions are: (1) which topics are represented in the group documents? (2) What challenges the users and administrators are facing when seeking and sharing verified information? (3) How high do users perceive their behavioral changes towards healthier food choices? (4) What are the most important predictors of perceived food literacy benefits from the group?

4.1 Methods, Samples and Procedure

In this research, a case study design was applied on a Facebook group. Multiple methods of data gathering were applied: content analysis of the group documents, interview with the main administrator and a survey of the group members.

Sample for the content analysis included all of the group documents. There were 17 files in .docx or .pdf format, and 114 files in the Facebook document format. The main

administrator for the interview was purposely chosen because she is an expert in nutrition and has created and adapted the nutrition guidelines in the Group. Sample for the survey was gathered via a post in the group with the online survey form. A large sample of 1081 members included parents who are probably the most active members, and therefore the most informed about various aspects of the group activities. The survey consisted of a self-administered online questionnaire, with most of the items on 5° scales, and three open-ended questions. The survey answers were collected during three days. The interview with the administrator was semi-structured, containing five main questions about challenges faced when seeking verified information.

Data analysis was conducted with the software package TIBCO Statistica, by applying descriptive, inferential and multivariate statistical procedures.

4.2 Results, Analysis and Discussion

Regarding the first research question (RQ1), the content of the documents (N = 131) created by the group administrators and other group members was analyzed. More than half of the documents (52%) are the descriptions of nutritive values and ways of preparing meals with specific groceries. Around 9% of the documents are about nutrition diet for specific health problems, such as allergies, celiac disease, dermatitis, immune system problems. The third most represented topic in the documents (7%) are the dietary or nutrition guidelines and normatives that include when (in what month) to introduce complementary feeding – specific food to children. Also, there are some files with descriptions of toxins and additives, feeding problems, frequently asked questions, as well as a wide variety of other topics. Most of the documents (87%) are in the Facebook file format and have the option of collaborative editing and commenting. The main documents are created by expert administrators, but members collaboratively contribute in creating and commenting on the documents.

The second research question (RQ2) is about challenges in seeking and sharing verified information. An interview was conducted with the main administrator of the group. She is an expert with a diploma in agronomy and specialization in nutrition. She often attends additional education on topics of healthy nutrition, and follows new research. For her, the former education, previous experience and guidelines of main institutions are helpful, but the main challenges are interpretations from experts themselves. She has emphasized that the most challenging topics regarding food and nutrition are food allergies. She stated, “This field itself is in constant change and individual approach is crucial. There is no common ground regarding allergies and cooperation between different professionals is important”. An administrator highlighted that “Problems emerge due to pretended experts in FB groups who use unverified information and scientifically unproven facts. Often these advices are harmful to children’s health”. Verified and most reliable sources are those from umbrella institutions, such as WHO, ESPGHAN and published scientific papers. The advice the administrator gives in ambiguous, unclear situations is based on her years of experience and opinions she gathered from other experts. From the answers, it is clear that this Group is led by a highly motivated expert who is constantly working on improving her knowledge in food and nutritional literacy and constantly educating both, administrators and members of the Group.

The challenges that the users are facing when seeking verified information (RQ2) were examined with open-ended questions in the survey. Some of the comments were about the situations where pediatricians gave advice about complementary feeding, and their advice is contrary to most of the guidelines. Parents usually follow their own "common sense" in interpreting what is the best decision when there is contradictory advice from various experts. Also, many parents have mentioned that they trust the administrators of the Facebook group "Homemade Food for Babies" as the experts, and they are trying to ignore advice from other ordinary non-expert users.

A survey of the most active group members (N = 1081) provides very detailed insights into the perceived group impact on the users' motivation, knowledge, and behavior related to food literacy, and it addresses the last two research questions (RQ3 & RQ4).

Of 1081 surveyed group members, only seven were male. Descriptive statistics and the qualitative data gathered with a few open-ended, qualitative survey questions reveal a rather high level of appreciation and respect that the group members have for the administrators and the entire group content. A small fraction of users are unsatisfied group members. Their arguments are about the lack of tolerance for different opinions. On the other side, there were comments that justify this lack of tolerance, with the arguments that some users are not respecting the group's guidelines and rules.

The third research question (RQ3) is about the level of users' self-perceived behavioral changes toward healthier food choices. Overall, they perceive a rather high positive impact of the group. The highest behavioral changes that the surveyed parents perceive are in preparing healthier food for their children (M = 4.4), using more home-made food (M = 43), and reading and understanding the food declarations more carefully (M = 4.3). Next, on average, the users positively, but weakly agree that they engage in detailed search for verified information about food composition and nutritive value (M = 3.6). Yet, they perceive a moderate increase in knowledge about the same topic (M = 4.1), possibly because they rely on expert advice and documents from the Facebook group, and not so much on their own information seeking and verification.

The key part of this research is based on the quantitative data, which is used to resolve the fourth research question (RQ4) about the predictors of perceived food literacy benefits. First, in order to have psychometrically valid measures, the survey results were factor analyzed. Table 1 is a short summary with properties of the six extracted factors and one combined factor. Nutrition literacy (F5, Table 1) and Healthy cooking behavior (F6, Table 1) share $r^2 = 49\%$ of common variance. Therefore, the Factor number 7 Food literacy was created as a combination of the latter two. It is in line with the theoretical framework, namely the conclusion by Krause, Sommerhalder, Beer-Borst, and Abel [7] that Food literacy includes understanding of nutrition information (Nutrition literacy) and applying information on food choices (Healthy cooking behavior). These scales (factors) might not be comprehensive measures for the entire concepts of Nutrition and Food literacy, since the items are adapted to the topical context of one specific Facebook group. This is both a methodological limitation and strength, since the developed scales are more valid for this context.

Most of the scales have good metric properties. The scale with the best properties is the scale of the perceived nutrition literacy benefits (F5, Table 1), with high reliability ($\alpha = 0.91$), and 53% of explained variance of the results. The content of F4 Group negativities scale has a low, but satisfactory consistency.

Table 1. Metric properties of the measurement scales (Extraction method: Principal Factors)

Scales (Factors)	M	SD	N. i.	V. e.	α	r_{it}
F1 Motivation to enroll *(to improve nutrition and share experiences)*	4.21	.77	3	37%	.64	.40
F2 Receptive participation *(reading and using advice, recipes, documents)*	3.81	.63	5	36%	.73	.36
F3 Active participation *(asking and giving advice, posting recipes)*	1.90	.75	5	45%	.75	.46
F4 Group negativities *(intolerance of different opinions)*	2.73	.75	6	24%	.64	.23
F5 Nutrition literacy *(better choosing sources, careful reading, and knowing health effects)*	3.80	.84	9	53%	.91	.53
F6 Healthy cooking behavior *(preparing healthy and home-based food)*	4.13	.81	4	45%	.76	.47
F7 Food literacy (F5 & F6)	3.97	.77	13	48%	.92	.47

M – arithmetic mean; SD – standard deviation; N. i. – number of items; V. e. – variance explained; α – Cronbach's Alpha; r_{it} – average inter-item correlation

In order to identify the most important predictors of food literacy, multiple regression analysis were conducted (Table 2).

Table 2. Multiple regression for the criteria of nutrition literacy and healthy cooking behavior

Criteria	F5 Nutrition literacy $R^2 = .33$			F6 Healthy cooking behavior $R^2 = .41$		
Predictors	r	β	Δ R^2	r	β	Δ R^2
Membership in months	.05	/	/	**.07**	**.06**	**.003**
F1 Motivation to enroll	**.40**	**.21**	**.046**	**.44**	**.23**	**.050**
F2 Receptive participation	**.52**	**.39**	**.267**	**.59**	**.49**	**.347**
F3 Active participation	**.28**	**.10**	**.009**	**.24**	/	.001
F4 Group negativities	**−.18**	**−.06**	**.003**	**−.21**	**−.08**	**.006**

R^2 - determination coefficient; r - correlation; β - ponder, standardized regression coefficient; Δ R^2 - difference in the explained variance

Reading and using the group content (F2) is the most important predictor of nutrition literacy benefits ($\beta = 0.39$; Table 2) and of healthy cooking behavior ($\beta = 0.49$). Motivation to enroll into the group is the second most important predictor

of both criterion variables. Perceived group negativity is a weak, but significant negative predictor (Table 2). However, there are a few specifics. Active participation in the group is a predictor of nutrition literacy only, and membership duration is a predictor of healthy cooking behavior only. This can be interpreted in a way that enhancing healthy cooking behavior takes time, even though membership duration is a weak predictor. In other words, it is more important to be motivated and to frequently read and use the content. This is even more evident with the criteria of perceived nutrition literacy, since membership duration is not even correlated with it. Active participation in the group is weakly beneficial for nutrition literacy. On the other side, active participation is not a unique predictor of healthy cooking behavior, since its variance is overlapping with variances of other more important predictors (Table 2).

Multiple regression analysis with individual items as predictors of F5 and F6 reveal more detail. For healthy cooking behavior (F6) it is useful to apply advice from group administrators and the recipes from the group (items from F2), as well as to be motivated. For nutrition literacy (F5) the motivation is crucial, followed by using documents and advice (items from F2). So, the first difference is that using the documents is important for nutrition literacy, probably because most of the documents contain explanations of nutritional value of food. The second difference is that the recipes (part of F2) are quite important for healthy cooking habits. For both of the components of food literacy, the common predictors are the advice of administrators (part of F2) and the motivation of parents to improve their own and their child's nutrition (part of F1). The importance of motivation to improve nutrition not only for their babies but also for themselves is in line with one of the main conclusions by Brug's [3] systematic review, stating that "parents have a crucial role in the nutrition behaviors of their children. They should not only provide a good example by eating right themselves but also by using parenting practices and styles that encourage and support healthy eating habits in their offspring" [3].

To sum up, the most important activity of Facebook group members is the frequency of reading and using the group content (F2 – Receptive participation), namely expert advice, recipes and documents. It has a strong impact on the overall perceived food literacy that combines both nutrition literacy and healthy cooking behavior. Also, the motivation to enroll into the group has additional unique and substantial impact on the perceived food literacy benefits. Surprisingly, active participation, such as commenting, liking, asking and giving advice is not a strong predictor of food literacy. Reading and using the group content is a lot more important for enhancing nutrition literacy and healthy cooking behavior, and therefore, overall food literacy. This is in line with the finding by van Uden-Kraan et al. [17] that reading activity is crucial for getting informed and feeling confident, while additional active participation primarily contributes to social well-being. Based on the theoretical framework of information literacy and related concepts, we can assume that critical evaluation of information is an important element of the aforementioned cognitive process of becoming informed. The sharing and commenting activities might be a reflection of differences in personality traits, such as the extraversion and agreeableness of the participants. Active commenting, liking, and sharing of personal experiences or even giving advice does not automatically imply a high level of critical thinking and other aspects of literacies. There are great differences in the quality of active participation, depending on the

domain knowledge and expertise of individuals, and the levels of their literacies. It is reasonable to conclude that cognitive and emotional engagement with the information while reading is crucial, while visible activities in the group are secondary. The metaliteracy framework could be modified based on the conclusion that reading and using the available content is more important than visible activity of sharing and collaborative production of knowledge. Also, in this research, the self-reported everyday life behavior was an important indicator of perceived food literacy. This integration of behavior and literacy concepts gave comprehensive insight into the literacy of individuals.

Multiple regression analysis made it possible to reach key conclusions about the role of specific aspects of engagement in forming food literacy. However, in order to make the results more tangible, K-means cluster analysis was applied with the goal to identify the most distinct subgroups of users.

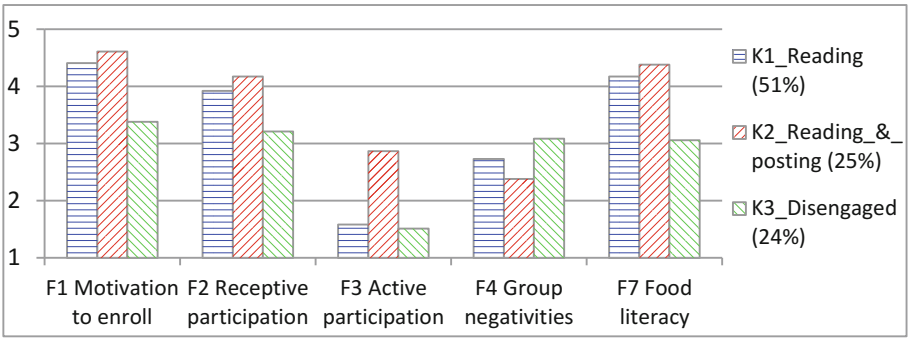

Fig. 1. Three clusters of distinct users based on their motivation, activity and literacy (K-means)

Figure 1 reveals that 51% of the surveyed members are classified to the cluster K1_Reading. They have the following features: rather high motivation, high frequency of reading and using the group content and high perceived benefits in food literacy. However, they are passive, invisible or lurking users whose participation is only receptive. The most active subgroup, cluster K2_Reading_&_posting includes 25% of the surveyed members. These members have the highest scores on motivation, receptivity and active participation, and perceived food literacy benefits. The difference in food literacy between the visibly active (K2) and lurking (K1) groups is rather small. As evident in the multiple regression results (Table 2), the strongest predictor of both food literacy components (F5 and F6) is reading and using the contents, while active commenting and posting has a weak, but still positive impact on the literacies. Both visibly active (K2, Fig. 1) and passive/lurking members (K1, Fig. 1) are often reading and using the group content, so all of them are receptive participants, while the active cluster members additionally participate in visibly active ways, by commenting and posting.

The third cluster, named K3_Disengaged, 24% of the surveyed sample, has these features: low reading and use of the group's content, low motivation, low perceived

food literacy benefits, and a moderate, but compared to others, the highest level of perceived negativities in the group. These perceived negativities could be the main reason for their low use of the group, but it cannot be concluded with certainty. They might perceive the group negativities because they are superficial in reading the guidelines and because they have a lower level of motivation to use the group. As mentioned earlier, the scale of group negativities (F4) has rather low metric validity. Part of the reasons for that is the different ways the users perceive group negativities. Some members do not agree with the group dietary guidelines and it contributes to their dissatisfaction with the group. Yet, other members argue that the advice given by some of the non-expert members of the group are not in line with the group guidelines and could even be dangerous, and those non-experts should not be giving advice.

It is necessary to point out that, even though the sample is rather large (N = 1081), it covers only a part of the Facebook group members, and those surveyed members are probably more active (posting and commenting) and maybe more receptive or lurking (reading and using) in comparison to those who did not fill in the survey. Hence, the percentage of lurking and especially the percentage of disengaged users might be substantially larger. Lurking users are not visibly active, but their receptive activity is evident in the frequency of content use. They have readily filled in the anonymous survey, as reflected in the size of cluster K1. However, disengaged users are visiting the group only occasionally, so they have a greater chance of not seeing the survey. Nevertheless, these results properly reflect the perceived literacy and behavioral dynamics of the Group members who are actually using the group.

Limitations of this study are measures which are based on self-perceived literacy and behavioral changes. Future research should include more objective measures, and preferably experimental and longitudinal research designs with additional variables.

5 Conclusion

The aim of this research paper was to explore possible benefits for the members of the Facebook group in changing their perceived literacy and behavior related to nutrition. The group follows World Health Organization's recommendations and principles on how to start complementary feeding of children.

The topics represented in the Group documents (RQ1) were gathered and analyzed. The main documents are created by expert administrators, but members collaboratively contribute in creating and commenting on the documents. More than half of the documents in the Facebook group contain descriptions of nutritive values and ways of preparing meals with specific groceries. Nutrition diet for specific health problems is the topic of nearly 10% of the files. Also, there are various general nutrition guidelines for babies, and related topics.

The challenges that the main administrator is facing (RQ2) when seeking and sharing verified information include: unverified sources regarding food allergies which can be harmful to children's health, and opposite advice and interpretations from experts themselves. The administrator stated that the field itself is in constant change and an individual approach is crucial. The challenges that the users are facing when seeking verified information include (RQ2) situations when their pediatricians give

advice that is contrary to some of the well established guidelines and principles about the age of introducing certain types of food to children.

The users perceive their behavioral changes towards healthier food choices (RQ3) as rather high. Specifically, the highest behavioral changes that the surveyed parents perceive are in preparing healthier food for their children (M = 4.4), using more home-made food (M = 4.3), and reading and understanding the food declarations more carefully.

In order to take into account the context of everyday life, the self-reported literacy metrics used in this research were context specific, with perceived behavioral changes as an important part of food literacy benefits. The most important predictors of perceived food literacy benefits from the group (RQ4) are receptive participation and motivation of individual members. In line with that, members of the two clusters (K1 and K2) that are frequently using the group content and that are highly motivated have the highest levels of food literacy. The active participation in the group is a weak positive predictor of food literacy, and its weak importance is also evident in the small difference in perceived food literacy between visibly active (cluster K2) and lurking (cluster K1) group members.

Overall, participating in this specialized Facebook group surpasses the simple aspects of sharing baby recipes. The users are developing or at least enhancing their food literacy by improving nutrition literacy aspects of seeking and choosing credible information, and by refining their healthy cooking behavior.

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An Invitation to Globalize the Information Literacy Agenda: Expanding Discourse

Sergio Chaparro[1] and Zachary Newell[2(✉)]

[1] Virginia Commonwealth University, Richmond, VA, USA
sergiochaparro.phd@gmail.com
[2] Eastern Illinois University, Charleston, IL, USA
zlnewell@gmail.com

Abstract. This paper attempts to investigate and discuss concepts of information literacy (IL) in light of global challenges to information access, the pervasiveness of educational inequalities, and the culture of informality that affects information consumers across spectrums around the world. We explore the possibility that these factors suggest a need to refine IL as a way of increasing its impact for the everyday citizen and expanding its mostly inside-the-classroom effect. We also propose the need to investigate the role of social media in normalizing misinformation and disinformation for everyday citizens in developing nations – what the authors see as dysfunctional information scenarios (DIS), where the majority of news is retrieved through contaminated channels. In turn these problems erode the basic principles of both democracy and IL and point to a need for IL educators to do more to expand the reach of information literacies across socioeconomic, cultural and political divides.

Keywords: Public sphere · Human rights · Socially enacted IL · Information poor · Fake news

1 Introduction

An article written in 2010 discussed libraries as being central to the debate that IL is a human right [1]. The authors present a case for educating and equipping people with the skills to critically examine the messages that reach them through a variety of media. This is not something that should be left to librarians alone – librarians cannot do this alone.

If we start from a human rights perspective, there is a strong, inclusive interpretation of IL. Defined as a human right, IL encourages librarians to look beyond the library use aspects on which they normally concentrate and, instead, incorporate powerful social aspects in communicating the value of the programs they (we) implement. Furthermore, rooting IL in a definition that includes human rights moves professionals to try to help people by developing their capacity to understand and interpret information; however, incorporating a right to IL education, has proved challenging in light of educational inequalities and in the absence of libraries in fostering a human rights perspective.

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Libraries have more recently been viewed as a space of cultural, social, and epistemological change in which competing knowledges and discourse of different ideas and spaces is brought into conversation to challenge and reshape identities. This is what might be called Third Space–where the librarian in partnership with the wider community, might function as a companion or guide for the adventurer or the displaced [2]. Librarians, embracing Third Space are cultural workers, aware of people as constantly between stages of development and struggling toward fulfillment. The library, then, provides context for struggle. The library becomes a space that involves understanding of who people are, what they care about, and how to engage them with adventure, play, and struggle to find personal meaning in information. Third Space becomes a new democratic space where librarians and library users work together to create real and meaningful conversations about information and how we use it to make our points and live our lives. How does this process work for those who do not inhabit or have access to the space of libraries? Can we extend Third Space within a larger, public cultural practice?

With recent attention on the propagating of dis-and mis-information, self-reflection might lead to the conclusion that librarians must assume some responsibility for part of the most recent crisis. Librarians, by trade, have worked to combat "fake news" – establishing credible channels of information, reinforcing authority, and educating in a number of environments users to utilize and appropriate information responsibly. The "crisis", while visible, is not entirely new. IL, justifiably a right for all, depends on formal channels of education in affording people the opportunity to approach information with a sense of authority and knowledge. There seem to be educational inequalities that create barriers to IL education for many. As educators of IL, occupying formal outlets for prescribed means (standards and frameworks) for implementing and teaching IL ignores a large audience of the information consumption world.

2 Expanding Communities of Practice

The idea that IL is constantly changing requires continuous re-examination of its principles and applications on learners in all avenues. This comes as part of the territory of assessment in claiming, or rather staking, value for both the learner and the educator. There is a political dimension of IL education – an issue that needs more exploration and research than has been conducted thus far [3]. Librarians lack the capital within Higher Education Institutions to transform their practice and culture. The impact that librarians-as-educators can have, and are permitted to have, in shaping learning environments (ecologies of resources), the cultural environment that supports these efforts and how that culture can be changed, seems to be limited by the stature of librarians within the culture of higher education [3]. This also speaks to the necessity for librarians to strengthen collaborations and partnerships beyond higher education and the formal structure of libraries. To get information consumers to be more reflective about the process of information, its creation and the way it is consumed requires negotiating collaborative relationships, which is dependent on the space and place of others, rather than independently crafted through solitary reflective practice. These relationships depend on the space that consumers occupy. It can no longer be the space

of higher education, the sharing of information between prescribed practices within a professional context. Instead, partnerships must be solidified and measures codified between educators, journalists, government agencies and companies as purveyors of information sharing (also known as the tech industry). It is more important now than ever for global consumers of information to understand how information is created and to collaborate with others to create a sense of agency.

2.1 Socially Oriented IL

Lloyd has been one of the biggest proponents of questioning the core elements of IL practice, of how the practice of IL happens and of how it is experienced. There is a bit of a tension that is developed in IL, particularly through Lloyd's work. The views are best summarized in a work, "Information literacy as a socially enacted practice" [4]. Lloyd often cites Merleau-Ponty's *Phenomenology of Perception* as a framework for understanding the ontological and epistemological conditions that establish and operationalize IL as a practice within a setting [5]. Lloyd references the term "insider" in passing, but it is conceptually similar to the outsider model of Chatman (situating information knowledge within a particular setting). For Lloyd, those negotiating the information landscape make sense of information when they are engaged within the exchange of practice and knowledge within that shared, insider space. As we consider the recent events of shared dis-and mis-information, we must consider that the attention received to the "fake news" movement has taken on a life of its own through the ubiquitous and pervasive nature of the online world – made possible through the proliferation of portable communication devices.

Lloyd's work represents a view of IL as a way of knowing an information landscape and as a socio-cultural practice. According to a more recent article, Lloyd explains that IL is conceptualized as a practice which contributes to our performance in everyday life and which, when explored carefully, references the context that shapes and enables that performance. From this perspective, ILis understood in broader terms, rather than restricted to enactments related solely to text-based mediums (print or digital). The practice is also present in a corporeal and social sense. It does not just connect us to epistemic/instrumental ways of knowing, but also to "local, nuanced, contingent and embodied forms" [5]. For Lloyd there is a question of how IL happens and how it is experienced.

In the conceptual space, is conceived primarily from a socially oriented perspective, which emphasizes the qualitative nature of information experiences in relation to specific contexts [5]. Lloyd continues to say that becoming information literate requires the development of a meaningful understanding of how knowledge is constructed, located, situated and valued within a landscape and the range of activities that enable information to be drawn from that knowledge base.

Working from this premise, we might ask: how is information experienced and extracted for those who occupy neither a socially nor a professionally oriented space – a space by which the exchange of practice and knowledge within a shared insider space is observed and "normalized"? What if those who navigate the information world are not considered insiders? How can we, as information professionals, embed IL practices for the everyday consumer?

The relationship between the information outsiders and that of the insiders suggests a world of social norms and mores that decides what information is important and what is not. Chatman explains the insider/outsider dichotomy from the perspective that the insiders' lived experiences are shaped by a shared cultural, social and religious perspective [6]. It is through these common experiences that provide expected norms of behavior and ways of approaching the world. This insular world also creates a sense of secrecy and protection with the idea that outsiders cannot comprehend a world different from their own. Insiders claim privileged access to certain kinds of knowledge. This idea is devised to protect insiders from "contamination" of the outside world. Outsiders, on the other hand, because they are part of the larger society, claim to have a more cosmopolitan view of the world, and thus easy access to its resources. There is a system of meaning that is played out based on the identification of insider/outsider. What happens when the "insider" is contaminated by outside influences, incapable of applying traditional frameworks to information to discern its meaning and intent?

3 Discourse and the Public Sphere

We have often used Habermas' theory about the public sphere – that democracy began in discourse [7]. The discourse for Habermas is founded on the beginnings of democracy – as those in the public sphere providing limits to authoritative influence. Habermas looked at historical models of the public sphere as providing balance to outside control by the state – as a space in which individuals had the capacity to develop their own ideas and communicate them in an open forum. There is a prevailing idea that the public sphere – free exchange of ideas – has eroded under a "variety of forces", including the influence of mass media and information consumerism that have adversely affected decision making [7]. This creates a discussion about a renewed public sphere so that public opinion can flourish again. The idea of the public sphere is predicated in part on the free exchange of ideas – a place that can nurture and activate critical examination, and as a mediator against media influence. It is often debated how the library fits into definitions of the public sphere. For the authors, conversation around the public sphere must be combined with an understanding and readings about critical literacy/theory. Where this is not entirely likely, it is necessary for a community in practice – in reflective partnership – to work together in open dialogue in fostering the exchange of ideas and developing critical capacity through appropriate channels (those channels occupied myopically and exclusively by the insider).

In some ways, the erosion of the public sphere depends on an approach that centers on our capacity to reintroduce IL, a critical approach to understanding and appropriating information for use in our daily lives. The erosion of the public sphere requires both instructors and librarians working together to draw on critical literacy theory, or critical pedagogy, where the instructor (en masse, those who work in partnership to build the public trust) introduces topics and directs learning but does so with public input and by valuing public experiences. Recent studies in the United States have cited the trust placed in the public library [8]. The library as a place is rooted in traditional ideas of democracy – transparency, equality, and advocacy for free and open dialogue. More people trust information from their local public library than from any other

source [9]. Learning is becoming a social process that is community- focused. As the arbiter for access to information, it is seen as the duty of librarians, today is it was years ago, to provide access to the fruit of human thought and communication, "not to reality, but to multiple representations thereof" [9]. This is a view that might best be described for the developing world – where libraries, education and the public are indissolubly joined.

4 Educational Inequalities – Limited Access to Libraries

Some of the most relevant statistics about library access in the developing world seems to indicate a consistent pattern of inequalities regarding Internet and library access [10]. In sum, the average citizen around the world still has limited access to the Internet, and by extension, to a variety of digital materials and information, including libraries.

Aside from the usual consequences of this situation (for example, limited access to knowledge and self-education, persistent information gaps, and lack of support for primary and secondary education), there is a larger problem: On the one hand, there seems to be a misleading perception: access to the Internet is not a problem, in spite of the evidence to the contrary. On the other hand, there is another inaccurate construct: that Internet access is all that matters because "everything is on the Internet". In many cases, the situation gets even worse by the assumption that internet access guarantees access to knowledge, therefore making libraries and library access both irrelevant.

In spite of the numbers and data available, we have to remind ourselves always that library impact goes beyond the mere count of libraries or collection size. There seems to be a consensus about the role that IL places on the socio-economic development of a nation but, at the same time, collecting statistics about IL worldwide is difficult due to the lack of data available [11].

We suggest that it is not enough to have a physical library in place, unless we examine other factors related to its impact. It is definitely not enough to have a library unless we examine the library from various perspectives and metrics to assess its value and impact. It may be very misleading to perform just a head count and assume that the number of libraries per country is in itself a consistent indicator of library culture, access, and IL. There are in addition other factors like the demographics or language of the users, the linguistic orientation of the materials, ease of access, among others [7]. Entire linguistic groups, for example, in South America or Africa remain conditioned to library information sources in a foreign language, or limited by the scarcity of library resources in their vernacular language. Inequalities exist at different levels in nations that pay no attention to the intricacies of information access for their citizens, and believe, consciously or not that one information and communication tool (for example, Internet) or one language (for example, Spanish) will equalize access to information for its citizens.

The problem as it persists in the fake news circle is that information is drawn predominantly from personal devices and social media, eliminating any characterization of the role of libraries, even in areas of the world where they are most relevant to democratizing information. The socially oriented perspective in which information

experiences are constructed in relation to specific contexts becomes void of a proper context; information is not constructed, but rather consumed indiscriminately.

Becoming information literate requires the development of a meaningful understanding of how knowledge is constructed, located, situated, and valued within a landscape and the range of activities that enable information to be drawn from that knowledge base. To a large degree, we would characterize those who access and consume a one-dimensional line of information (without understanding how knowledge is constructed, located, situated and valued) as among the information poor. Information poverty (an impoverished information world) is defined in which a person by affiliation with insider membership is confined to the norms of the insider circle. Social groups (and social media) contribute to information poverty by hindering an individual's need to seek information (everything is in front of us), and the individual keeps others from sensing a need for information. In everyday life, for people to benefit from information received from outsiders, there needs to be trust associated with the process.

5 Informality of Information Consumers: Portable Communication Devices and Culture

Chatman describes situational relevance as relevance in an everyday context—that which will be of interest is that which is useful in response to some concern or problem. Relevant information is then construed as not always in the best interest of the individual. The notion of relevance becomes more selective the more personal the nature of the information being sought [6]. For information to be relevant, there must be a personal meaning attached to the way it is located, situated and valued (within a socially constructed context). Access does not necessarily involve meaning. We have to be very careful in separating access from information impact, relevancy, and library impact.

Data about Internet access worldwide needs to be carefully reviewed in light of the global situation related to information and communication technologies (ICTs). This paragraph on the International Telecommunication Union's (ITU) Report is indicative of inequities in access to information:

4.3 billion people are still not online, and 90% of them live in the developing world. Fixed broadband penetration stands at 6% in developing countries, compared with 27.5% in developed countries, and growth rates are slowing. Mobile broadband is growing fast, but the difference between developed and developing regions remains large, with 84% penetration in the former as against 21% in the latter. Increasing ICT uptake in the world's least connected countries (LCCs), which are home to some 2.5 billion people, should therefore be the policy focus for the years to come. In these countries, the share of population living in rural areas is often high, reinforcing the urban-rural digital divide [10].

According to the data, global online access remains unequal and suggests a picture of informality in terms of information consumption on the part of citizens in the developing world. Unable to gain access to qualified and curated knowledge from libraries, that citizen also faces the problem of information and communication

technologies' divide. Unable to benefit from consistent access to one or the other, we assume the citizen has to rely on pockets of access obtained through mobile communication technologies, when available or the use of libraries with, for instance, limited collections or public access. We suggest that this context produces an informal information consumer, especially the mobile communication and technology user, who is not educated on the complexity of the information searching and whom perceives information searching as a simple activity intended to fill a gap without critical thinking, much similar to the role *fast food* plays in the eating habits of the population. This fast food mentality produces several potential risks to the citizen. Much like the actual fast food provides an illusion of knowledge that is not really there. In addition, as mentioned before, it misleads the citizen into believing that searching for information and gaining knowledge is actually a very easy and simple process, just like typing words on a search engine and choosing results from a list. It separates the citizen-user from the critical perspective that, for example, IL educates in every possible library interaction. Finally, it separates the citizen-user from the notion of intellectual authority that emanates from libraries, promoting the usual question of: Who needs libraries if I have internet access?

Needless to say, we also face, based on the numbers, the challenge of an increasing number of mobile users who have zero or very limited experience with public library and academic library use, but for whom portable mobile communication is the only way to access information. The fast food syndrome remains present here, like *food deserts* in inner cities of first world and developing nations, fast food remains the only option available in the neighborhood, promote a whole set of unhealthy eating behaviors. The same with information. The absence of a reliable library, with consistent quality collections, professional librarians, solid access, for instance, offer the citizen-user of information very few and usually poor choices to select, read, and consume information. The options are limited: Strong reliance on Google or Facebook-like options [12], ignorance of advance search options, misunderstanding of the role and value of research, absence of critical thinking when evaluating sources, and limited access to either printed or digital information. These elements characterize the information poor. All these factors seem to encourage the existence of what we call dysfunctional information scenarios (DIS), where in addition to the conditions mentioned before, citizen-users of information have no option but to consume "contaminated" information provided by a very small number of information sources in "information desert" environments. The citizen-user of information has no alternative for consuming news, for example, through information channels. In addition, when these scenarios occur in media concentration nations, open discussion of issues, information biases, rejection of opposite views and biases towards specific political and economic agendas, limit then the democratic discourse, increasing the need for IL agendas, mechanisms, and institutions that educate and inform the citizen in the selection, retrieval and analysis of information. Cases of media concentration in, for example, Argentina, Peru or Brazil [15, 17], are very indicative of this trend [17], as well as the spread of political discourse strategies that favor DIS [13] to cause the maximum effect. These DIS represent an extremely disruptive force against democratic dialogue first and user's perception of reliable information sources second, especially media information [14]. Contaminated channels are an obstacle to information flows and citizen's perspectives,

and at the same time, erode the ability of the citizen-user to analyze critically information in formal and informal contexts. They also provide the illusion of the "informed" citizen – which increases the risk of becoming more disenfranchised regarding information [17]. This misperception of information is particularly damaging in areas like South America where the existence of multiple news channels for example tricks the citizen-user into believing he or she is enjoying an actual balanced and dynamic information culture of democratic discussion or perspectives and views when, in turn, media or information channels regulation have allowed for more options but less information [12].

We propose then that media conglomerates are cartels/monopolies that represent another obstacle to the situational relevance of information because they only feed the user/citizen with (fast food) information/news. They offer the illusion of options and choices for the citizen/user, but in reality, make the citizen-user more prone to, for example, political manipulation.

6 Conclusion

As discussed above, the proliferation of information so readily available by way of personal communication devices establishes an impersonal nature to the consumption of information. The dependence on a myopic source of information also negates the need to understand the greater value of information, the need to seek out trusted sources, or for understanding the need for varied points of view. Without the presence of public libraries, or a socially enacted context, we cannot mandate an educational component without the partnerships formed from all members of society – politicians, media, tech companies, and educators. We continue to depend on global agencies, such as UNESCO, but we must re-engage with grassroots efforts to understand the information is created, proliferated and utilized in multiple contexts. While this is a massive undertaking, it requires that IL educators at all levels reposition the way we understand the currency of dis-and mis-information, and what can be done to advocate for a more widespread IL across cultural and socio-economic boundaries.

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Biometric Tools in Information Science. The Example of an Information Literacy Study – A Holiday Planning Experiment

Justyna Jasiewicz(✉), Małgorzata Kisilowska, and Anna Jupowicz-Ginalska

Faculty of Journalism, Information and Book Studies, University of Warsaw, Warsaw, Poland
{justyna.jasiewicz,mdkisilo,a.ginalska}@uw.edu.pl

Abstract. Effective studies within interdisciplinary research fields, such as information literacy, require complex research methodologies. The purpose of the paper is to present the possibilities of biometric tools in the field of information science in triangulation with other methods and techniques. In addition to a literature review, the paper presents the project concerning information skills of young respondents in everyday life tasks. The study was conducted with the triangulation of a behavioral experiment, biometric measurements, and individual interviews. Results proved that young people are not as fluent in social media usage as it may seem. College students have limited communication and content creation skills. University students, however, present more advanced information skills. That might implicate the positive influence of university education and socialization on information literacy. During the project the biometric measures proved to be effective tools in exploring psychophysiological reactions while executing information tasks.

Keywords: Information literacy · Digital skills · Biometric tools · Experiment · Methodology design

1 Introduction

Nowadays numerous daily activities are being realized in the digital environment including shopping, travelling, cooking, and paying bills. Therefore, the importance of information literacy in everyday life activities is obvious. While the amount of actions that are realized on-line is growing it is important to know how young people, often perceived as technologically and informationally skilled, deal with Internet services. At the same time, new research possibilities, emerging from technological development, enhance chances to understand how young people are using digital technologies in everyday life. Biometric measurements enrich information literacy research, both in methodological and essential ways. In this paper potential usage of biometric methods in information science will be explored. Its' purpose is the presentation of the possibilities of biometric tools and their potential use in the field of information science in

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triangulation with social sciences' methods and techniques. Besides the literature review, the paper presents the project concerning information skills of young respondents in everyday life tasks, such as planning a holiday trip.

2 Literature Review

2.1 Jan van Dijk's Access to New Media Model

van Dijk's [1] model of access to new media, being a conceptual framework of the discussed project, clearly defines types and levels of competencies required for being an effective member of an information society. It specifies four levels of access to information communication technologies (ICT): motivational, material, skills, and usage. The skills level, which is next to last, includes six levels/areas of skills:

- operational – the ability to operate software, use of various input options, operate files in various formats;
- formal – the ability to navigate the Web with the ability to 'find yourself';
- information – the ability to find needed information;
- communication – the ability to choose and participate in online contacts, online image management, online experimenting, and negotiating in order to obtain optimal results of actions taken;
- content creation – the ability to create quality messages and publish them online;
- strategic – the ability to choose and direct actions towards a goal, make decisions, and to take advantage of achieving goals [1, 2].

The above model draws attention to the motivation and to the benefits of contact with digital media. This approach redefines the assumptions of digital activation and education, focusing on individual determinants in the use of digital technologies. Thanks to the van Dijk model, the axes of interest are motivation, competences, and applications of digital technologies. Digital competences are perceived as a condition for the extensive use of digital media in various contexts. In connection with the above, this model allows to regard digital competences not as a rigid register of skills that should be possessed, but as a multidimensional issue that determines the effective use of the opportunities given by digital media.

2.2 Biometric Projects in Library and Information Science

Although biometrics offers wide range of solutions and might be a valuable supplement to the research methods used widely in the library and information science (LIS field), such as interviews or observations [3], it is used rather frequently. Popular applications of biometric tools in LIS research include reading patterns [4, 5] and information retrieval, in particular evaluation of relevance criteria [5–9], and evaluation of search results in individual documents [10]. Biometrics is sometimes also used in evaluation of online services provided by the libraries [11, 12]. Lopatovska and Arapakis [13] offered a review of theories and studies of emotions in LIS, information retrieval, and human-computer interaction. They also mentioned neuro-physiological signal processing methods, i.e. biometric studies on emotions in information processing.

Projects focusing on reading patterns include for example the one concerning reading effectiveness – its influence on the process of metacognitive skills and development of specialist knowledge. Eye tracking was used also in a research aimed to examine online reading patterns of first language and second language readers. It was recognized that both groups of respondents performed equally well and similar behaviours were observed when it comes to navigating through the text, but second language readers needed twice the time as first language readers to find needed information [14]. Problem of text relevance assessment with an eye tracking has been analysed by Gwizdka and Zhang [15], as well as eye tracking and EEG by Gwizdka et al. [16]. They found out that reading relevant texts differed from reading irrelevant ones in larger pupil dilations, longer fixations, and higher propensity. Buscher et al. [4] have found strong relationship between reading patterns and relevance (reading behaviours are very focused on relevant part of documents), as well as relevance and gaze-based measures. Their results can be useful in improving and personalizing information retrieval methods (in both printed and Web documents) and in developing so-called attentive documents.

The other category of biometric projects consider information behaviours of the users of library websites and services (OPACs). Kules et al. [12, 17] examined library users' gaze behaviours while searching a web-based, faceted library catalogue, and depending on the training, familiarity with this tool, and/or the stage of searching process. They applied both eye tracking and interviews to gather data. The study confirmed the proportion of facets in library interface use, its changes during the searching process, as well as in the result of video training. Examination of effectiveness of academic libraries' Internet usage to meet the needs of the users was undertaken by Mierzecka and Suminas in 2016. As the outcome of eye tracking research of student behaviour it was stated that although academic libraries see websites as important gateway of communication with their users (based on an observation of amount of information available there), they do not meet users' needs. It was observed that users seemed to be lost while performing everyday activities, such as using an online catalogue, checking opening hours, and logging to their account [11].

Studies on online information retrieval concern evaluation of relevance, of the searching process, and its results. In their position paper, Mostafa and Gwizdka [18] defined potentials of applying neuro-physiological measurements (like eye tracking, EEG, fMRI) in research of information retrieval behaviours and formulated recommendations and cautions concerning highly desirable development of this approach. Cole et al. [13–19] presented and confirmed a potential of eye tracking measurement for exploring user's domain knowledge, without considering content of documents or websites, but referring only to eye movements patterns, that can be further analysed in studies on user-centered, personalised information systems.

Knaeusl and Ludwig made an attempt to develop a theoretical model for planning searching paths [20]. They referred to changes in motivations and contexts of searching, using the Wikipedia example. They considered use of Wikipedia not only in searching for learning purposes, but also for leisure, on mobile devices, any time – any place. Eye tracking, electromyography, and browser logs were used to record the respondents' activities: looking up, learning, and browsing. Actual differences were found in information searching behaviours depending on the task. Arapakis, Konstas

and Jose [21] aimed at exploring information processing psycho-physiological symptoms, trying to develop a model describing affective features of information searching. They used an automated facial expression recognition system, heart rate monitoring, galvanic skin response, and skin temperature. As a result, a classification of user affective responses from biometric data was developed. The authors confirmed that these responses "vary across the relevance of perused information items" [21, p. 468]. Lopatovska [22], referring to the facial-expression theory of emotions, recorded respondents' face expressions with computer camera, and analysed them with a specific software their emotions during and after online information search. She did not found any direct influence of search tasks, performance variables, or quality of search results on the respondents' mood. The only relation was between a positive mood accompanying fewer search activities and a negative mood resulting from an increased number of search activities [22, p. 1790).

Although the use of biometrics in information science is somehow limited, Gwizdka and Zhang [15] offered a new "neuro-information science" term as encompassing research trends using neuropsychological tools and methods of measuring reading or information searching behaviours.

3 Holiday Planning Experiment

Due to the need of exploring potential use of biometrics in the field of information science, research based on the ground of methodological triangulation was conducted. In addition to a behavioral experiment, observation, and individual interviews were carried out. Although the research aim was to study behavior on the internet and social media in a task based setting and explore wide range of digital skills of the youth, outcomes concerning information skills will be presented here.

3.1 Research Questions

The following research questions were formulated to explore information skills of the youth:

1. Do the respondents pay attention to the collective knowledge elements (opinions, ratings, "likes")?
2. Which opinions attract attention of the respondents most (shorter, longer, newer, older)?
3. Do the respondents pay attention to factors that prove the reliability of information (date, source)?

3.2 Research Settings and Methods

Qualitative methods (semi-structured individual in-depth interviews) were used along with ethnographical (non-participating observation) and biometric ones (eye-tracking and face-tracking). Additionally the Polish adaptation of the Positive and Negative Affect Schedule (PANAS) by the Psychological Test Laboratory of the Polish

Psychological Association was used [23]. The research was carried out by researchers at the Media Analysis Centre at the University of Warsaw.

Task. The respondents were asked to complete a task of everyday use of ICT and information available online. It was expected that this kind of task will minimalize the risk of outcomes misstatement caused by the unnatural laboratory situation. Therefore the respondents were instructed to prepare a post in any social network they used, inviting their friends to a holiday trip to Masuria, a well-known holiday destination in Poland. Respondents were allowed to use any functionality of a social network. Additionally they were asked to check the opinions about the destination, travel options, and local attractions. They were supposed to insert a picture in a post and clear the search history of the search engine after completing the task. The level of difficulty was similar for all the respondents, especially due to the location of the destination in Masuria region that is situated apart from the main attractions of the region, with the limited possibility of traveling by public transportation. Therefore previous visits to the region would not affect the research task itself.

Operationalisation of Jan van Dijk's Model of New Media Access. Regarding research aims and questions, operationalisation of a competence level of Jan van Dijk's model of new media access was of key importance. Therefore, first we offered a potentially completed list of activities for each area of competence. Then the activities that were not expected to appear in the task to be realised were removed. Indicators were added to the rest. Final version of the observation sheet included eleven subject sections with particular activities and two additional sections for biometric measurements only.

Pilot Test. Before the research, two pilot tests were realised: the first was to verify the observation sheet; the second – all the measurements. The pilot test of the observation sheet was realised on November 9, 2017, with two respondents (adults, 1 woman and 1 man). During the test it was noticed that completion of the task took a dozen or so minutes, and its first part (before writing a post) – less than 10 min. This observation enabled shortening the anticipated time of task realisation; minor changes in the observation sheet were also introduced.

A pilot test of the whole research (including all types of measurements) took place on November 23, 2017. We confirmed amendments and changes in the observation sheet, as well as previous observation concerning time for task realisation. We discarded previous assumption concerning 2 researchers to observe a respondent (one in a cabin, the other at the measurement equipment), as it was noticed, that this would be too stressful for the respondents. Another changes were made in the observation sheet: abbreviations and coloured sections were added to facilitate its navigation; order of behaviour components was changed; an indicator concerning usage of keyboard shortcuts (e.g. alt + tab, crtl + c – in the section "efficiency in hardware and software usage") was added, and minor language changes were introduced in a description of behaviours.

Research. The research was conducted during December 2017 and January 2018 with all selected methodologies. Biometric measurements were collected form 19 respondents: 13 high school students (2 women and 3 men measured on December 15, 2017;

4 women and 4 men measured on January 12, 2018), and 6 university students (5 women and 1 man measured on January 8, 2017). Due to poor quality of some data, 16 persons were selected for further analyses: 10 high school and 6 university students. All the respondents participating in biometric measurements were also observed; 14 of them were interviewed.

The measurement data were integrated in the iMotions platform, monitoring, and analysing reception of audiovisual media. This system enables biometric measurements (physiological reactions to a stimulus) taken with specific equipment. In this research the following devices were used:

- eyetracker TOBII X2-60 (60 Hz) for measuring eye movements during reception of different media content;
- Affectiva (Facial Expression Analysis Engine) for monitoring so-called mimic expression, in other words, measuring and coding movements of face muscles; this measurement enables reading and interpretation of basic emotions, being expressed during reception of specific parts of stimuluses (e.g. advertising spots, films, and texts).

Next, the results were recoded to integrate them with the operationalised van Dijk's model. The recoding procedure were based on the Likert scale, modified according to the project's specific. A general scale and three detailed scales were applied to particular activities, shown in Table 1.

Table 1. Recoding scales for the actions taken during realisation of the task.

General scale	1 – done 0 – not observed −1 – done, but mistaken
Media differentiation scale	1 – applied $\geq$ 5 media 0 – 1–4 media applied −1 – 0 media applied
Writing efficiency (number of fingers being used while writing on a keyboard)	1 – > 6 fingers used 0 – 3–5 fingers used −1 – 1–3 fingers used
Time needed to prepare to writing a post	1 – $\geq$ 3 min 0 – 1–2 min −1 – 0 min

Due to the complexed research methodology, empirical material is very extensive. It is worth to mention that interviews outcomes, even though they are not presented here, were recorded and analysed. Because of the obvious limitations, in this paper only chosen results of the eye-tracking and face-tracking measurements will be presented, while the latter were used in exploratory scope here. Deeper analysis of the empirical material will be presented in other articles.

3.3 Results

Before the results concerning the information skills will be presented, some general observation are required. First, all the respondents completed the task and prepared the post, even though three of them (college students) did not paid attention to any opinions at all. Secondly, the respondents used different ways to meet the task criteria, but still some common sources were used: Facebook as a social media where the invitation was prepared, and Google as a first-choice search engine. Most of the respondents additionally used Booking.com, Google Maps and Google Images. While collecting information about the holiday trip destination, a few of them also used the Polish equivalent of Booking.com – noclegowo.pl. Thirdly, respondents from both groups did not need much time to locate information needed to prepare the post: university students spent on that 5 min in average, while the college students – only 2 to 3 min, but a few them needed 7 or 16 min on that. Within that time span they were able to find a guesthouse's website (via Google) and open a couple of other websites, as potentially useful in task realisation. Writing the post took more time: 6 to 20 min for college students, and 13 to 34 min for university students. While doing this, they either browsed through the websites opened before, or developed the post. The task was more time-consuming for the latter. This can be explained by their greater awareness of the task complexity, more careful selection and usage of information sources, and more precise construction of the post. These differences come from information more than operational competences, however potential explanations require further studies.

None of the subjects applied an option of advanced searching nor the Boolean operators while formulating the information retrieval phrase. It can be discussed in regard of information competencies, but effectiveness of Internet searching tools seems to be sufficient to complete a task of this complexity.

Nevertheless there were clear differences between university and college students observed. While the former run (limited) search and collected information about the destination of the holiday trip, the latter immediately started to work on the Facebook post and searched for the needed information in the meanwhile.

Results show that most of respondents pay attention to the opinions – 12 of them read short (or numeric) opinions (see Fig. 1). One did it carefully. It is worth mentioning that 3 respondents did not read opinions at all. When it comes to the numeric reviews there is bigger discrepancy between the respondents – only 7 of them paid attention to them; 9 did not. Therefore we can cautiously suggest, that it is not a routine activity, taken as an obvious or indispensable element of most (if not any) information searching.

There are recognizable patterns while reading the opinions. The respondents did not favour longer opinions, even though they seem to contain more information. They were read by older respondents recruited from among the university students, while college students tend to skip longer opinions and read shorter ones.

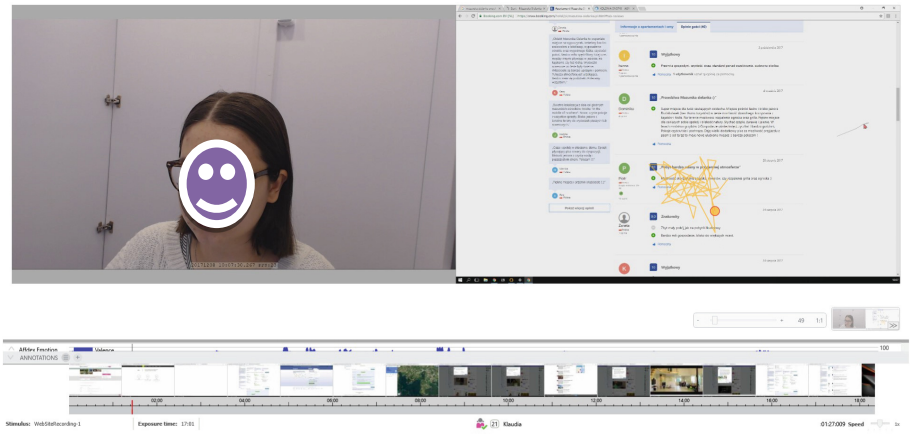

Fig. 1. Fixations on a short opinion at booking.com.

Analysis of websites selected as information sources does not empower us to make any conclusions concerning respondents' decisions in relation to websites' reliability. We cannot verify if the trust in booking.com is characteristic as all the sites being visited were selected from among first 3 to 5 search results on Google. This can be considered as a kind of respondents' "laziness" and routine. No other recognizable patterns of verifying information were noticed. Respondents did not check the date nor the institutions/persons/other authorities responsible for information.

If the respondents were not able to achieve what they had planned, a sense of being lost and/or helpless was observed. They were neither able to find a mistake nor to correct it while conducting the task.

3.4 Limitations

Limitations of this project are twofold. The first one is the number of the respondents in this study. The other was related to the laboratory conditions of the experiment and potential influence of a "being observed and recorded" status on the respondents' behaviours and/or emotions. This might have slightly reduced the authenticity of performed activities. However, it should be noted that it was the sphere of social media that was researched, where it is obvious to be exposed to the assessment and judgment of other Internet users. Due to the exploratory character of this study, verification of the results in further studies are strongly required.

4 Conclusion

Information competencies belong to a set of capabilities crucial for effective and successful usage of Internet resources. As discussed in the literature review section, they have not been so far a subject of biometric research within the LIS discipline.

The project discussed above seems to be the first attempt to operationalize information competencies to measurable skills and/or behaviours expected from information literate people.

Youth as a research group was selected due to social perceptions of their proficiency in information and communication behaviours, and in a virtual network in particular. However, as the project revealed, they are not so advanced in Internet navigating and searching information. They use simple searching tools and the most popular engines, visit websites from the top of the results list, and do not verify their date or authority. Even instructed, they read opinions selectively, according to "the least possible effort" rule. They feel quite uncomfortable and lost when mistaken (for example, when visiting a website of another guesthouse of the same name as the proper one), with no precise reflection of what is actually wrong and how to correct themselves. The positive symptom is that they work on 2 to 3 websites while searching for specific type of information (destination; travel options; images), as comparison is the simplest and most popular way of verifying information among the youth.

These results stand in line with research showing that a stereotype of a "digital native" generation, fully capable to use the Internet in competent and reasonable way, is invalid. They rather confirm the general tendency to seek and apply the simplest solutions. They are also a reason for discussion concerning the range and effectiveness of information literacy education, in either formal (website structure, in other words, where to find specific elements, also those revealing reliability of a source) or content (why one should read opinions and how to interpret them) aspects. Therefore, the results show deficiencies in information literacy of the youth.

Finally, biometric tools proved to be applicable in studies concerning information and digital literacy. They reveal in detail gaze movements, directly related to information behaviours in general, while in the information searching process. Emotional reactions revealed during this process are also measurable. As it was said, biometric research was not used before while researching information literacy, but rather reading patterns and evaluation of on-line services and in limited scope in information behaviour. Therefore it is not possible to link the research with previous methodological solutions or research outcomes. However, as it is often mentioned in literature, biometric data should be confronted and/or completed with other qualitative or quantitative ones, to get an objective set of information.

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Privacy Literacy and the Everyday Use of Social Technologies

Zablon Pingo(✉) and Bhuva Narayan

University of Technology Sydney, Sydney, Australia
{Zablon.pingo,Bhuva.narayan}@uts.edu.au

Abstract. The increased privacy concerns and risks associated with the misuse of personal information collected, processed and re-purposed from various digital technologies calls for users' understanding of their own informational privacy. While regulatory and technical mechanisms exist to protect individuals' information privacy, these approaches have failed to be effective. This study presents the case for privacy literacy from an information literacy perspective as a complementary mechanism to the existing approaches to protecting individuals' information privacy. The research used a constructivist paradigm, through interviewing twenty-one participants, and through online observation of SNS (social network services), and a privacy-settings walkthrough specifically on Facebook, and asking participants to track their online footprints and talk about any personal information found online.

Keywords: Privacy · Privacy literacy · Information literacy · Information privacy

1 Introduction

In digital economies, the prevalence of dataveillance [1] and monitoring of people through data from self-archiving technologies [2, 3] and online personalized and customized services [4, 5] are raising privacy concerns, debate and discussions. While these technologies provide great benefits in everyday life for the purposes of online purchases, access to information, socialization, and entertainment among other benefits, they also pose the risk of revealing too much personal information about users and of repurposing this collected information without the users' knowledge [6].

In studying privacy issues, researchers often take legal and IT systems approaches but little is known about the users' own experiences, perceptions and responses towards the efforts of managing information flows in digital technologies [7]. Privacy literacy is presented here as complementary and essential to the existing mechanisms to ensure individuals have some level of awareness and understanding of how information is tracked and used (or misused) in online environments [8]. The concept is further defined as the means and abilities to assess the collection, processing, distributing and use of personal data in digital environment [9]. Givens [10] adds that privacy literacy enables people to have an informed concern and deploy effective strategies against any privacy mismatch. Therefore privacy literacy is positioned as part of information literacy and as a means for individuals to have some level of understanding of how

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information flows, and the ability, knowledge, and skills to assess the risks and rewards associated with disclosing personal information within online environments [10].

Previous studies have quantitatively measured users' privacy perceptions and attitudes [9, 11–13]. These studies indicate that people weigh the cost-benefits and risks of sharing particular information with others [11, 14]. This study provides a qualitative perspective of users everyday privacy practices within social technologies using the lens of Sandra Petronio's communication privacy management theory [15]. In doing so, the study aims to make a case for the inclusion of privacy literacy as a fundamental aspect of promoting information literacy.

2 Research Problem and Research Question

Recent research findings demonstrate that people care about their privacy and security more than other factors in regard to information technologies [16]. The current approaches to privacy protections have "assumptions [that] users of digital technologies are omni-competent" in evaluating the present benefits and potential risks [17], and that the presumption of individuals' informational privacy is protected by legal and technical means; however, researchers have noted that these approaches do not keep up with digital innovations [18]. Additionally in the data driven society, privacy discussions have shifted from structuralistic towards individualistic perspectives due to the changes brought by economic and technological contexts [19]. Therefore, the research question is: How do users of social media (Facebook, Twitter, LinkedIn among others) understand and manage their privacy, including the risk of personal information exposure?

3 Literature Review

Scholars have theorized the concept of privacy from multiple perspectives including legal, technological, and philosophical [20]. The legal perspective conceptualizes privacy as a human right or a right to be left alone [21] while the social psychology perspective sees it as a human need for solitude, intimacy, anonymity and reserve [22]. The struggle to pin down the concept of privacy is not only because of cultural and social or contexts, but also because of complications from the digital technology innovations that Froomkin [23] refers to as 'privacy-destroying technologies', which continue to blur the lines between public and private. In this paper, we use Westin's [22] definition of privacy as a 'claim of individuals, groups or institutions to determine by themselves when, how, and to what extent information about them is communicated to others'. In the current information economies there is apparent negative impact to individuals occasioned by use of personal information without their knowledge or understanding consequently violating individuals' rights to privacy [24]. Informational privacy has become important due to the increased exposure and associated risks in digital technologies [7, 25, 26] making it an important aspect worth exploring from multiple perspectives to understand how people respond to privacy concerns. Scholars

have explained people's privacy attitudes, perceptions and behaviors [27, 28] indicating a discrepancy between behavior and perception popularly referred as the privacy paradox [27, 29].

3.1 Communication Privacy Management

This study addresses privacy literacy informed by the perspectives of the communication privacy management theory (CPM) [15] to understand how consumers or users of digital technologies respond to privacy and data sharing practices in social technologies. The CPM theory [15] builds upon Altman's early conceptualization of privacy as a boundary regulation process where individuals determine their accessibility along the dimension of closedness and openness depending on the context [30, 31]. The CPM theory uses a boundary metaphor to explain how people make decisions about revealing and concealing personal information for everyday privacy management [32]. Thus the boundary erection becomes a mechanism for determining/controlling who has access to personal information or space and how much information is accessible by others [15, 33]. The theory explains that in everyday life people regulate open- and closedness to others along three different dimensions; the boundaries of disclosure, time, and identity [15]. Petronio [15] notes that in our daily lives we struggle with the question of "what to tell or not to tell" and using 'a mental calculus' helps people decide on what to disclose and to whom. That is, when to let others know our private information or thoughts and when to make it confidential; just as in interpersonal relationships, revealing information online is never a straightforward decision and is a constant balancing act. The theory identifies various factors that impact and influence privacy boundary formation rules that include: culture, gender, motivations, contexts, and risk-benefit [15], in this study we used the lens of the last three factors. Thus this theory ideal to be applied in understanding how individuals build and develop rules to aid decisions about what to reveal or conceal to best protect personal privacy through: boundary rule formation, boundary coordination and boundary turbulence [15, 32].

3.2 Information Literacy and Privacy Literacy

Over the decades information literacy (IL) has been conceptualized within the confines of education and library science as a means of identifying a need, planning to search information, consulting appropriate sources, determining the authoritativeness and authenticity of the information and finally the use of information [34]. In contexts such as new media and digital information worlds, IL has shifted significantly and expanded to other areas such as Internet literacy, media literacies and digital literacies, making it complex to determine its boundaries [34, 35]. This extends information literacy to complex models and practices including digital, media, algorithmic and privacy literacies. For instance, digital literacy is conceptualized as the ability to use information and communication technologies to find, evaluate, create, and communicate information requiring both cognitive and technical skills [36] while privacy literacy as a subcategory encompasses aspects of use of technology and awareness of personal and information privacy. The privacy literacy framework [8] identifies five cognitive

processes of managing personal information disclosures that include: (1) understanding different privacy contexts related to personal information disclosures, (2) recognizing where (or which platform) to share or disclose specific information, (3) realizing the implications of sharing information in social circumstances, (4) evaluating possible threats to privacy in a given interaction, and (5) deciding what to information to share under what circumstances.

3.3 Privacy Literacy in Online Environments

Privacy literacy is positioned as a need for individuals to develop technology skills to competently use and understand issues of safe online privacy practices [10]. But privacy literacy is not only confined to online privacy practices but also includes the understanding of ones' rights to privacy, awareness of data practices, and knowledge of the institutions that safeguard data protection and privacy. Thus privacy literacy is not limited to one's ability to limit access to one's own information but extends to information from others and an understanding of how information flows in digital technologies referred to as 'networked publics' [37]; as it is also increasingly complex to control privacy in social networks due to the 'context collapse', with information flowing beyond one's control or to unintended audiences [38].

In spite of the solutions offered by technology-based and legal mechanisms to protect users' privacy, issues are still prevalent from the misuse of personal information by service providers and data brokers through their current business models [39]. Privacy literacy provides requisite awareness and knowledge for users to navigate the contexts and understanding of how such technologies work. This includes the understanding of the nature and openness of various Internet platforms, and the exposure and permanence of one's personal information once it's out there [40].

Scholars are also insisting on the need for people to understand the new information technologies and the new privacy concerns to master the information control strategies [41]. In this context a privacy-literate person is deemed to be a person who understands the constantly shifting ground of how digital technologies are over-exposing personal information to wider public and having the necessary tools to protect their privacy [8]. In addition, the person should have the ability to recognize and differentiate the type of information disclosed openly as a means of self-governance and autonomy to their privacy [28].

4 Research Design

The broader study was aimed at understanding how users of digital technologies (fitness trackers, loyalty cards and social networking sites) respond to privacy concerns. The privacy issues surrounding these technologies are associated to collection, processing repurposing, dissemination and exposure of personal information [24, 42, 43] consequently posing privacy risks to individuals (Table 1).

Table 1. Participant demographics

Participants (Pseudonym)	Gender		Occupation	Age range	Level of education	Social media used
	M	F				
Kelly		X	Professional/Student	35–40	PhD (Ongoing)	Facebook, LinkedIn, Twitter
Vera		X	Student	25	MBA (Ongoing)	Facebook, Instagram, LinkedIn
Marcello	X		Professional/Student	27	PhD (Ongoing)	Facebook, Twitter
Deepak	X		Student	22	BSc (Ongoing)	Facebook, Instagram, LinkedIn,
John	X		Professional	43	PhD	Facebook, LinkedIn
Molly		X	Professional	38	MSc	Facebook, LinkedIn
Elaine		X	Professional	25	PhD (Ongoing)	Facebook, LinkedIn
Dolly		X	Professional/Student	25–30	PhD (Ongoing)	Facebook, Instagram, LinkedIn, Twitter
Janet		X	Professional	30–35	PhD	Facebook, LinkedIn, Twitter
Sue		X	Student	23	MSc (Ongoing)	Facebook, Instagram, LinkedIn
Harry	X		Student	25	PhD (Ongoing)	Facebook, LinkedIn
Teresa		X	Professional	45–50	PhD (Ongoing)	Facebook, Flickr, Instagram, LinkedIn, Pinterest, YouTube
Michael	X		Professional/student	45	PhD (Ongoing)	Facebook, LinkedIn, Twitter
Evelyn		X	Professional/Student	45–50	PhD (Ongoing)	Facebook, LinkedIn,
Ivan	X		Student	45	MBA (Ongoing)	Facebook, LinkedIn
Lillian		X	Student	25	PhD (Ongoing)	Facebook, LinkedIn, Instagram
Pauline		X	Professional	45	MSc	Facebook, LinkedIn
Julie		X	Professional	44	MEd.	Facebook, LinkedIn, Twitter
Daniels	X		Student	19	BSc (Ongoing)	Facebook, Snapchat, Instagram, Twitter
Joe	X		Professional/Student	23	MBA (Ongoing)	Facebook, Instagram, LinkedIn, Reddit, Snapchat, Twitter
Andrew	X		Professional	52	MA	Facebook, LinkedIn, Twitter, YouTube

The participants fulfilled the following criteria: all were 18 years or older and had been using at least one of the social networking sites (Twitter, Facebook, Instagram, LinkedIn) for at least one year. All participants used the English language version of the SNS. Among all the participants, twenty-one used Facebook, eighteen (LinkedIn) nine (Twitter) and seven Instagram. Prior to conducting this research the university ethics committee checked and approved the study methods to ensure the research participants were protected. General descriptors of "professional" and student are used to describe the participants' occupations rather than providing specific occupations to avoid exposing their identities in addition to using anonymised pseudonyms.

The research used a qualitative approach to collect data through face-to-face interviews and online observation of participants' social network sites (SNS) and checking privacy settings using a cognitive walkthrough to see how they use and manage their privacy settings in relation to their privacy expectations and preferences. The use of semi-structured interviews offered a flexible way of exploring participants' experiences and awareness through the guiding interview questions. Additionally,

during the interviews, the participants searched their names on search engines to reflect upon any personal information accessible to the public and how it related to their privacy expectations.

Twenty-one participants (N = 21) were recruited through word of mouth, email circulation in university listservs, and through various Facebook groups. All participants were based in Australia: fifteen (n = 15) were students out of which two (n = 2) were undertaking undergraduate and thirteen (n = 13) were post-graduate students in various universities within Australia, six (n = 6) were fulltime industry professionals, nine (n = 9) participants doubled as part time students and professionals and nine (n = 9) were full-time students.

The participants took part in semi-structured interviews of between forty-five minutes to one-hour between November 2017 and December 2017. The use of semi-structured interviews supported the research findings with direct quotations from the participants [44]. The interviews were audio-recorded and transcribed for analysis. Finally, the data was coded manually and later exported to NVivo for thematic analysis. The data analysis used elements of communication privacy management theory [15] and thematic analysis [45] which are presented in the findings.

5 Findings

Our findings offer insights into participants' experiences, knowledge and skills toward privacy management on various digital and social technologies.

5.1 Appropriateness and Minimization of Personal Information Exposure

In this study the majority of the participants (14) termed the provision of some information on social media as sensitive, making them uncomfortable to share all sorts of information with services providers or with others. To counter the excessive information collection or exposure, the respondents indicated that they limited the information to only compulsory or mandatory information. For example Teresa said: "I just provide my name email address and any other compulsory data that would have been indicated as required".

Additionally the participants were concerned about disclosing information related to location such as home address due to security reasons. Kelly explained her responses as: "On Facebook I'm quite careful so no address no phone numbers, year of birth, gender, location. My current status is like I'm studying I'm married. So I would share that. So some very basic demographics but nothing that can link me to where I live unless they can still find it somehow".

In addition another participant Elaine indicated she limits personal information to minimum: "I don't post where I work on Facebook because they don't need to know. I don't have any relationship information because also they don't need to know. I think all I have is where I study and where I was born".

These data minimization practices essentially means the reduction of the personal data shared online and determining the contexts and appropriateness of sharing

particular information. Thus participants purposefully use this strategy to protect their informational privacy and reduce online risks. Most participants cited the provision of (only) mandatory information as a strategy to reducing the risk of overexposing personal information. These practices are necessitated by the constant wariness and concerns associated to possible misuse of personal information (phone numbers, emails and addresses) for junk/spamming mails, selling, targeted marketing or advertisements from marketers and data brokers.

5.2 Privacy Boundary Management Practices

In online platforms it is evident people manage the type of information others can have access to as a privacy management strategy. While in social media platforms its difficult to effectively control how information flows, participants in this study deployed various strategies by actively managing what others can access about them. These practices manifest in different ways through: audience selection, managing the boundaries with their connections, self-censorship, and deletion of information accidentally or intentionally disclosed information with the goal of protecting their privacy. Some of these practices are detailed below:

Boundary Opening and Closure Across Platforms and Organizations. As part of privacy management process, people enact boundary rules to determine whether to link to others, who to be included or excluded and the type of information to be shared or revealed to others [15]. Personal information from users' social media profiles can easily permeate to unintended persons or organizations depending on how individuals manage personal information. The social media platforms provide opportunities for users to log in to other third parties applications to access other services using sign-in with Facebook or Google+ affordances. The consequent use of these conveniences effectively authorizes access of the user's profile personal information. While the "signing in with" provides convenience for the users this means one is combining boundaries of two organizations that give access to personal information to both organization, and the individual has little knowledge how their personal information will be used. In the study the majority (15 of 21) participants expressed concerns over using this convenience by purposively avoiding linking the boundary by attempt to limit information to a single organisations rather than making the link across many entities. For instance Michael indicated in the past he used the social media signing-in functionality but later on avoided it due to privacy concerns associated with enabling tracking by application providers. Michael reflected how he changed his signing in practices by creating a new account whenever using online services or applications rather than using the sign-in affordances: "I am careful about what data they allow to be shared with others. So using Facebook to log in to other things for instance is not something I would like to do, I would create a separate account for each separate one. And I won't allow to log in Facebook across, once Facebook gets into something then you know as my boss would tell me the only other thing that's got worse than terms and conditions in Facebook site is they make it easy for people to log in with Facebook everywhere. So people take the easy path all and the Google generation just don't care about".

The participants indicated taking precaution in using the "sign-in with" affordance as a way to avoid connecting boundary between two different organizations that collect personal information. Kelly also indicated in the past she used the functionality but due to increased privacy concerns, she started to create new accounts like Michael whenever signing-up for any new online services: "….I think once or twice I did sign in with Facebook because of the convenience. But now I usually get them to e-mail me a link to reset my password and then I'm go to reset everywhere else, so even though they say would you like to sign in through Facebook. I usually say no, I just prefer to have account with just that. And Facebook with just Facebook, sometimes I don't see the relevance of signing up with… because I don't want Facebook to know what I'm buying or doing. Of course they might soon know for some reason but I don't want to be the one creating the direct link".

The findings indicate awareness to online data collection practices and active privacy management in controlling the information boundaries between companies through the avoiding linking of personal information between platforms. The boundary closure practices reflect increased participants' knowledge and awareness of privacy risks, associated with using such affordances to prevent any potential privacy risk.

Connecting and Disconnecting of Boundaries in Social Networking Sites. Facebook, Twitter, LinkedIn and Instagram are common "places" where people provide self-identifying and expressive information [8]. The privacy boundary in these platforms is managed through connecting and disconnecting with other people through sending and accepting "friend" requests and also determine what is open to others or not.

Most participants indicated they have clearly segmented their social media according to their own predefined purposes in order to determine with whom to connect. For instance all twenty-one (21) participants used Facebook to link with friends, family, new acquaintances and sometimes colleagues, and seventeen (19) used LinkedIn to connect with other professional and colleagues, while nine participants used Twitter for connecting with colleagues, professionals and others in their areas of interest and with the general public due to its open nature.

The participants indicated they were very cautious on how they responded to requests from colleagues and unknown people, for instance four participants: Teresa, Molly, Pauline and Julie all female all over 38 years old, indicated they decline accepting friend requests from colleagues or bosses on Facebook unless they have been working together for a long time or have developed close relationship. Deepak (male, student) also indicated similar views of determining boundaries with whom to connect and not, in his part time job, especially the bosses due to concerns of allowing them access to his social life. The participant explained there should be a boundary to separate formal and social relationships.

These deliberate practices of purposively and cautiously managing the boundary between personal life and work was expressed by most of the participants, citing it as a means to avoid any potential problems or mixing-up of personal life with work relationships. For example Teresa explained: "I'm very selective when I get invitations from people, for example former work colleague that I don't usually like, sent me an invitation recently and I said I'm going to be friends with her on Facebook. So with that I rejected it. But if she approached me on LinkedIn, probably would accept. Because I

use them differently I want to keep them very calm and compartmentalized, LinkedIn is my work my professional life and Facebook is my personal life"

This segmentation of the platforms social and formal relationships enables people to decide whom to connect with on what platform and what type of information can be accessed by whom, which helps users to draw their privacy boundary. For instance Joe indicated that: "There's a big difference between work life and social; that's sort of a big line there" This illustrates how people manage their privacy boundaries on an interpersonal level by selectively concealing and revealing personal information to others [46] with an increased manifestation in social media platforms [15]. The active boundary management allows people to decide with whom to have access through connecting and disconnecting boundaries (accepting or ignoring "friend" requests) in social media platforms as a way of regulating and maintaining one's privacy.

These findings are in line with previous studies; people are constantly engaged in privacy management by determining what information about them is accessible to others, and by managing personal and professional boundaries through selective disclosure of information on the Internet [47]; we found that this also applies to online social media.

Selective Information Disclosure for Reputation Management. Prior studies indicate people purposefully and selectively reveal or share information online with the goal of reputation management [46, 47], which is a privacy management goal to distinguish what is accessible and not to others through online platforms. Social media platforms easily open up personal information to the public. People share a variety of information including: academic qualifications, place of work, photos, opinions or comments, and other information, which a person may not want open to everyone.

In our study, all participants used more than one of the popular social media platforms: Twitter, Facebook, LinkedIn, and Instagram. The participants indicated a clear segmentation of the use of each social media platforms for particular purposes: LinkedIn for professional promotional and connection purposes, Facebook and Twitter are used for social and quasi-professional purposes, Instagram for personal hobbies, and personal self-promotion among other purposes. Most of the participants have categorized the use of each platform according to its perceived functionality. For instance Joe explained: "I really don't get a lot out there in my Facebook timeline. Twitter is sort of quasi-professional, I think my main motivation in maintaining that profile to appear visible; to be able to tweet at conferences, look like a somewhat active member of the field. LinkedIn is purely a sort of networking for work purposes and on Snapchat I will snap regularly with friends and Instagram is kind of much about myself - sort of a record of my photos".

Joe, who is also a casual teacher at a university, elaborated that while he uses his personal Facebook account for teaching purposes, he is careful to manage what is visible to the students by not allowing them access to his profile: "When I started teaching, I just wanted make sure students are not seeing the huge amount of personal stuff. So I guess that would have been the last time I checked sort of Facebook because we'll have like a Facebook group for the class and so people will be messaging me so I wanted to make sure that they don't see too much - I sort of treat it like my CV".

Most of the participants (19 of 21) had LinkedIn profiles, out of which twelve participants were still undertaking their studies (bachelors, masters and doctoral studies) and considered it as an important promotional tool to promote themselves to potential employers and to connect to other professionals within their field of interest. For instance Elaine (female, PhD student) said: "I do want that when people Google me I do want them to see my LinkedIn profile, that's really the only thing I try to publish as much as possible. I do want people to see my YouTube video because it's about my research; staff profiles, that's fine. My Facebook doesn't come up and I think and that's the way I want it"

In contrast, two participants (Andrew and John) working as higher education professionals indicated a lack of interest in having LinkedIn profiles; however, due to workplace pressure they had to set-up their profiles against their wish or interest. For example John expressed his displeasure as: "We were told to have LinkedIn so I had to set-up the account".

Andrew further expressed his concerns that LinkedIn profiles are publicly accessed terming it a vulnerable "place" where people expose too much personal information with a potential of negative impact to individuals. Andrew was weary of privacy concerns due to the possibility of over-disclosing information, which might aid identity theft given that one discloses a lot of information including personal interests. Andrew noted that: "I've never really thought of LinkedIn as a public document and that if somebody knew mine, because you know, the literal meaning of curriculum vitae is the story of your life. If someone knew everything in that CV, I think that it definitely can compromise your privacy. Yeah, I think, things like your personal interests, I don't think the world needs to know my personal interests. And some of those pieces of information can be clues for passwords or those security type questions"

Generally the determination of what sort of information to share on particular platforms and with whom to connect is an indication of privacy management, thus avoiding linking information and personas, which one does not necessarily want other audiences to see or connect. This segmentation and selective disclosure enables participants to manage their reputation by controlling and determining what to reveal, conceal and with whom, which supports earlier research findings [47].

Privacy Management Through Audience Selection. By default, social media platforms open up personal information, both expressive information and self-identifying information [8, 48] to a wider public access. To navigate these privacy challenges participants are constantly managing by deciding what information is accessible to unintended audiences using the privacy settings [48]. While information sharing in social media is platform dependent, audience selection plays a key role in determining who has access to particular information. For instance, Joe explained how he actively manages audiences on Facebook: "There are some people that I chose to hide some of my posts from rather than actually deleting them from my friends list because I don't want them to know that I deleted them. I do so because they're posting too much, or I found their views annoying, or I don't want them to see my posts"

To manage the audience the participants actively use the privacy controls to keep certain information within the intended target audience rather than broadcasting to "all friends" on their social media platforms by using the blocking feature, deleting posts,

unfriending when there is a breakdown of a relationship, and limiting of information posting to friend lists or groups as a way of managing privacy. For example, Janet limits access to some people by blocking them or filtering them from the posts to avoid getting comments or being associated with their views. She pointed out that: "My mom posted things that has made me really angry. So I've put her on "very limited". I have blocked her and she can't see anything because my mom is older and doesn't understand the concept of digital footprint and that sort of thing. So I don't want to be associated with some of her views".

Although participants indicated that on social media they generally connect with people they trust, especially Facebook, but when their reputation is potentially compromised, they limit access to information for a targeted audience, irrespective of their closeness or their pre-existing or social relationships. For those who have connected with colleagues on social media platforms they actively engage in deleting old posts as a way to avoid giving people access to their previous views which might not necessarily represent their current status. For example Joe indicated he has deleted photos to avoid people having access to them: "I feel that there were a lot of people out there that I had nothing in common with. So I've done a bit of cleaning of the account since its quite old maybe from 2008. So like there are some photos on I'm still seeing stuff that is quite frustrating because I made terrible decisions when I was younger like silly things and I don't find it particularly useful in the platform".

Monitoring Online Digital Footprint and Self-censorship. Managing personal information and digital footprint in our data-driven society is of importance but hard to control what information about an individual is publicly available and accessible on the Internet [49]. People care about what is out there about them and strategize on how to manage their footprint by routinely searching their names, videos and images on popular search engines in order to evaluate their online digital footprint or presence.

In this study the participants indicated they actively and regularly search the Internet to see what is accessible publicly about them. For example Julie, who works as a department manager, occasionally searches her name to reflect upon what personal information is out there about her on a regular basis. The self-searching or name search seemed to be a popular tool for privacy management. Julie was excited to see her publicly accessible information through search engine referring it as "googleable" with a positive connotation of good presence: "I'm very googleable because I made up my name, so when I Google I can see what I've posted. Like I can see who I am. You can find quite a lot about me and there's not much you can do about that, so I just let it go and I like what I see".

In addition, during the research interview the participants were asked to search their names and reflect on the search results as a way of understanding how people manage online footprints. All the respondents were satisfied with the results, since most of the personal information was related to their professional profiles in LinkedIn, personal websites, publications, or conference presentations and images. For instance Molly expressed her constant concern, which motivates her to engage in regular self-searching to see if there is any inappropriate information or images accessible online: "I always wonder what is there in the net about me. Because sometimes for example you can find your name or images you posted and forgotten it, right?" Dolly also narrated her

experience of using Facebook from her teenage years as being careful in making decisions on whatever she posts for everyone to see. “I was quite young when I signed up because I was quite vulnerable to the Internet. I am a little bit more responsible now that I know that whatever goes up onto the Internet, I basically need to be aware that at some point it might be hacked, and it might be spread out to the world. Whatever I post has to be something that I am happy to go out to the world”.

The awareness of the open nature of the online platforms informs participants’ engagement in self-censorship, guiding what they post on particular online platforms as a way of protecting their reputation and privacy. These awareness and social media practices could be attributed to participants’ level of education and profession. The continuous and careful management of information on respective social media indicate the deliberate development of new professional images by intentionally portraying “the fronts” [47] as professional in LinkedIn and Twitter while limiting “the back” personal life to platforms like Facebook.

Context Collapse Navigation Using Anonymous Accounts as a Means to Creating a Personal “Space”. Although previous research indicate users of social media increasingly use their real names as a strategy to build reputation [49], some people maintain more than one account to enable them to express their opinions anonymously to protect their privacy or avoid other people’s access to their expressive information. In this study Julie, Teresa, and Molly used anonymous names on Twitter as a means of concealing their identity and allowing them to share things they want, without the fear of being judged or their real identity known. For instance Julie has two Twitter accounts: one with her real name and the other one anonymous in what she referred to as a “secret account”.

Each of the two accounts serve specific purposes with the anonymous one as a strategy to protect her privacy while on other one is actively used for professional purposes and general information sharing. The anonymous account is used to share information related to her common interests, particularly about her swimming achievements and religious views, which she does not necessarily want her colleagues or people in her professional circles to know. Julie said she decided to use the account to avoid mixing her personal and professional boundaries: “I have two accounts one is my real name and I’m happy because that’s my work one, the one I use to connect with people in my industry and at conferences and in teaching and learning forums and stuff like that. But I only post stuff that is related to work or related to something or management, that sort of stuff. On my “secret account”, I’ve deliberately not given Twitter any information about who I am. So essentially I’ve got this random e-mail address, because otherwise people can search for you via email address”.

The use of the pseudonyms or anonymous accounts names is a strategy to protect one’s personal identity and reputation by avoiding linking two personas, which corroborates with early research on reputation management [49]. For instance, Julie maintains two online personas, one as a professional and the other one as a Christian and an individual who is actively working out to lose weight using the two different Twitter accounts. This indicates that although anonymous accounts can be misused to infringe on other people’s privacy, in this case the anonymous account provided a personal “space” for people to express their opinions openly without fear of being

judged by colleagues or other close relations. The interviewee added further: "I would share a lot of things, I don't really want to be that public because Twitter is a very public medium. When I'm frustrated with work or something else I didn't want people to be out to link me to that person who works or when I'm frustrated with life or because I'm a Christian. Sometimes I'll post Christian stuff. I don't want people necessarily at work to think that's how I think about life".

The recognition of the openness and public nature of the social media platforms necessitates people to manage personal views, which represent multiple personas and the separation of them as a way of avoiding any potential conflicts and contrary perceptions against individual expectations.

5.3 Protection of Individuals Locational Privacy in Social Technologies

Social media permits people to share locational information with others within the platforms, but individuals have some forms of control to disclose or not use the locational feature for various reasons.

Although all twenty-one participants indicated they use location features in Google maps for navigational purposes, Facebook checks-ins and locational tagging, they were highly concerned about locational privacy concerns, especially in disclosing their home addresses and their real-time location for security reasons. To control the flow of locational information, participants indicated constant attempts to limit access by deactivating locational features on their smartphones or applications and avoided using the location features in social media platforms. For instance, Pauline expressed why she limits access to some location for locational privacy reasons: "I want to limit the exposure of my personal information as much as possible. I don't use my location on my phone because I don't want people to know where I'm located. So only when I'm desperate and I need to go somewhere I use Google Maps then I put my location on and then as soon as I finish up I takeoff my location".

Additionally Teresa indicated she always denies access to location while using some of the smartphone and social media applications, and only activates when using specific applications: "I don't like sharing my location for every application. I have a bad feeling about being monitored, about people knowing exactly where I am and I just… it's just doesn't sit comfortably with me".

Although most participants (fourteen) indicated occasional use of the social media locational check-in feature, two of them (Michael and Kelly) indicated they only use the feature after leaving the place rather than doing it in real-time while seven indicated they had never used it and only enable the location functionality when using the applications on their smartphones applications are necessary. The protection of location privacy takes multiple perspectives both technical and active use of the social media controls, with an indication of individuals deploying all necessary means to control their locational privacy.

5.4 Managing Targeted Ads and Information Collection by Organizations

The targeted ads refer the practices of advertisers using individual users' online profiles to provide ads [50]. The targeted ads are increasingly termed as intrusive to privacy due to the collection of too much personal data about individuals. In this study participants expressed annoyance about the unwanted ads from social media and search engine providers, telemarketers and data brokers. The participants indicated active resistance to profiling and targeted ads in the browsers and on social media. For instance, 10 of 21 participants delete their search histories in the browsers, avoid using the "like button" on Facebook for things to acknowledge their personal interests in social media. The respondents were uncomfortable about targeted ads and felt being stalked, terming it as unnerving especially when reflecting on how it's done.

The respondents' attempt to control and avoid the targeted ads by using a different email address, which they use to register for all sorts of online services and subscriptions in order to avoid receiving advertisement emails or junk emails, or so as to pay special attention in their work or formal email. For example Michael said: "I have different email accounts, my personal one, the one that I give out to friends and family and other people. Then there's the Gmail account I tend to use for mailing lists and other online stuff that doesn't necessarily disclose too much personal information. It allows me to segregate out a whole bunch of junk mail that I don't necessarily want clogging up my primary email account".

Although the participants recognized targeted advertisement as unavoidable and beyond individual control in the online platforms the attempt to counter the targeted ads through active deletion of browser search histories and avoid clicking on the ads was a way to protect their privacy. Elaine explained: "I get pretty pissed off and mind-boggled, when I've done something not associated with what I did on Facebook, and then it comes up. I think that's quite annoying. I try not to search it again or go back to my history and delete all my history".

These practices of attempting to avoid online personalized services reflects some level of understanding and awareness of the omnipresent online profiling practices, and the deletion of the search histories is a form of response to counter the practices. As Dolly says: "When I see ads on my Facebook related to what I shopped for, I freak out, but I can't do anything" or as Kelly says: "I have been a bit apprehensive when you log into my email address or website and on the side there's a bar of like of everything that you visited yesterday or something… It kind of it monitors everything that you do, which is a little bit uncomfortable but I usually don't click on those things anyway because it looks like a virus to me, even though I know it's not. I don't like clicking on it".

Although some (three) participants prefer targeted ads due to the relevance to their interest they still felt uncomfortable about the tracking. Therefore, to counter the tracking, the respondents avoid clicking on the ads as a way of countering prevalent online tracking and information collection and use beyond users understanding or expectations.

6 Discussion and Conclusion

Our findings indicate that the majority of participants engage in managing privacy on social networking sites through data minimization, blocking others, unfriending, and declining friend requests, reflecting a growing awareness about privacy issues across social technologies.

The participants have clearly segmented information on particular platforms through audience selection and also by managing the boundaries between their social and professional lives, through making a deliberate choice of connecting with colleagues using LinkedIn and Twitters platforms, and using Facebook for social purposes. Although they connected with others outside their circle on Facebook, this was dictated by the already-established social relationships between individuals. In general, our findings align with earlier privacy research [46] where the participants indicated they selectively disclose and conceal some information to specific individuals by managing which audience has access to particular information. This reflects a sense of awareness of the openness of the platforms that necessitated these particular practices.

Urban and Hoofnagle [51] categorized people into privacy vulnerable and privacy resilient. We found that although participants are potentially vulnerable when ignoring terms of services and sharing their personal information to online services in exchange for benefits such as easy networking, keeping in touch, personal image management, and entertainment, they also managed their risks in a way that they could be resilient. They monitored their own data and erased data as needed. Some limited their personal information across devices and online applications, which reflects an awareness of the risks, but this also needed continual effort and continuous management on their part, and hence was also a constant negotiation. Nevertheless, this negotiation requires an informed understanding of the fast-changing world of digital social media, which reiterates the role of privacy literacy.

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Personal Information Management and Organisation Competencies: A Review of Information Literacy Conceptual Frameworks and Standards

Jerry Jacques(✉)

Research Center in Information, Law and Society (CRIDS),
University of Namur, Namur, Belgium
jerry.jacques@unamur.be

Abstract. The aim of this paper is to identify, in information literacy conceptual frameworks and standards, contributions and definitions related to personal information management and organisation competencies. This article reviews the scientific literature pertaining to information literacy and information literacy standards proposed by educational institutions and information professionals' associations. The review consists of an inventory highlighting the need of (1) information literacy frameworks and standards dedicated specifically to these competencies and (2) dedicated research on personal information management and organisation competencies. The conclusion of this paper introduces a framework of personal information organisation competencies which constitutes a first attempt to define these competencies as essential components of personal information management literacy, leading the way for its recognition as a key domain of information literacy.

Keywords: Personal information management · Information organisation · Literacy · Literature review · Competency

1 Introduction

The development of information and communication technologies pushes individuals to deal with complex and large collections of digital information. To make sense of these collections and to meet their life's objectives and fulfill their roles and responsibilities either in personal or professional situations, they have to put great effort into the management and organisation of personal information [1, 2]. Personal information management and organisation practices call for specific competencies and development of personal information literacy [3–5], an area that remains largely unexplored in the field of personal information management.

The objective of this contribution is to review the academic and professional literature about information literacy to look for contributions related to personal information management and organisation competencies in order to identify constitutive components of a personal information literacy.

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The conclusion of this paper introduces a framework of personal information organisation competencies defined on the basis of guided-tour interviews by students of their personal information spaces [6]. It takes the form of a matrix of four core-activities (inclusion, exclusion, apprehension, implementation), three dimensions of information items (technical, informational, social), and three types of relations (efficacy, efficiency, virtuality) between the pursued objectives of individuals when they organise personal information, the opportunities and constraints of the situations, and the mobilisation of their competencies.

2 Towards a Personal Information Management Literacy

Personal Information Management (PIM) can be defined as "*the practice and the study of activities a person performs in order to acquire or create, store, organize, maintain, retrieve, use and distribute the information needed to meet life's many goals (everyday and long-term, work-related and not) and to fulfil life's many roles and responsibilities (as parent, spouse, friend, employee, member of community, etc.)*" [1]. This field of study dates back to the beginning of the 19th century when researchers and practitioners started to explore information use, storing and organising behaviours [7–9]. Since the advent of the personal computer, PIM has become an important area of inquiry with contributions focused either on the development of tools and applications designed to help to manage information (e.g., Rekimoto 1999; Bauer et al. 2005; Rodden and Leggett 2010) [10–12] or on the description of behaviour of individuals when they interact with personal information (e.g., Malone 1983; Boardman and Sasse 2004; Bergman et al. 2010) [13–15].

Despite the richness and diversity of the PIM field of study, little attention has been paid to the competencies involved in the process of managing personal information. Nevertheless, the definition of a PIM literacy is critical for helping users to improve their own PIM practices [5] and more globally, for empowering individuals living in a knowledge society where PIM is a core dimension of people's interaction with computers [3].

Mioduser, Nachimias and Forkosh-Baruch [3] identified "*the ability to store information items in a way that facilitates its efficient retrieval*" as the primary ability of PIM literacy. They distinguished different components of this ability: (a) giving meaningful names to information items and folders; (b) avoiding creating folders with too little information items or too many of them; (c) avoiding creating folders of ample hierarchical depth; (d) putting shortcuts to information items of high relevancy to the user on the desktop, to shorten their retrieval time and remind the user of their existence and (e) avoiding clustering folders with irrelevant information items [3, pp. 35–36]. They also introduced a *"task management"* skill in PIM literacy, although this ability goes beyond the area of PIM. Majid et al. [4] noted a gap in information literacy models and standards where PIM skills are overlooked. They argued that this lack of PIM skills may result in problems for individuals (e.g., waste of time and effort, information overload) and proposed to integrate skills related to the PIM activities proposed by Jones [1] (finding, keeping and meta-level activities) to information literacy frameworks.

This paper aims at completing these initial attempts to define PIM literacy which only covers a limited portion of the issues raised by the management of personal information. These components are focused on very specific skills where wider competencies should be defined to broaden the scope of the PIM literacy, not only as a list of specific abilities, but also as a complete and integrated framework of competencies needed by individuals to address autonomously and creatively the diversity and complexity of PIM challenges. As a first step, a review of existing framework and standards of information literacy was necessary to search for existing competencies definitions related to PIM.

3 Searching for PIM Literacy Components in Information Literacy Frameworks and Standards

On the side of academic literature, the Big6 Skills approach to library and information skills instruction [16] is an early attempt to define the components of information literacy. This model articulates 6 skills: (1) task definition, (2) info seeking strategies, (3) location and access, (4) use of information, (5) synthesis, (6) evaluation. In this framework, PIM is essentially related to skill four "*use of information*", and one of its subcomponents: "*extract relevant information*". In a subsequent contribution about information, communication and technology (ICT) skills curriculum [17], even more specific references to PIM can be found: "*record electronic sources of information and gather the URL locations of those sources (…) analyze and filter electronic information in relation to the task, and reject information that is not relevant or credible (…) save and backup gathered data to secure (…)*" [17, p. 24]. At first glance, PIM seems also related to other skills of the Big6 Skills. For example, the skills "*organize information from multiples sources*" could refer to PIM but is more related to the ability to produce and synthesize a presentation of the content of the information rather than the organisation of information objects. PIM may be related, as well, to the capacity to "*engage (e.g., read, hear, view)*" and "*evaluate*", as understanding the gathered information and evaluating the management processes are abilities involved in PIM. However, this is not clearly mentioned in this model built around a vision of information practice as essentially focused on information seeking and use issues, with only a few references about information management concerns.

Secker and Conan [18] proposed "*a new curriculum for information literacy*". This model is structured around ten thematic strands, each dedicated to a specific dimension of information literacy. The sixth strand defines key skills under the label "*managing information*". This strand is divided into five skills: "*note-taking, time management and planning, storing information effectively, bibliographic and reference management and push services/alerting/keeping up to date*" [18, p. 13]. Even if this model put the emphasis on academic information, those skills could all be related to PIM. Specifically, the skills "*storing information effectively*" is specified in two learning outcomes: "*develop and implement a plan for organising your files (including naming and organising folders), decide on an appropriate information management technique suitable for your discipline or the resources you use*" [18, p. 13]. This contribution is one of the most concise found on the issues of management of information with clear mentions of skills related to information storage and organisation.

Kuhlthau [19] proposed a model of curriculum for developing information literacy. One of the central concepts proposed in this curriculum could refer, at least partially, to PIM: "*Information that is organized provides access to facts, ideas, and multiple perspectives*" [19, p. 77]. Nonetheless, the rationale for this concept is rather the ability to distinguish between libraries, as meaningful classifications systems structured by professionals, and the internet, as a complex collection of information structured with hyperlinks by its users. No reference is made to the value of organising found information items in order to structure a meaningful personal collection. This model stresses the importance of evaluating information and sources, albeit no direct reference is made to PIM and the impact of this process on the ability to decide what should be included or excluded from a personal information collection.

Turning to information literacy definitions proposed by nationwide professionals' associations, the Australia and New Zealand Institute for Information Literacy published in 2004 a second version of its Australian and New Zealand Information Literacy Framework [20]. Among the 6 core standards proposed, one could refer to PIM: "*The information literate person manages information collected or generated*". This standard is detailed in two learning outcomes: "*records information and its sources" and "organise (orders/classifies/stores) information*" [20, p. 18]. However, given examples of those learning outcomes are essentially concerned with citation and bibliographic matters and not directly with PIM.

The Society of College, National and University Libraries (SCONUL), based in the United Kingdom updated its "*Seven Pillars of Information Literacy for Higher Education*" in 2011 [21]. A pillar of this model is "*Gather: can locate and access the information they need*". This pillar partly refers to PIM when it mentions that individuals have to understand "*the issues involved in collecting new data*" and have to be able to "*use appropriate techniques to collect new data*" [21, p. 8]. Similarly, the definitions of digital capabilities proposed by Joint Information Systems Committee (JISC) briefly refer to PIM under the element "*Information, Data and Media Literacies (Critical Use)*" defined as "*the capacity to find, evaluate, manage, curate, organise and share digital information*" [22, p. 2].

A noticeable allusion to PIM can be found in information literacy skills as defined by the Chartered Institute of Library and Information Professionals (CILIP) in 2012 [23]. This document acknowledges that to be information literate individuals require an understanding of how to manage their findings: "*Know how to store and manage the information you have acquired using the most effective methods available. Reflect critically on the process and achievement as well as on the sources found in order to learn from the experience of finding and using information*" [23, p. 4]. The reference to PIM gets even more direct in the given examples of this understanding: "*Consideration of re-finding resources (either locally or in the original) at a later date. Use of, and relocation in, filing cabinets and/or shelves for physical resources. Use of folders to organise computer-stored data. Organisation of email and email attachments. Use of appropriate software (spreadsheet/database/statistical/reference management etc.). Security and backup copies. Tracking changes in documents. Personal content management*" [23, p. 4]. The framework proposed by the CILIP thus considers issues related to personal information management as constitutive parts of information literacy.

In the United States of America, in 2000, the Association of College and Research Libraries (ACRL) released a definition of "*information literacy competency standards for higher education*" [24]. The second standard of this model ("*the information literate student accesses needed information effectively and efficiently*") is detailed in a performance indicator: "*the information literate student retrieves information online or in person using a variety of methods*" [24, p. 10]. Mentioned examples of outcomes include: "*selects among various technologies the most appropriate one for the task of extracting the needed*", "*creates a system for organizing the information*" and "*uses various technologies to manage the information selected and organized*" [24, pp. 10–11]. These standards are the earliest attempts to define skills related to PIM found through this review. The ACRL recently replaced its Information Literacy Competency Standards for Higher Education with its Framework for Information Literacy for Higher Education [25]. This framework is organised into six frames anchored in central concepts of information literacy: authority is constructed and contextual, information creation as a process, information has value, research as inquiry, scholarship as conversation, searching as strategic exploration. This framework briefly refers to PIM in the frame "*research as inquiry*" which emphasises the iterative nature of information search process and the ability to ask questions when searching for information. Two abilities related to information management are recommended: "*monitor gathered information and assess for gaps and weakness*" and "*organize information in meaningful ways*" [25, p. 7].

Recently, the American Association of School Librarians (AASL 2018) released a new version of its "*AASL Standards Framework for Learners*" [26] which considers curation as a key competency. This core concept is globally defined as: "*Make meaning for oneself and others by collecting, organizing, and sharing resources of personal relevance*". This framework takes the form of a matrix combining the key competencies with four domains: think (cognitive), create (psychomotor), share (affective), and grow (developmental). The curate competency is hence declined in multiple competencies related to the different domains. Those competencies are closely related to different dimensions of PIM practices: information needs ("*determining the need to gather information*", "*identifying possible sources of information*", "*making critical choices about information sources to use*"), information gathering ("*seeking a variety of sources*"; "*collecting information representing diverse perspectives*", "*systematically questioning and assessing the validity and accuracy of information*", "*organizing information by priority, topic, or other systematic scheme*"), information sharing and group information management ("*accessing and evaluating collaboratively constructed information sites*", "*contributing to collaboratively constructed information sites by ethically using and reproducing others' work*", "*joining with others to compare and contrast information derived from collaboratively constructed information sites*") and information organization ("*performing ongoing analysis of and reflection on the quality, usefulness, and accuracy of curated resources*", "*integrating and depicting in a conceptual knowledge network their understanding gained from resources*", "*openly communicating curation processes for others to use, interpret, and validate*"). By putting great emphasis on curation, the AASL model is particularly concerned with issues of PIM and the multiple competencies proposed in relation to curation offer a detailed and relevant list to lay the ground for a PIM literacy.

Despite the limited scope of this review, which should be enriched with contributions from other researchers and from information professionals' associations based in other countries, this work highlights trends in the existing definitions of information literacy skills related to PIM issues. First, contributions vary significantly in the importance they attach to PIM. While some contributions clearly define skills related to information gathering and organising others overlook PIM issues with a focus on competencies essentially related to information seeking, evaluation and use. Second, the inclusion of PIM in information literacy seems a quite recent and rising tendency. This might be explained by the development of the PIM research field and the increasing complexity of these practices: individuals have to manage, by themselves and more than ever, consequent collection of personal information with multiple devices and across the multiple contexts of their everyday life.

Two limits arise from examining this review of information literacy standards and frameworks. On the one hand, the methodologies applied to produce definitions are often unclear. Standards and frameworks often seem to be formulated on the basis of information experts' knowledge and scientific literature. It is crucial to complete this approach by developing dedicated research studies designed to define competencies and anchored in the information practices as they are experienced by individuals. This is particularly required in the context of PIM practices which take place in the context of everyday life and not only in formal settings. On the other hand, the integration of the components of information literacy often remains unclear, with many definitions taking the form of lists of skills/competencies/knowledge to be mastered in order to be information literate. This approach is limited in its capacity to define information literacy as an integrated set of skills/competencies/knowledge closely related and mutually dependent. A matrix approach, as adopted by the AASL, seems more appropriate to reflect the intertwined nature of the constitutive elements of information literacy. To address these issues and to contribute to the definition of a PIM literacy, the results of a 4-year research project which led to a definition of personal information organisation competencies are briefly described in the next section.

4 A Definition of Personal Information Organisation Competencies

In order to define personal information organisation competencies, 58 semi-structured interviews were conducted with first-year undergraduate students. Interviews took the form of guided-tour interviews [13] by the informants of their personal space of information, including every device they use (e.g., personal and family computers, smartphones, tablets) and information related to the diverse projects of their life (family life, leisure, education). Students were interviewed twice, before and after their entrance into higher education, to observe how they adapted their PIM practices to face new informational challenges, with the idea that PIM competencies would play a key role in this transition. They were asked to explain how they organised their personal information and to show and comment on the produced organisations of their personal

information collections (e.g., folders, playlists, tags). Interviews also focused on the informants' capacity to reflect on their own practices with questions asking them to evaluate their pros and cons. Each interview was conducted in the everyday context of use of their digital tools, typically at their homes.

Interviews and analysis were inspired by phenomenography [27] with the objective of mapping the variety of the experiences and conceptualisations of PIM practices and competencies as they were experienced and described by informants. The research method was also inspired by sense-making methodology [28] with a focus on the role of PIM practices in the process of sense-making by the informants of their collections of personal information.

The analysis with the NVivo software combined deductive coding articulated around categories of activities proposed in the PIM literature [1, 29] with inductive coding following a grounded theory approach [30, 31]. The analysis of the interviews led to comparison of PIM practices both within subjects, between their different practices and between the two different interviews, and between subjects, for the same activity.

These interviews led to the identification of both successful and unsuccessful PIM practices experienced by the students. By comparing the strategies adopted by the informants and the way they framed and justified their practices, a definition of personal information organisation competencies was formulated [6] (Table 1).

Table 1. A matrix definition of personal information organisation competencies [6]

	Efficacy			Efficiency			Virtuality		
	Tech.	Info.	Soc.	Tech.	Info.	Soc.	Tech.	Info.	Soc.
Inclusion									
Exclusion									
Apprehension									
Implementation									
	Meta-Analysis								

This matrix combines 4 activities (inclusion, exclusion, apprehension, implementation) with three dimensions of information objects (technical, informational, social), and three types of relations (efficacy, efficiency, virtuality) used to characterize the mediating role of competenc*i*es between the individual's intentions and the opportunities and constraints of the situations where they are mobilized.

The four activities are largely inspired by existing literature on PIM [1] and on information organisation [29]. Inclusion activity concerns the entrance of the collection and consists in evaluating and deciding which information items should be added and saved to the collection. The exclusion activity consists in deciding which are the information items that are no longer useful and meaningful, and deleting them from the collection or archiving them. The apprehension activity consists in perceiving and understanding the characteristics of information items and their relations. Finally, the implementation activity consists in leveraging affordances of the devices and interfaces used to describe the information items and structure them in order to enable and facilitate interactions with the collection.

The three dimensions of information items proposed above are inspired by the work of Fastrez [32] in the field of media literacy and are fruitful to analyse information items from three complementary perspectives, as they are:

- informational, they represent things through the use of different sign systems, attaching a signifier to a signified. They are characterised by formal properties, referential objects and specific modes of signification.
- technical, they are stored, perceived and manipulated through technical devices combining hardware and software.
- social, they are related to the intentions of the individual and institutional agents who produce and diffuse them. They produce effects on their users and are used in a context influenced by cultural models and social representations.

Finally, this matrix combines activities and dimensions with a third level which characterises the relation between the objectives pursued by individuals when organising personal information management, the specific constraints and opportunities of their everyday life situations, and their competencies. The efficacy relation relates to the ability of individuals to mobilise their PIM competencies to achieve their objectives with their collection of personal information such as listening to music, writing a paper, or responding to an email. The efficiency relation relates to the ability of individuals to mobilise their PIM competencies to achieve their goals with minimum effort. The virtuality relation relates to the ability of individuals to mobilise their PIM competencies to maintain their personal information collection over time by anticipating their future needs and the possible evolution of their collection.

Each cell in the matrix represents a particular competency situated at the intersection of an activity, a dimension of information object and a type of relation to the pursued objectives. For example, when organising their musical collection, individuals have to be able to select appropriate music files to be included in their collection, taking into account the technical format of the music file and the efficacy of this file to reach a particular objective such as running or relaxing. Finally, this matrix also proposes a meta-analysis competency to emphasize the importance of the ability for the individuals to take a step back and reflect about their own practices in order to improve their competencies and their PIM practices.

5 Conclusion

Despite the development of the PIM field of research, and the increasing complexity of PIM practices, the question of PIM competencies needed by individuals to manage their personal information has been largely overlooked in the scientific literature. Through the review of information literacy standards and frameworks, different references to PIM competencies have been discovered in the scientific and professional literature. This review shows that the recognition of PIM competencies as an essential part of information literacy is a recent trend with many contributions giving little attention to PIM matters. It also shows that definitions are often formulated from the point of view of information experts and academics and need to be completed by dedicated research designed to define competencies on the basis of information

practices as they are experienced by individuals in the context of everyday life. This review also indicates a need for more integrated frameworks of information literacy competencies beyond simple lists which artificially fragment their definitions.

Considering these limitations, a definition of personal information competencies is proposed at the end of this contribution. This framework combines four activities (inclusion, exclusion, apprehension, implementation) with three dimensions of information objects (technical, informational, social), and three types of relations of competencies with the objectives motivating the PIM practices (efficacy, efficiency and virtuality). It is a first attempt to define information organisation competencies as essential components of personal information management literacy, laying the groundwork for its recognition as a key domain of information literacy.

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Students on a Social Media 'Detox': Disrupting the Everyday Practices of Social Media Use

Krista Lepik(✉) and Maria Murumaa-Mengel

University of Tartu, Tartu, Estonia
{krista.lepik,maria.murumaa}@ut.ee

Abstract. This article explores how disruption of habitual social media use reshapes the information behavior of emerging adults. Using the core ideas from theories about the social acceleration of time, reverse domestication and social media literacies, we designed a study where full-time BA-level students (N = 42) were asked to keep a diary about quitting social media for five consecutive days. Despite temporary disconnection, participants expressed anxiety and negative emotions brought on by the non-usage and perceived slowing of time – meaning mostly boredom and 'fear of missing out' while being inaccessible to others. Alternatively, many participants expressed fulfillment and a sense of serenity from the absence of constant availability. Considering this exercise of contemplating taken-for-granted activities, we propose a simple tool to reflect upon information behavior in the context of accelerating social time, to ensure subjectively perceived comfortable sense of time.

Keywords: Information behavior · Self-reflexivity · Social media use · Students

1 Introduction

In our paper, we discuss the initial results of our recent study exploring how disruption of habitual social media use reshapes information behavior of young adults. By contextualizing this study in theories of accelerating social time [1, 2], and uses and gratifications [3, 4], we explore people's perceptions of passing time: its pace, and connections between perceptions of time, and sustaining various relationships during a disruption of everyday practices. These relationships, kept up by "connected presence", "expressive communication", and "micro-coordination" [5] often remain taken for granted due to the quick pace of life – thus, a certain amount of reflexivity (part of both social media literacies [6] and media domestication [7]) is needed to revisit already established, but unnoticeably changing information behavior under daily pressure [8].

There is existing research on disconnection and non-use with the focus on people who are disconnected because of digital divides [9], who give up or abstain from social media as means of ideological resistance [10], or have different strategies for limiting their use of specific platforms [11]. We aim to explore how planned disruption of habitual use of social media can enable and empower participants' self-reflexivity and how 'detoxing' influences the perception of time and social relationships.

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Our study involves personal diaries about social media usage disruption during five consecutive days. Over 40 BA-level students at the University of Tartu kept diaries as part of their homework during the "Information Society and New Media" courses. These students normally have social media occupying an important part in their lives, so this homework enabled them to step back and see what would happen in case social media would be entirely removed from their reach for a few days. As has been discussed elsewhere [12], one's own choice or forced disruption in non-use or disruption of social media can also matter in the form of so-called 'have-nots' or 'want-nots'. In the present context, the students were presented with a task to abstain, so they were forced to become 'have-nots', but through the use of such exercise, many could explore the depth and overlap of their belonging to the 'want-nots' group to a certain extent.

Thus, our study functions as an initial test of a low-cost and low-tech tool for self-diagnosis which, instead of demanding to do something, demands not doing something. This way, our study proposes easily accessible and applicable social media literacy-related practical recommendations, potentially inspiring the teaching practices of colleagues teaching courses about learning skills, and at the same time, shedding light on relevant aspects of emerging adults' information behavior.

2 Theoretical and Empirical Background

Several recent studies have stressed the importance and effect of the increased pace of our daily life, including rapid production and consumption of information [8]. The pace of life, characterized by imperatives of "flexibility" and "efficiency" [1], taken-for-granted instantaneity [8], multitasking and other 'symptoms' of acceleration of social time [2] affects lives of people with different socio-demographic backgrounds [13].

While some studies have stressed the temporal factors in information seeking [14], the context of fast-paced life has been considered in fewer works [15, 16]. To gain a better understanding about the impact of the accelerating pace of life on information behavior (containing both active and passive activities to obtain information, but also information avoiding strategies [17]), the slow principles like reflexivity and mindfulness, control over speed of information consumption, the "non-task aspect of much information behavior" [8, p. 700] have been discussed. Yet, these principles still contain possibilities for further inquiries. It is even possible to stress the urgency of studies that consider the acceleration of social time in the framework of the information behavior as apparently, previously established time-management strategies or mindsets might not be useful under those new circumstances [18].

Theoretically, our study takes its vantage point from the uses and gratifications theory [3, 4]. The basic needs that both traditional media and social media fulfill, are:

- cognitive needs to acquire information and knowledge;
- affective needs to view content for excitement, enjoyment, and pleasure;
- social needs to create a sense of group belonging, influencing and contributing to others;
- individual needs to enhance self-promotion, personal gain and confidence;
- escapist needs to use the technology to flee from reality and create an alternative virtual and imagined reality [4].

Considering the needs and active roles [4] of social media users, to some extent, we also need to rely on media domestication theory which describes "how media and communication technologies are becoming increasingly interwoven in users' lives" [7, p. 27]. Some technologies and platforms have been domesticated to the point where they are perceived as reliable and trustworthy tools, thus losing their magic and becoming unnoticeable part of the routines [19].

As social media is used for a number of reasons – for example, finding and sharing information; maintaining, managing and building relationships, and one's own identity/communities, participating on many levels and modes [20] – our study also focuses on social-media-specific literacies. As has been stated previously [21], neither engineers nor policymakers are proposing serious solutions to the disorienting super-abundance of digital communication. Furthermore, digital and social media literacies are often framed as the responsibility and expression of individual agency [22]. So designing and testing a tool for developing such literacies in our research participants, can potentially serve as an attempt to fill the aforementioned gap both in theory and practice.

In fact, there are various and often overlapping concepts (such as information literacies, media literacies, new media literacies, digital literacies) used when talking about people's ability to apply informational self-determination in online settings and participatory cultures [23] in a meaningful way. We will focus on a more specific and relevant subset of digital skills – social media literacies [6, 24]. Social media literacies have also been analyzed in five sets of skills and knowledge related to attention, participation, collaboration, network awareness, and critical consumption [6]. These skills are not always linear and interconnected, with attention as fundamental to all others and at the center of our study – to be aware, present and mindful, knowing when to be alert and vigilant, when to block out distractions and make use of disengagement practices. In fact, the boundaries between use and non-use are increasingly blurred, with emerging practices enabling diverse ways and degrees of engagement with and disengagement from social media [11, 12]. In media domestication theory this kind of reflexivity is bound to 'reversed media domestication' entailing "reflection on the cognitive and practical strategies for distancing and withdrawal" [7, p. 29] from social media, and developing strategies of "controlled reduction of media intake" [8] – qua different information or social media 'diets'. Eventually, self-reflexivity or the "reflexive form of knowledgeability" [25] is a core concept for the agency of people in general, not just social media.

The notions of accelerating social time, uses and gratifications theory, but also social media literacies inform our research questions. Firstly, to set the focus of our study on the fast-paced life, we approach the students' social media disruption diaries to ask how they described the pace of time when absent from social media. Secondly, considering various uses and gratifications of social media, and the reflexive nature of our study, we are interested in how these perceptions of time were connected to sustaining peer, family and work-life relationships. These two aspects can both be considered as important contributors to learners' success, and thus, can be discussed fruitfully in the context of academic life and social media literacies.

3 Methodology of the Research

We conducted our study at the Institute of Social Studies, at the University of Tartu. In the fall semester of 2017 and spring semester of 2018, we asked BA-level students enrolled in the "Information Society and New Media" courses to stop using social media for five consecutive days. The students (91 in total) kept personal 'social media detox' diaries about this experience. As the courses were held in English, the diaries were written in the same language, as well. We encouraged the students to write as if they would write for themselves without constraining or censoring themselves. Over five days, the average length per diary was four pages (using standard formatting). We offered the students the option of submitting their diaries for our study – 42 students agreed to do so. Submitting a diary was entirely voluntary. After grading the diaries as part of the homework in the course, we invited students to submit their diary with a disclaimer that they could opt out of participating in our study any time. We also empowered the participants by giving them control over the final "printed word" [26] – they could edit the diary when necessary, and we also kept our promise to properly erase all the personal details from the diaries for the analysis. While analyzing the diaries, we considered their performative nature [27], and the fact that the diaries were related to homework, thus still subjugated to certain Freirean power hierarchies. Despite these limitations, our research design allows us to evoke self-reflexivity on the participants' level, and provides us with qualitative insights into aspects of people's lives often left unexamined.

The diaries were submitted by a rather heterogeneous group of students: the majority of students enrolled in this course were 19–23 year-olds from Estonia, studying journalism and communication, while about a quarter of students had an international background (coming from various countries via student exchange programs). Of the participants, 27 were female and 15 were male. We collected the diaries presented by full-time regular students but many Estonian students also work (part-time), so their work-life might also be heavily integrated with active social media use.

We analyzed the 42 submitted diaries (174 pages in total) using within-case and cross-case qualitative text analysis, more specifically, thematic qualitative text analysis [28]. This type of analysis suggests that researchers identify "what is common to the way a topic is talked or written about and of making sense of those commonalities" [28, p. 57]. We identified our approach as combining inductive and deductive analytical logic, being of experiential nature and making use of the social constructivist framework [28, p. 58]. Deductive analysis was purposeful to consider the context of our theoretical reasoning behind the diaries. At the same time, while looking for answers to our research questions about the perceptions of pace of time and its impacts on various relationships, we approached the diaries inductively and experientially in terms of letting our diary authors speak for themselves.

4 Results

Before turning the focus specifically to our research questions, it is interesting to take a look at how the participants started the detox. The beginning was usually carefully planned and we saw two distinct time-related strategies for starting their disruption. First, matching the expected slow tempo with the most similarly-paced part of their existing routines. For example, participants were describing starting their detox on a day off, just before a weekend trip with their friends or going to visit their parents, often at the countryside (where the disruption seemed more justifiable and accepted by others than going off the grid in the city). The second strategy was timing the detox to cover a period of time where there is much and intensive (home)work to be accomplished, hoping to increase productivity and fight the anticipated boredom by keeping busy.

4.1 Perception of Time During the Detox

Although the perception of time was not mentioned in the description of the detox task, it was a central concept in students' diaries. When describing their usual habits that the participants were forced to break, social media was described as a time-filler, time-killer or time-stealer. Without social media and the distractions that come with constant multitasking, students usually described their day as passing by more slowly:

> M1: The day goes by pretty slowly when u don't use social media. But you win a lot of time! I managed to do a lot of work. That was the biggest positive.

From this quote we can see an example of how the slowing of time, and essentially 'free time' was quickly re-contextualized as a possibility to increase productivity in work or school-related tasks. Which can, without the availability of connected presence and micro-coordination [5] be more time-consuming and thus social media platforms lose their 'domesticated' status, becoming more visible once again [19].

Or alternatively, to increase work-related productivity, the participants exchanged one type of media to another – reading, watching and listening to the news constantly and intensely and thus fulfilling their cognitive needs (in the form of news) or affective needs (entertainment and enjoyment mostly achieved via Netflix or Spotify). In these cases, there is proof of looking for substitute activities, not adjusting to the newfound pace. In some diaries, we noticed that the participant had anticipated slowing of time and initial boredom that might come with it and even 'overplanned' their days:

> F21: I was really productive. However, by the end of the day my head was heavy and I felt as though it would explode any second. I realized that it was because I hadn't had any breaks to unwind.

Time without social media can feel wasted or unpurposeful which was evident from how the participants described their activities (eating, having a phone call, falling asleep, waking up) as being 'just that and nothing else', for example:

> F1: This morning I spent this fifteen minutes in the kitchen. I just sat there without using my smartphone and I drank my tea all alone. I was so bored and watched the grey walls of our kitchen.

On the other hand, time without social media can feel precious, the slower pace might transfer to other communication modes, as described here:

> F15: Without social media, communication speed is slower, time is slower, too. I suddenly want to write rather than typing, slowly rather than quickly. And when I described the stories and my feelings in the letters, I tried to get the language correct and beautiful. Actually I find that some words I wrote on the letters I might never type on the social media.

Mundane routines and activities are often accompanied by screens so time being spent without that stimulation can feel quiet and slow. In addition, the downside of gaining extra time, perceiving slowing of time was the feeling of FOMO (fear of missing out) set in motion by not being able to do these micro-checks constantly.

Typically, the participants settled in to the disruption in a couple of days. What usually began as a change in outward-oriented time (such as 'I have to share this', FOMO, worrying about contact with others) transformed somewhat into inward-oriented time perception or "reflexive form of knowledgeability" [25], or awareness [6] which was usually described as a positive feeling:

> F26: And while thinking my thoughts, I realized, that they were so pure and so my own thoughts. I thought about things, that I hadn't thought about for a while, (but I wished I would). This seemed such a new and fresh feeling, it felt like for a very long time /…/I was instead thinking about a lot more interesting and important things, about my own life, my own dreams and wishes, about my future.

Furthermore, most participants described increased face-to-face communication with others, as well as going back to and making use of 'old school' phone calls and e-mails.

When detoxes came to an end, we noticed a typical scenario in the diaries that can be termed sped-up acceleration. The participants often found solace even during the detox from getting back to 'normality' soon, to binge-scroll everything after the five-day-abstinence. And many of them did exactly that, for example:

> F2: It took me around 2 h until I was well-informed again. It is quite strange that I had no problems renouncing on social media, but then used it again as I would be addicted.

But in long-term, nearly half of the participants described different changes they had made to their social media usage based on the detox, for example: some had 'decluttered' their feeds by unfollowing people, groups and pages; others had switched off notifications that serve as a constant reminder or temptation to check different platforms or moved the app out of sight, to the last screen page on phone; few had even de-installed certain apps or stopped using them entirely (mostly Snapchat). In essence, some of the diary keepers explored the affordances of stepping into the shoes of the 'want-nots' group [12]. Interestingly, many of the participants expressed similar opinions about the length of the detox - feeling like they would have gained a deeper insight to their informational needs and invisible media usage patterns by being absent for a longer period of time:

> M8: During the last days, my brain received and processed so little amount of information, comparing to the previous periods. I think, there would emerge much more crucial changes and realizations if the detox period was longer.

Some students wrote in their diaries that now when they know the 'genre' and how to approach the disruption, they plan to make time for similar detoxes independently.

4.2 Relationships Affected by Detox

As we live in the always-on, on-demand society, most of the students felt like they could not just go off the grid and start the detox but rather prepare carefully. These preparations usually involved communicating their 'unusual circumstances' to important others and very noticeably, often taking a certain amount of pride of their uncommon choices:

> M1: My great preparations managed to save my relationships. Most of the people knew that I was not going to use for some time and they totally accepted it. A friend even said I should write a feature about it. What a feature that would be!

Others' reactions mostly mirrored the norm of availability, according to the diaries, as friends, family members and colleagues expressed surprise and in their reactions confirmed once again the exceptionality of such a disruption to the participants:

> F27: Some people were almost swept off their feet (again, definitely not an exaggeration). "Why on Earth would you do something like that?", "Is everything okay?", "So what will you and what will you not be using? Is Youtube social media? Should we start an iMessage chat? Can you cheat?" etc. Honestly I was not too sure myself.

One participant wrote about different generations having a different look at these aspects, when telling her (older) co-workers about going on a detox, they pointed out the "unoriginal specialness" of such disruption:

> F11: The funny thing is that when I told the people that I work with that I am doing a detox they said "How millennial of you." It's scary because the older generations can go without social media, it is us, the newer generations, who feel the constant need to use it to not miss out on anything.

In addition, the availability of facts and being able to seek additional information about people was sometimes perceived as making people anti-social:

> F22: I guess that Facebook makes me a bit more uncommunicative at some points, as I sometimes don't ask people where they live or come from, because I think I can look that up later.

Most dominantly notifications about going on a detox were contextualized as important information for friends and family ("so they know I haven't died"), as usually social media functions as a platform for small acts of care: being there for others constantly and paying attention, "extra closeness" as F27 put it. Most importantly, though, school and work relationships were brought up as something needing preparation and reorganizing:

> M1: Facebook is the only social media site I use every day. It has turned into a work site because of my usage. All of my group work goes on in Facebook and that is why this detox is a bit dangerous to be honest. It carries all possible functions and it turns out it has become irreplaceable.

Majority of participants described how the detox increased the amount of time spent on face-to-face communication that was perceived as having supremacy over computer-mediated communication, a shift from quantitative communication to qualitative one.

And to a few, the detox itself was a testing tool for existing friendships – who will care if I am not constantly available?

5 Discussion and Conclusions

In our study, we have kept in mind the specific constellation of accelerating social time [1, 2, 8], uses and gratifications [3] related to social media [4], media domestication [7], and social media literacies [6, 24]. Although it may seem that all these notions do not have much in common, there is still a common thread of agency and reflexivity binding these notions. The acceleration of social time, however, leaves little time to ponder on the technological and social changes (including acceptance of newer technologies), and may eventually cause an uncomfortable sensation 'fear of missing out' or just boredom. The question is thus: can reflexivity on "media produsage" [23] in this aforementioned context be treated as a transferable skill that can also be supported in various learning environments (such as a university, among others)?

The principle of keeping a 'social media detox' diary is simple as it helps to reflect on something one does not do. There can be different aspects one might consider writing about in her diary (like mood changes, small hints related to smartphone apps, reflections on a critical choice of information sources), yet one of those aspects is related to the perception of time, bound to the peer and work-life relationships. While theories on social media literacies in general point fruitfully towards the agency of social media users, participating and collaborating in different activities [6, 24], critical media consumption, but also attention [6], these kinds of awareness have seldom been related to temporality, that is – what about the perception of time with or without [7] social media, and the connection between time flow and fostering peer relationships.

For the field of media and information literacy, our study holds significance, as it points towards easy and fun ways to increase and develop people's media and information literacies. Considering that updating these nuanced and context-specific literacies are often framed as a personal responsibility [22], the accessibility and ease-of-use of tools and methods is crucial. Usually we turn our focus toward what it is that people do and what kinds of knowledge and skills are needed in order to engage in something, but we emphasize the importance and potential of *not doing* something, as a part of different literacies and the value of disengagement, serving as a mirror for self-reflexivity or exploring alternative media repertoires. So if the system is geared towards constant acceleration of time and there is a need for new time-management strategies [18], approaches enabling people to 'shift gears' are worthy of exploration. After all, people's agency is characterized by an innate ability to imagine different outcomes [25] which can bring change and restructuring.

Without preferring any attitudes of some research participants over attitudes of others, this study helped us to better understand the meaning of 'social media detox' in terms of perception of time. The 'social media detox' provided both new possibilities

(of doing something you did not have time to do before), but also new challenges (how to avoid boredom and solitude, and keep in touch with family and friends, how to run even the smallest errands outside social media). Also, the diaries revealed very vividly different categories related to diary keepers' evaluations about usage of time: whether it was 'well-spent', 'wasted', 'killed' – the diaries provided these useful insights both from the time before (when social media was still used), and the time after (when 'social media detox' left a certain amount of spare time).

The previous intensity of social media usage and satisfaction with time spent away from social media seem to form certain continua that invite posing new hypotheses – whether the intensive usage of social media usage induces stronger positive or negative emotions, related to perception of 'social media diet'? Or, besides the intensity of social media usage, what are the affordances of the absence from social media, and how strong do these affordances need to be in order to challenge the taken-for-granted normality of being instantly available [8]? These different questions and continua yield us understanding about subjectively perceived comfortable sense of time.

On the basis of our sample (N = 42) whose members were of relatively the same age, we were able to detect very different attitudes towards relatively similarly altered pace of time. Similarly, the absence from social media had very different impacts on sustaining various social relationships: some of our research participants happily sought new possibilities to communicate to their significant peers, while some were struggling to find these possibilities. Thus, our results help to take a look at the different social- media-related patterns of time consumption of emerging adults.

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Information Literacy, Active Citizenship and Community Engagement

Character Building in Children's Online Information Behaviours: Applying a Virtue Epistemology Perspective to Information Literacy

David McMenemy(✉) and Steven Buchanan

Strathclyde iSchool Research Group, University of Strathclyde, Glasgow, UK
{d.mcmenemy,steven.buchanan}@strath.ac.uk

Abstract. This paper advances our understanding of the theoretical and practical challenges of developing intellectual character in children's online information behaviours. We argue that widely reported issues such as misinformation and disinformation extend IL education beyond considerations of ability to considerations of disposition, and highlight this as an understudied topic within IL education. We introduce the classical concept of intellectual character and discuss virtues traits in the IL context. Applying Baehr's nine intellectual virtues to two commonly cited IL models, we evidence limited presence of virtues in IL models, and propose an important agenda for future research.

Keywords: Digital citizenship · Virtue ethics · Information literacy · Information behaviour · Virtue epistemology · Children

1 Introduction

This paper advances our understanding of the theoretical and practical challenges of developing intellectual character in children's online information behaviours. Character is understood as "the comprehensive set of ethical and intellectual dispositions of a person" [1]. In relation, intellectual character "is the part of your character—your dispositions to act, think, and feel—that pertains to thinking and learning" [2, p. 18]. The authors position intellectual character as a topic of significant societal concern. Issues in the online information behaviours of children are reported globally, ranging from access (e.g., obtaining) to use (e.g., application) to conduct (e.g., respect). For example, a recent UK national report identifies common issues of misinformation, hate speech, sexting, and cyberbullying amongst children [3]; and another that as many as one in four young people in the UK have experienced cyberbullying [4]. Similar cyberbullying rates are reported in many other countries, (e.g., Australia and the USA, and South Africa), rising to 43% in Serbia, and 77% in Argentina [5–7]. Issues of disinformation for malicious purposes are also reported [8].

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2 Background

Whilst intellectual character is positioned by the authors as an important aspect of information literacy (IL) education, it would also appear to be an understudied topic within the discipline. Reviews of the main library and information science databases, *Library and Information Science Abstracts* (LISA) and *Library, Information Science, and Technology Abstracts* (LISTA) were conducted Spring 2018, encompassing the entire collections to date. Searches combined IL with relevant epistemological keywords (discussed in Sect. 3.1) including: virtue epistemology; virtue ethics; character.

Notably, limited specific reference and/or discussion of intellectual character was found. For example, virtue epistemology produced two precise hits on LISA (one a general review of Baehr's book, and the other a brief reference to Zagzebski) and three precise hits on LISTA, two of which were further reviews of Baehr's book, and the other related to cultivating online enlightenment from a Buddhist perspective. Ethical values related to social justice have received some attention [9–15], but relate to ethical aspects of character, not intellectual.

Similar concerns regarding a lack of attention to issues of intellectual character have been raised within education more broadly. For example, Dow argues that "there is a striking lack of familiarity with matters of intellectual character and virtue at the academic and popular levels" within education [16, p. 16]. Other researchers have observed the "constantly evolving legitimating principles of character education and their continued non-appearance on education-policy and teacher-training agendas" [17, p. 79]. Consequently, this paper asks two fundamental research questions: (1) What are the desirable intellectual character traits applicable to children's online information behaviours? (2) How is the development of desirable intellectual character traits currently addressed within IL education?

3 Methodology

In this initial exploratory study, we sought to identify and understand concepts of character in the IL context, and explore presence of character concepts in IL models.

3.1 Theoretical Framework

Our interdisciplinary framework brings together theories and models of information literacy with theories and models of virtue epistemology to explore shared concepts of knowledge acquisition and sharing. Virtue epistemology (VE) relates virtue (i.e. the traits of a moral person) to knowledge, and knowledge acquisition pursuits. VE in the knowledge acquisition context, "requires that we think, reason, judge, evaluate, read, interpret, adjudicate, search, or reflect in various ways," with particular attention to aspects of personal and intellectual character [18, p. 18]. VE is placed in the educational context via the use of Baehr's [2] framework of nine core virtues: curiosity; intellectual autonomy; intellectual humility; attentiveness; intellectual carefulness; intellectual thoroughness; open-mindedness; intellectual courage; and intellectual tenacity.

Our IL definition is provided via the UK Chartered Institute of Library and Information Professional's (CILIP) Information Literacy Group (ILG) definition, which states that: "Information literacy is the ability to think critically and make balanced judgments about any information we find and use" [19]. The CILIP ILG definition, with emphasis on critical thinking and balanced judgment, appeared particularly appropriate due to potential synergy with open-mindedness aspects of VE. Other IL definitions, while similar, possess less synergistic use of language. For example, the American Library Association define IL as [20], "a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use the needed information effectively".

3.2 Identifying Character Concepts in Information Literacy Models

Baehr's nine core virtues provided a conceptual framework for identifying concepts of character development in information literacy (IL) models. The IL models selected for analysis were the Big6, and the ACRL Framework; representing two commonly cited models widely used in education. Content analysis was identified as an appropriate method for identifying the presence of character concepts in IL models.

Content analysis "is a research technique for the objective, systematic and quantitative description of the manifest content of communication" [21, p. 18]. It provides a method to "quantify content in terms of predetermined categories and in a systematic and replicable manner" [22, p. 689]. However, it is important to note that whilst quantifying content, our approach to coding also incorporated qualitative analysis and extended beyond identification of manifest content to latent content facilitating an interpretative approach to content analysis [22]. Manifest content refers to exact or close matches, the latter extending to synonymous terms. Latent content refers to matches expressed in different terms but with shared meaning. Whilst open to interpretation, analysis of latent content was considered important given the cross-disciplinary nature of this study and the potential for variance in articulation of character concepts. Periodic code checking (multiple sample coding), was conducted by one team member independent to the first to validate coding, with no notable variations found. Our initial focus was the identification of presence of concepts. We reserve further examination (e.g. exploration of prescriptive depth of character concepts) for future work.

4 Character

Character has long been discussed, and long recognised as something to be nurtured in children. For example, in the *Nichomachean Ethics*, Aristotle explored the importance of human virtue for the cultivation of the virtuous citizen. For Aristotle, virtue fell "into two divisions, intellectual excellence and goodness of character" [23]. Aristotle believed that virtuous behaviours were gained by repetition and training: "the virtues are not formed in us by nature, but they result from our natural capacity to acquire them when that capacity has been developed by training" [23]. Importantly, bad habits could be formed in a similar way, "as [bad] habits of character are formed as the result of conduct of the same kind" [23]. Consequently, Aristotle believed that the cultivation of virtue in the young was something of "supremest importance" [23].

Cultivation of virtue to foster citizenship must now consider behaviours in both the physical and digital space, and the concept of digital citizenship, now considered crucial for future generations [24]. Further, issues such as cyberbullying and misuse of information extend IL education beyond considerations of *ability* (i.e. skills) to considerations of *intellectual character* (i.e. desirable or virtuous dispositions).

4.1 Baehr's Nine Core Virtues

Baehr's research on VE led to a widely cited book in 2011, followed by a project, "Intellectual Virtues in Education", which investigated the application of virtue epistemology theories within educational practices. This led to the formation of a US middle school which teaches based on VE theories. In addition, Baehr has produced a practical guide for applying VE in the educational setting. Baehr is thus selected as a theoretical model that has successfully put character concepts into educational practice.

Baehr provides two classifications of intellectual virtues. The first is a set of nine core virtues arranged under three groupings related to the knowledge-building process. The second provides a further more detailed exposition of intellectual virtues divided into six categories [2]. For the purposes of this study the first classification is considered sufficient to introduce core intellectual character concepts and guide analysis of IL models. Each of the nine core virtues are discussed below and are placed in the information behaviour context by identifying related concepts within two commonly cited models of information behaviour: Wilson's [25] model of information behaviour; and Kuhlthau's model of the information search process [26].

Baehr's first grouping identifies intellectual character virtues required for initiation of knowledge acquisition and ongoing direction:

a. Curiosity – relates to being "driven to explore and expand their mind" [2, p. 59]. For Baehr this "occupies a special role in the overall economy of learning" [2, p. 59]. Unlike those who are curious only for extrinsic reasons such as prescribed tasks, Baehr argues that, "fostering curiosity is akin to fostering a 'love of the game' in sports" [2, pp. 59–60]. For Baehr, curiosity is motivated by a desire for genuine, and broad, understanding.
b. Intellectual autonomy – describes "a willingness and ability to think for oneself" [2, p. 70]. Baehr argues that, "like all the other virtues, [autonomy] needs to be balanced and constrained by complementary virtues, in this case virtues like intellectual humility… We need to be aware and accepting of our intellectual limitations and deficiencies" [2, p. 72].
c. Intellectual humility – refers to"an alertness to and willingness to "own" one's intellectual limitations, weaknesses, and mistakes" [2, p. 81]. Baehr argues that the "intellectually humble person, instead of trying to steer the conversation away from his ignorance, will seek to replace it with knowledge or understanding" [2, p. 81].

In information behaviour terms, curiosity is recognised as a psychological motivation that can activate and drive information-seeking activity [25, 26]. Intellectual autonomy can be related to aspects of self-efficacy [25], and intellectual humility to knowing one's limitations, and being willing to seek out assistance when experiencing uncertainty [26].

Next, Baehr identifies virtues required for continued progress, and in particular, depth of understanding:

d. Attentiveness – relates to the individual being "present in the sense that he's personally engaged and invested in what's being said or learned" [2, p. 94]. According to Baehr, the attentive student "listens carefully and openly" [2, p. 94].
e. Intellectual carefulness –is present when the "person takes pains to avoid making intellectual mistakes… [and] also has a grasp of the rules of good thinking and related intellectual activities" [2, p. 105].
f. Intellectual thoroughness – is present when the "person is disposed to probe for deeper meaning and understanding" [2, p. 117].

In information behaviour terms, attentiveness can be related to active and constructive information seeking behaviours [25, 26]. Intellectual carefulness and thoroughness can be considered in relation to the process of constructing meaning from new information, and inherent reflective practices and expansive information searches [26].

Finally, Baehr identifies virtues for overcoming obstacles throughout the learning process:

g. Open-mindedness – refers to a "person is one who is willing and able to consider alternative standpoints, to give them a fair and honest hearing, and to revise her own standpoint or beliefs accordingly" [2, p. 126].
h. Intellectual courage – refers to, "when we subject ourselves to a potential loss or harm in the context of a distinctively intellectual pursuit like learning or inquiring after the truth" [2, p. 139].
i. Intellectual tenacity – is present when a "person doesn't give up when she doesn't understand something. Nor does she treat intellectual failure or defeat as a final judgment of her abilities." [2, p. 150].

In information behaviour terms, open-mindedness can be related to exploratory and expansive information seeking actions [26]. Intellectual courage and tenacity can be considered in relation to stress/coping mechanisms influencing subsequent information behaviours [25], and resilience to uncertainty including new knowledge that can challenge existing personal constructs [26].

5 Character in Information Literacy Models

We now discuss our findings related to the presence of Baehr's nine core virtues in the Big6 model and the ACRL framework.

5.1 The Big6

The Big6 is a widely-used "six-stage model to help anyone solve problems or make decisions by using information" [27] developed by Eisenberg and Berkowitz [28, 29]. The model is built around what are described as the six big skills of information-problem-solving: task definition, information seeking strategies, location of and access

to information, use of information, synthesis, and evaluation. The focus of the model is "on developing broad skills areas reflecting the information problem-solving process rather than teaching how to use specific resources, tools, or library systems" [28, p. 100].

None of the nine core virtues were manifest within the Big6. Latent analysis also failed to identify virtues with any degree of confidence. For example, for the first step in the Big6 model, task-definition, it is stated that, "Before using any other information skill, students must first be able to articulate information needs" [28, p. 115]. Within the objectives listed for this skill, the focus is on a specific information-seeking problem, and thus has limited interpretation. This was the case across all Big6 steps. Perhaps the closest to a degree of interpretation as incorporating character concepts was step two, information-seeking strategies, which suggests, "examining alternative approaches to the problems of acquiring appropriate information" [28, p. 110], which could arguably be associated with virtues of open-mindedness, intellectual autonomy, and intellectual humility. However, again the description of the skill is focused on meeting an individual task as opposed to developing knowledge acquisition. Overall the Big6 was found to be task-focused, and thus limited in relation to character development.

5.2 ACRL Framework for Information Literacy for Higher Education

The ACRL Framework [30] is a development of the *Information Literacy Competency Standards for Higher Education* first published in 2000. The current Framework was adopted by ACRL in 2016, and has six frames that form the basis: Authority Is Constructed and Contextual; Information Creation as a Process; Information Has Value; Research as Inquiry; Scholarship as Conversation; Searching as Strategic Exploration.

An important point to note about the fit of the Framework for a virtue epistemology approach is that it refers to the expected skills that should be acquired as "dispositions".

This is a potential indication that the approach taken in the development of the Framework is cognisant of character issues. None of the nine core virtues were manifest within the ACRL Framework; however latent analysis identified several relationships.

The first frame, "Authority Is Constructed and Contextual", relates to the credibility and construction of information, and recognising what levels of authority are required for different kinds of information need. There is latent presence of several virtues. Specifically, the following excerpt supports both open-mindedness, and intellectual carefulness: "Experts view authority with an attitude of informed skepticism and an openness to new perspectives, additional voices, and changes in schools of thought". This mirrors Baehr's notion that, "the intellectually careful person takes pains to avoid making intellectual mistakes… [and] also has a grasp of the rules of good thinking and related intellectual activities" [2, p. 105]. It also reflects Baehr's summation of open-minded people as "willing and able to consider alternative standpoints, to give them a fair and honest hearing, and to revise [their] own standpoint or beliefs accordingly" [2, p. 126].

The second frame, "Information Creation as a Process", focuses on the process of creating information in multiple formats, and the awareness in the researcher of that process: "experts look beyond format when selecting resources to use". While we recognise it could be argued that this could be described as an aspect of intellectual thoroughness or intellectual carefulness, the frame relates to skills as opposed to dispositions, and thus is not considered to incorporate aspects of intellectual character.

The third frame, "Information Has Value", relates to the value of information on multiple fronts, from economic to social, to legal: "the individual is responsible for making deliberate and informed choices about when to comply with and when to contest current legal and socioeconomic practices concerning the value of information". This was not found to have presence of any of the core virtues.

The fourth frame, "Research as Inquiry", relates to the process of research as being iterative and about complex or emerging questions. Several core virtues are present latently within this frame. The virtue of curiosity is present in the statement that, "Experts see inquiry as a process that focuses on problems or questions in a discipline or between disciplines that are open or unresolved". This mirrors Baehr's notion that "a curious person is disposed to wonder, ponder, and ask why… to know how or why things are the way they are" [2, p. 61]. We can also see both intellectual humility, and open-mindedness in the following summary of the process of inquiry: "this process includes points of disagreement where debate and dialogue work to deepen the conversations around knowledge".

The fifth frame, "Scholarship as Conversation", relates to the cultivation of scholarship as discourse between different minds. This frame is supported by several of the core virtues. It presents scholarship as "a discursive practice in which ideas are formulated, debated, and weighed against one another over extended periods of time" and this can be clearly linked to open-mindedness, intellectual humility, intellectual carefulness, and intellectual thoroughness. In addition, that, "Experts understand that, while some topics have established… query may not have a single uncontested answer. Experts are therefore inclined to seek out many perspectives, not merely the ones with which they are familiar". This mirrors Baehr's insistence that the intellectually thorough person probes for "deeper meaning and understanding" [2, p. 117]. On intellectual humility, and again, open mindedness, we can identify the virtues in sentences like: "develop awareness of the importance of assessing content with a skeptical stance and with a self-awareness of their own biases and worldview".

Lastly, "Searching as Strategic Exploration" emphasises the potential complexity of seeking out information and the skills necessary in understanding that overall process. It states that, "Searching for information is often nonlinear and iterative, requiring the evaluation of a range of information sources and the mental flexibility to pursue alternate avenues as new understanding develops". There is latent presence here of intellectual humility, as Baehr suggests the intellectually humble person, "instead of trying to steer the conversation away from his ignorance, will seek to replace it with knowledge or understanding, possibly by noting his ignorance and asking others to fill in the gap" [2, p. 80].

6 Discussion

The development of intellectual character in children can be considered in relation to nine virtues [2]: curiosity; intellectual autonomy; intellectual humility; attentiveness; intellectual carefulness; intellectual thoroughness; open-mindedness; intellectual courage; and intellectual tenacity. We have positioned these virtues as core to the development of desirable online information behaviours in children, but in relation, we report a lack of previous studies within IL education, and identify limited presence of such virtues within our sample of IL models.

Within the Big6 only one step, 'information-seeking strategies', could be loosely associated with virtues of intellectual autonomy and humility, and open-mindedness; however, relations are not explicit and subject to interpretation. Within the ACRL we identified virtues latently present within the descriptions of the frames. The most common virtues related to open-mindedness and intellectual humility. Relationships to intellectual carefulness, curiosity, and thoroughness were also identified. However, several of these relations are not explicit and subject to interpretation. This could be interpreted as a usage of the terminology of virtue without a clear connection to the epistemological meaning. Baehr argues that using the language of virtue in inauthentic ways, or over-using the terms when not actually undertaking teaching from that perspective risks backfiring on educators [2, p. 363]. He encourages intellectual virtue language to "be integrated into statements of course goals and objectives" [2, p. 366]. This is synergistic with ACRL recommendations to view IL frames as outlines to be developed further. In particular, "to develop resources such as curriculum guides, concept maps, and assessment instruments to supplement the core set of materials in the frames" [30]. Character concepts would be incorporated at this stage.

It is also important to note that IL educational programmes should not only make virtues explicit, but should also consider how such virtues are developed in children (i.e. process aspects). In relation, development of character should be viewed as an incremental and iterative process [2]. Baehr argues:

> "Character virtues arise through the practice or repetition of virtuous actions. Applied to intellectual virtues, the idea is that the traits in question develop through thinking, reading, interpreting, reflecting, analyzing, and discussing academic content in ways that are inquisitive, attentive, careful, thorough, [and] honest." [2, p. 507].

Such principles of incremental learning are again synergistic with recommended approaches to IL education. For example, the ACRL framework, whilst acknowledging that single classes in IL have value, nonetheless recommends that IL education be viewed as a gradual process of learning transfer. In addition, it is important to recognise that the cognitive dispositions being developed require deep understanding, and require sufficient time be allocated to desired learning outcomes. Baehr recommends that: "… if we want to do what we can to ensure that our classes have a positive impact on the intellectual character of our students, we would do well to ask ourselves: "How well does my allotment of the time I have with my students reflect this pedagogical goal?"" [2, p. 292]. Further, careful consideration must be given to how to incorporate character development into IL education, and development of appropriate teaching and learning resources. We reserve exploration of this challenge for future research.

7 Limitations

The paper provides the first critique of IL education models from a virtue epistemology perspective; however, our qualitative analysis is open to subjective interpretation. Further independent assessment would verify findings. Other frameworks of virtue epistemology could also have been considered, (e.g. Rithchart, and Sockett) [31, 32]. Further, our analysis is limited to a sample of IL models. Analysis of further IL models would establish generalisability of findings. In relation, our methodology provides a repeatable approach for examination of both our sample and further IL models.

8 Further Research

We position the development of intellectual character in children's online information behaviours as an understudied topic of significant societal concern, and encourage further research. In particular:

1. Further theoretical refinement of IL education models to explicitly incorporate application of intellectual character virtues.
2. Empirical studies with children to explore appropriate methods of intellectual character development to inform IL education programmes.
3. Analysis of current IL education for practitioners to consider how VE concepts can be introduced into the professional body of knowledge.

9 Conclusions

The cultivation of character in children to foster virtuous citizenship must now consider behaviours in both the physical and digital space, and the concept of digital citizenship. We have argued that widely reported issues such as misinformation and disinformation extend IL education beyond considerations of ability to considerations of intellectual character; however, to date, the latter appears an understudied topic within IL education. Further, we have identified limited presence of concepts of intellectual character in our sample of IL models, with none explicit, and all subject to interpretation. If we accept that the development of character in children's' online information behaviours is indeed an important aspect of IL Education, much further research attention appears required to put into practice.

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Assessing Libraries' Community Roles. Proof of Concept

Helena Lipkova[1(✉)], Tomas Diviak[2], Adela Jarolimkova[1], Barbora Drobikova[1], and Hana Landova[1]

[1] Institute of Information Studies and Librarianship, Charles University, Prague, Czech Republic
{helena.lipkova, adela.jarolimkova, barbora.drobikova, hana.landova}@ff.cuni.cz
[2] Department of Sociology, Philosophical Faculty, University of Hradec Králové, Hradec Králové, Czech Republic
tomas.diviak@gmail.com

Abstract. An essential condition for a public library's fulfilling its community role is a thorough understanding of its position in the local social network. The approaches used by libraries so far are based on partial, intuitive forms of assessment. In our study, we prove that the analysis of such networks can be based on a theoretically, as well as methodologically, rigorous approach. This article outlines the possibilities of using - Social Network Analysis (SNA) - in the field of library and information science (LIS). The main contribution of this study is the pilot verification of SNA in a local library in a small-town environment, in this case the town of Sedlčany located in Central Bohemia (population: 7,000). The SNA was applied using basic descriptive measures within the sociocentric approach and subsequently compared to the results of the subjective, intuitive self-assessment of the egocentric network by the library staff.

Keywords: Libraries · Community role · Social network analysis · Self-assessment

1 Introduction

The concomitant phenomenon of contemporary society's development is the radical transformation of information and communication processes, the disruption of traditional social ties, and the increase of distrust. This situation also influences the role of libraries in society, particularly public libraries. Public libraries fulfil their traditional cultural function by providing access to information, but they also perform an increasingly important community role by organizing activities that help create a space for meeting, development of personal connections and communication with members of various segments of society regardless of their education, religious beliefs, state of health, or social status. The openness of these events to the general public contributes to overcoming barriers between individual social groups and creates space for the integration of diversity and building a feeling of mutual belonging. In addition, it helps to strengthen the position of library as a trustworthy institution, providing reliable

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information, which is extremely important in the era of false and fake news. The role of the library as a place of information and digital literacy education will have a higher impact in a strong, open, and interconnected community. On a secondary level, community events can contribute to the deepening of bonds between individuals in a given area, their history, natural, or cultural heritage. Thus, public libraries can contribute significantly to forming and consolidating trust in society at the mezzo-level between the macro and microspheres. They can strengthen social cohesion and consolidate relationships between stratified societal groups at the local level [1].

An essential condition for fulfilling the community role is a thorough understanding of the position of the public library in the local social network. The approaches used by libraries so far are based mainly on partial, intuitive, and/or subjective forms of assessment.

2 Objectives

The aim of this paper is to show the possibility of using a social network analysis (SNA) for the analysis of the local network of organizations contributing to community development; namely, in building libraries as part of this network. This is a solid theoretically based approach that has found its applicability in a whole array of disciplines among both social and natural sciences [2]. So far only bibliometric studies focused primarily on co-authorship and referential ties have been used in the field of LIS [3]. This pilot study identifies the benefits, and also the limits, of this method in mapping the contemporary community role and in building a community strategy for a specific library. It also verifies the method's usability in practice. It also focuses on comparing SNA outputs with a subjective evaluation of the community role from the perspective of the egocentric as well as the whole network.

3 Community Role

3.1 Communities

"First and foremost, community is not a place, a building, or an organization; nor is it an exchange of information over the Internet. Community is both a feeling and a set of relationships among people. People form and maintain communities to meet common needs." [4].

Community is a very complex concept. Trust, shared experience, a shared - or sense of shared - history, caring for each other, and common needs are some of a community's main characteristics. Communities are of different sizes; they might overlap or they can exist within each other. Each individual belongs to multiple communities [4].

3.2 Libraries and Their Role in the Community

The roles of the libraries have changed over the time. In the mid-20th century, librarians emphasized a different role: providing access to information. "Libraries saw themselves

as providing an antidote to the social ills of the day. As the people's university, creating good citizens through education and literacy instruction was a core purpose of the early library [5].".

While providing access to information is still an important function of the public library, the past twenty years have brought a shift back to libraries' roots as community builders [6]. Libraries are a very important and key actor in community building. It is their task to use all tools and experiences to strengthen the communities around them. Succeeding in doing so will enable libraries to thrive in the future. "Physically and virtually, libraries reflect the belief that people, regardless of age, gender, race, income, skill or education, have the right to information and knowledge. Whether through books, events, programming, or simply providing space for discussion, libraries play a critical role in expanding knowledge and engaging people in conversation with each other and encouraging them to be active in their communities [6].

As for the assessment of the community role, an instrument for helping libraries capture their community impact is proposed, for example similar to the instrument developed by Davis and Plagman. It is based on a set of questionnaires for library patrons focused on different community roles [7]. Also, various studies on the creation of social capital in libraries can be viewed as studies on libraries' community role. The questionnaires were distributed to library patrons [8], alongside interviews with public library staff [9], and interviews with public library leaders [10, 11].

4 Methods and Data Collection

4.1 Social Network Analysis[1]

We define *network* as a set of nodes and the ties among them. Nodes can represent any entity. In our specific case, nodes represent organizations involved in the life of the community. Ties are the connections; this definition encompasses a broad range of phenomena [16]. In our case, a tie between two organizations represents the interaction of cooperating on organizing an event together. This relationship is undirected (ties have no direction); cooperation is by definition mutual. Ties may have different levels of strength. However, for the sake of simplicity, we consider only binary ties here: ties either exist or they do not, and they are not further differentiated by strength. All these aspects of network can be visually represented in network graphs also known as sociograms.

Centrality Measures. Centrality measures are a set of methods that are used to identify the most prominent nodes in the network [17]. Here, we will take a look at just two of these measures, which are frequently used and complement each other: degree and betweenness.

[1] There are many more network concepts and measures. We present only those which we use in our analysis based on standard introductory texts [12–14] as well as intermediary ones [15]. Interested readers should consider these for further reference.

The degree of a node is a simple sum of its ties. A node with a high degree has a lot of ties to other nodes, that allows it to access a lot of information and resources as well as to cooperate directly with a lot of other nodes.

The betweenness of a node is the proportion of the shortest paths (sequences of ties) between all pairs of nodes in the network that pass through a given node. Betweenness is important for relationships that have to do with communication and distribution; or other flow processes in the network. Nodes with high betweenness are sometimes called brokers, as they serve as intermediaries through which important things flow from one part of the network to another.

Cohesion Measures. Whereas centrality measures focus on individual nodes within the network, cohesion measures assess the network as a whole. Specifically, cohesion measures indicate how well connected and cohesive the whole network is. Density is a proportion of existing ties in the network relative to the maximum number of possible ties in the network (the number of all pairs of nodes). The result ranges from 0 to 1, where 0 means that the network is just composed solely of isolated nodes, while 1 means that each node has a tie to another in the network. Thus, density can be expressed as a percentage.

Network cohesiveness not only depends on the number of ties, but also on their dispersion. This is because ties can be concentrated around a few very central nodes, or they may be evenly spread. Centralization measures the extent to which a particular network resembles a star network, which is a network maximally centralized around one single node with ties to all others and no other ties among the other nodes. If centralization equals 1, it indicates a star network; whereas, if it equals 0, then each node in the network has the same number of ties.

Geodesic distance is the shortest path (the smallest number of ties) between a pair of nodes. A cohesive network is a network with short geodesic distances among its nodes, because nodes can easily reach each other in such a network. This can be expressed with an average geodesic path length. The smaller this average is, the more cohesive the network is in these terms. Diameter is the longest of all geodesic distances in the network.

All the computations were conducted using the UCINET [18] software for SNA.

4.2 Research Data

During the data collection process, we searched for all publicly promoted events in the given area meant for the general public. These were events that could eventually contribute to building community life in local society (hereafter referred to as "community events"). In accordance with the definition of community role, special emphasis was placed on activities open to general public that help create a space for meeting for citizens of various segments of society regardless of their education, religious beliefs, state of health, or social status. Events meant only for closed groups of citizens without ties to other actors were left out. From a time-space point-of-view, the data was limited to community events that took place in Sedlčany[2] between 1 January 2017 and

[2] Sedlčany is a town of approx. 7,000 residents near the border between Central and Southern Bohemia. The town is far enough away from Prague that local life is not impacted by what is happening in the capital. Sedlčany is also known for its rich community life.

31 December 2017. Events that took place in surrounding townships in the area were excluded. Those events represent edges in our SNA network.

We identified the following parameters for each item:

- date on which the event (tie) occurred and how long it lasted;
- description of the relationship (interaction);
- participating nodes (i.e. cooperating entities);
- citing of sources;
- strength (frequency) of ties;
- direction;
- source name;
- link to source; and.
- person who found the given tie.

The *date* item served as a clear form of primary identification of duplicity. All institutions and organizations listed in the *Edges* table were later transferred into the *Nodes* table. This table serves primarily as an inventory of all participating actors and for eventual identification of the ties between them (i.e. a tie between the Lukášek Community Center and the Sedlčany Public Library, in whose building the Lukášek Community Center has its facilities). We set the following for individual nodes:

- node name;
- "type of organization" attribute for the categories: cultural institution, general free-time organization, school or pre-school education, sports club, social services, religious association, club/generally beneficial society, foundation, sports facility, media, commercial institution, college, or government body (state administration/ autonomous administration);
- "location" attribute for the categories: local (or having a long-term local presence), national, or international;
- affiliation (i.e. ties to other nodes); and,
- link to information source on given node.

4.3 Research Data Sources

The SNA was carried out on a collection of primary data that was extracted from the following sources: Sedlčany Township's Cultural Events Calendar; Josef Suk Cultural Center Cultural Calendar; Sedlčany Public Library Calendar; online presentations that actively promote their plans to the public; local and regional media (for example Sedlčanský kurýr, Příbramský deník, and so forth).

These sources were gathered from searches of the Anopress database (database of Czech media accessible online with archives dating back to 1996) with key words focused on the Sedlčany area.

5 Results

5.1 Self-assessment Results

Egocentric Network. The egocentric network, a network of The Sedlčany Library and organizations it is most closely related to, was mapped using qualitative self-assessment by the library staff. The Sedlčany Public Library is located on the orange sticker in the center of the egocentric network that maps the immediate network of nodes directly tied to the library. The following were placed on green stickers indicating they are primary institutions that, together with the public library, shape community life in the township: the senior citizens home, the Našlose civic association, Sedlčany Museum, the high school and expert secondary school, the 1st basic school in Sedlčany, and the Velká Kobra Club. The primary art school, the Sedlčany kindergarten, the Ochotnický spolek (Amateur thetre society), and the Josef Suk Culture House were all mentioned on the blue (smallest) stickers. All these institutions are perceived by the library management to be the main subjects shaping community life in the township; however, each in this group's had varying degrees of impact, as indicated through slightly different sticker sizes are. The town assembly was also mentioned, without whose understanding and financial support it would not be possible to develop these activities, on the large orange sticker in the background.
Information about the rest of the network was compiled with the head of the library and her colleagues. Together, they tried to look at community life in the township from the points-of-view of all local actors. The results are summed up in Table 1.

Table 1. Summary of the whole network

Orange stickers = most important	Municipal library Town assembly
Green stickers = important	**Cultural institutions:** Sedlčany Museum, Josef Suk Culture House **Social services facilities**: Senior citizens home, family centers Petrklíč (Primrose) and Hnízdo (Nest) **Clubs and societies:** Amateur theatre society (Ochotnický spolek), Civic association Našlose, Club Velká Kobra **Schools**: Sedlčany kindergarten, tech high school, high school and expert secondary school, basic schools (all three), Primary art school

(*continued*)

Table 1. (*continued*)

Blue stickers = somewhat important	**Clubs and societies**: Sedlčany Auto Club, Fishermens club, Tatran (sport club), Mela (beneficial society), Páni ze Zvěřince (historical swordsmens association), Friends of the Kamýček Dance Group Association, Carolus (choir) **Private companies**: STROS (heavy equipment factory), Savencia Fromage and Dairy (dairy company) **Churches**: Roman Catholic parish **Social services facilities**: St Johns home Municipal police force Association of Library and Information Professionals **Schools**: Chlum elementary school (nearby village school)
Red stickers = least important, but still participating in the community life	**Schools**: Czech Agricultural University, Automotive and information high school (Prague), Creative Communications College (Prague) **Clubs and societies**: Uran Příbram Photo club, Repete Folklore Group, Záboj choir, Hunters association, Breeders Club **Other:** Ministry of Culture of the Czech Republic, Czech Radio, Post-Bellum (non-profit organization focused on oral history), One WORLD Film Festival

A special spot was given to a journalist from *Příbramský deník* who works very closely with the library. Thanks to him (or her) community activities are very well promoted.

5.2 SNA Results

The most central node, both in terms of degree and betweenness in the network, is by far the public library (Městská knihovna) with 30 ties; that is, 30 instances of cooperation with other nodes. Some other central nodes include public schools (1. ZŠ; 2. ZŠ and ZUŠ) and local public cultural organizations ([J. Suk Culture House (Kulturní dům J. Suka) and the Town Museum (Městské muzeum)], although they are, by far, not as prominent as the library. Overall, the sets of the most central nodes are very similar between the two measures, which suggests that there are now specialized brokering nodes in the network. Looking at the sociogram (figure n. N), it is very clear why: the network consists of several highly central nodes and a large number of marginal ones. To illustrate the importance of central nodes in this network, bear in mind: if one of them were removed, it would leave a large number of disconnected nodes. If the removed node were the library, the whole network would almost cease to exist. The most central nodes are summarized in Tables 2 and 3.

Table 2. Degree

Node	Degree
Public Library	30
1st Elementary School	17
Josef Suk Culture House	15
Town Museum	8
2nd Elementary School	7
Primary Art School	4
Senior Home Sedlčany	3
High School and Expert Secondary School	3
Sedlčany Municipality	2
Velká_Kobra (Club)	2

Table 3. Betweenness

Node	Betweenness
Public Library	1200,17
1st Elementary School	596,83
Josef Suk Culture House	379,67
Town Museum	333,00
2nd Elementary School	173,00
Primary Art School	81,33
Senior Home Sedlčany	58,00
Sedlčany Municipality	58,00
Roman Catholic Parish	15,17
Tech High School	5,83

The image of the network as revolving around a few, highly-central actors is complemented by the cohesion measures. The concentration of ties around central nodes is measured by degree centralization, which, here is 0.48. The network is almost halfway to being a star network that is maximally centralized. This confirms what is already quite apparent from the sociogram and centrality measures: the network is held together by a few central nodes. Other than that, the network is considerably sparse with a density of 0.04. Only 4% of all possible ties are actually present. With the exception of ties incident to the most central nodes, there are very few ties in the network. However, thanks to this centralization, there are quite short geodesic distances (with an average of 2.64) with a diameter of 4. This means that the largest distances between any pair of nodes is just four steps. Cohesion measures are displayed in Table 4.

Table 4. Cohesion measures

Measure	Value
Degree centralization	0.48
Density	0.04
Avg. geodesic distance	2.64
Diameter	4.00

Taken together, the network is clearly highly-centralized with the public library (Městská knihovna) cooperating on a lion's share of events in the community. This makes the network quite well manageable as the public library (Městská knihovna) can reach out to any other organization either directly or through just a single intermediary. This comes at a price: there is vulnerability in case of the library's removal. If this node would not operate, organizations in the community would basically be left to their own devices when organizing events.

6 Discussion and Conclusion

The sociogram (shown in Fig. 1), which is a visualization of SNA outputs, objectively demonstrates that the Sedlčany Public Library represents the epicenter of the town's community life. In the sociogram, both views (egocentric and holistic) intersect and the library is always located in the center of the town's community life. The self-assessment results thus match the results acquired using the SNA.

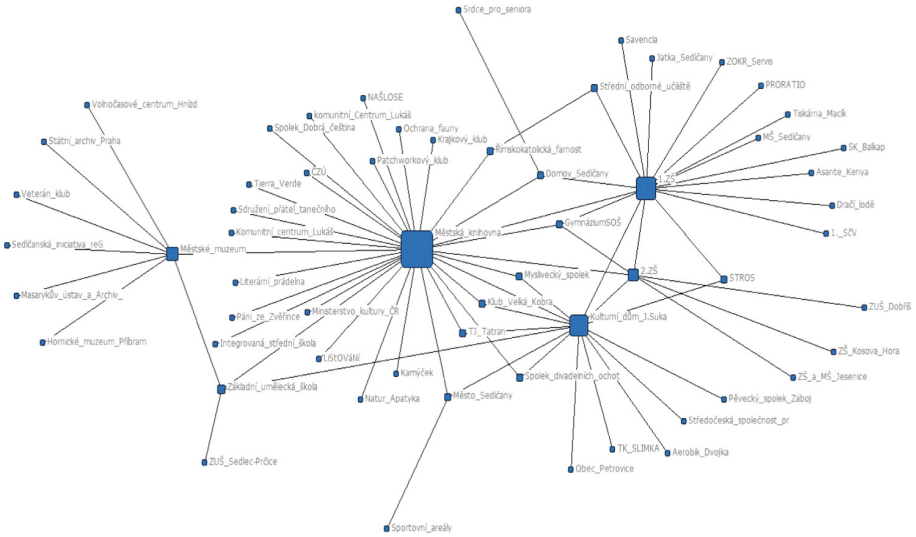

Fig. 1. Sociogram

This match is conditioned, however, on the self-assessment respondent's ability to assess the town's institutions critically and with some reserve (distance). Thus, the SNA represents a more reliable, more systematic and more objective tool for modelling reality. The SNA outputs could be better used when presenting the results of an organization's activities, building strategic development plans or when acquiring further financial resources from either their founders, from sponsors or from grant-givers. The advantage of using the SNA is also its theoretical and methodological bearing, as SNA allows to not only visually asses the network, but also complement the visualization with various metrics indicating structural features of individual nodes or the network as a whole – something sole visual representation is no sufficient for.

On the other hand, the quality of the SNA outputs is conditioned on the quality of gathered data as concerns the scope of sources monitored and the precision of their sorting. Data collection is relatively demanding time-wise: in this monitoring study it took approximately 2 man-weeks: this despite the fact that the environment researched had available long-term cultural event calendars with lists of social events taking place in the given area. Even though we were able to mine only approximately 65% of all data from these calendars, they still provided a good off point from which we could find

key actors. Other data was then identified via other sources, or it was searched for in a "snowball" method. Based on this experience, we recommend starting by putting in place a very good data collection strategy such that the acquired data set is as complete as possible. When collecting data, it is also necessary to adhere strictly to a unified identification of participating subjects, in other words, a preferred form of names, so that you can achieve precise results and avoid one organization to be represented as two distinct nodes due to unclear coding scheme. When carrying out the study, we found that the terms *community role/community event* were too vague. Definitions used in expert literature are relatively broad and in certain cases it can be difficult to decide when a specific event falls into this category or not. This reality appeared in our research, for example, for smaller sporting events (matches for local sports clubs, school sporting events, and so forth). Thus, it is necessary to define in advance perspectives that will be included in the monitored sample when selecting community events.

Without personal knowledge of the environment, it appears complicated to identify from available sources actors who act as "activators" when organizing community events; in other words, the persons who come up with new ideas. It is difficult to distinguish them from secondary cooperating entities ("passive actors").

Despite these difficulties, we can state that the study shown demonstrated the benefits of SNA in LIS; specifically, in mapping the community role of libraries. Based on our findings, we believe that SNA has, from a theoretical, methodological and practical perspective, potential for broad application in the field of LIS: even beyond its use to date in bibliometric and scientometric methods.

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Four Spaces of Civic Literacy Education: A Literature Review

Jos van Helvoort(✉)

The Hague University of Applied Sciences, The Hague, Netherlands
a.a.j.vanhelvoort@hhs.nl

Abstract. The purpose of this literature study was to obtain an overview of previous civic literacy projects and their characteristics as primarily described in educational science literature. Eighteen academic articles on civic literacy projects in higher education were studied in detail and coded using the qualitative data analysis instrument, Atlas.ti. The codes and quotations compiled were then divided in various categories and represented in a two-axis model. The definitions of 'civic literacy' found in the literature varied from an interest in social issues and a critical attitude to a more activist attitude (axis number 1). The analysis of the literature showed that, especially in more recent years, more students than citizens have benefited from civic literacy projects in higher education (axis number 2). The visualization of the findings in the two-axis model helps to place civic literacy projects in a broader frame.

Keywords: Civic literacy · Higher education · Literature review

1 Introduction

In preparation for living and working in the twenty-first century, the current generation of students must learn how to handle the tremendous amounts of information, both solicited and unsolicited, that is available to them. It is crucial for them to possess the ability to assess the reliability and usefulness of the information around them. Media and information literacy are therefore strongly linked to the concept of twenty-first century skills (www.p21.org).

Catts and Lau [1] distinguish four different contexts where the competence of information literacy is relevant:

- education
- workplaces
- health and well being
- the civic society.

Most research studies on information literacy are conducted in education. While research on information literacy at the workplace is less but still available [2] and health literacy is seriously studied by a specific group of researchers, information science research on 'civic literacy' is much harder to find and its perspective is seldom used by information literacy practitioners [3]. Active information seeking and critical appraisal of information and media are nonetheless essential components of democratic participation [1, 4, 5]. This is particularly true in this age of fake news [6].

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This paper presents an explorative literature research to inform a bigger research project, that will investigate just how an environment can be built so that citizens of the City of The Hague and students of The Hague University of Applied Sciences can work together to improve their abilities to judge the usefulness and the reliability of local information on news and events. Because of the social focus of our research group - hence its name: Information, Technology and Society - we have chosen in this project to approach the theme of media and information literacy in a setting where students and civic society organizations can collaborate together.

2 Methodology

2.1 Purpose of the Research Project

The aim of the bigger research project is the creation of a 'fact checking factory', where students of The Hague University of Applied Sciences and citizens of The Hague can learn from each other about how information on local occurrences and developments can be judged on their reliability and value in use. The aim of this goal is to create an experimental environment where the citizens and students can work together on the investigation of the quality of the information about their city area that is disseminated in newspapers, local magazines, broadcasts, and social media. Products and services include: dossiers on actual themes, fact checking of news messages, facilities for the consultation of newspapers, media and information sources, meetings to discuss local news messages and events, and games. The first two actions of the project passed during the periods November 2017–February 2018 and February–April 2018, preceding the local elections in The Netherlands.

2.2 Purpose of the Literature Review

The aim of the exploratory literature study in this paper was to find out how comparable projects in higher education have been organized. In a preliminary research we found the phrase 'civic literacy' as a key term for media and information literacy in a societal context [7]. The research question for the literature review therefore became: What are the characteristics of civic literacy projects in higher education that are described in the educational and in information science literature? More specifically, we were looking for answers on the following sub-questions:

- Which definition of 'civic literacy' was used in the described project?
- What are the benefits of citizen – university collaboration?
- What were the learning goals or desired learning outcomes for the students in the projects, and how can students be assessed in having reached these goals and outcomes?
- What are appropriate learning environments and what is the role of teaching professionals?

2.3 Search Strategy for the Literature Review

For the information retrieval we used the bibliographic databases Eric for the educational domain and Lista and Lisa for the information science domain.

As mentioned before, the main keyword for media and information literacy in a civic societal context is 'civic literacy'. The phrase 'civic litera*' (truncated to retrieve also 'literate') was combined with the phrase 'higher education' in one query in all three bibliographic databases. This resulted in a list with 14 references to relevant peer reviewed publications (28 December 2017). During the literature analysis it was remarked that 'service learning' was an important notion in civic literacy projects. We extended our research with a search in subject fields for 'service learning', 'information literacy', and 'higher education' in all three bibliographic databases, which resulted in 4 new relevant documents. The total number of studied papers was 18.

2.4 Analysis of Results

The results of the literature search (journal articles) were studied in detail and coded with Atlas.ti. For this we used a code list that was created beforehand, based on the preliminary coding of a small subset of the research articles. Appendix 1 gives a systematic overview of the code list that was used. Based on a codes-quotations report we found answers on the forenamed research questions.

3 Results

3.1 Definitions

In the retrieved literature the construct of 'civic literacy' is at least understood as the capability and the willingness to listen to other people. Civic literate persons establish informed and affective connections with other human beings [8]. In other words, a social orientation is one of the qualities of a civic literate person. Another quality that is mentioned is "political knowledge and the skills to serve as active informed citizens" [9, p. 98]. Civic literate persons are capable "to make informed moral, economic, political and scientific judgements" [10, p. 29] and to participate in civil discourses [9]. One can also say that civic literacy enables "citizen empowerment and democracy" [12, p. 550]. However, most authors do not reckon political activism to civic literacy *education* because, in their opinion, that would overgrow educational goals. In the retrieved literature, it is Bauerlein [13] in particular who sees civic literacy as, for instance, the knowledge of rights and laws and the skills to resist or protest. Charest et al. [14] consider the problems that their students sometimes have as 'community issues' that cannot be solved except only at school. This is, however, not a common opinion. Pollack [15] describes how a concept as 'service learning' strikingly developed from social activism in the 1960s to only an educational method nowadays.

In summary, one may conclude that civic literacy, according to the educational literature, refers to a person's

- skills and willingness to communicate and cooperate with other people
- the knowledge and skills to make informed decisions about issues that play a role in his/her societal environment.

The willingness to take responsibility for that environment (an 'activistic attitude') is mostly considered as a political issue that belongs to civic literacy but should not be purposed as an educational goal.

3.2 Benefits of Citizen – University Collaboration

Almost all of the educational literature described environments are organized as 'service learning' projects. In the previous section we already came upon the idea of 'service learning'. This construct can be defined as "a form of experiential education that integrates a service project into the coursework" [16, p. 116]. As stated before, service learning is nowadays mainly regarded as a promising educational approach [15]. It is considered promising because students can learn much more from real life problems than from a more or less artificial school situation [12, 16–18]. The projects are often information-rich because students have to solve the unexpected problems that they meet [19]. The main role of citizens in such kinds of settings is to provide students with the opportunities to improve their skills in communication and cooperation – the facet of civic literacy that we mentioned as the first in the section definitions – and also to improve more affective personality dimensions like self-confidence and self-esteem [19].

Many authors have observed a declining social engagement among young adults since the 1970s [9–11, 16, 20]. One of their purposes with service learning projects is the renewal of students' involvement with the community and politics. A diminishing interest in community issues is nonetheless not recognized by all authors. For instance, Leek [17] argues that today's young people do indeed seem to lack engagement with the more 'institutional politics' but that this does not mean that they are not engaged with society itself.

However it may be remarked that both observations (the restriction of service learning to an educational method and the aspiration of renewing social engagement) suggest that most of the authors are of the opinion that the educational environment benefits nowadays more from civic literacy projects than society itself. One of the exceptions is the publication by Snavely who mentions explicitly "developing information resources for those they are serving" and helping the community in "learning to distinguish between information supplied by [different] sources" [21, p. 39].

3.3 Learning Goals for Students and How They Are Assessed

An important learning goal for civic literacy programs is to foster students' interest in civic and political issues. As explained before, this implies knowledge and skills to make informed judgements [14]. Pollack emphasizes that we do not only have to prepare students to "earn a living" but also to "continue the work of building an

ever-more inclusive and just society" [15, p. 223]. A minority of the publishing authors has the opinion that it should also imply the actual willingness to execute actions [16]. It is noted that Newell [10] had already mentioned in 1988 critical thinking and lifelong learning as learning goals for twenty-first century learners.

As Maloyed [16] has remarked, it is hard to measure the achievement of those learning outcomes objectively. Most assessments of described civic literacy programs are therefore restricted to surveys and self-evaluations. These provide information about the usefulness of a project according to the participators and their experienced achievements, rather than their actual performances. Evaluation is, in other words, restricted to an institutional level, for instance the library's contribution to the learning culture [22], as the measurement of individual student achievements is not involved.

3.4 Learning Environments and the Role of Teaching Professionals

As stated before, civic literacy is among other things defined as the skills and willingness to communicate and cooperate with other people. Collaboration in interdisciplinary teams is probably the best way to stimulate this [10]. Much of the scholar literature on civic literacy education describes projects where creative writing and public art are part of the learning process [14, 20, 23, 24]. Developing communication or creative skills in this concept are extended to delivering contributions to the public discourse [24]. Leek [17] even suggests incorporating policy debates in service learning projects. The development of debating skills, in her opinion, includes the ability to gather information and to rethink it critically. Kranich describes the role that libraries in particular can play in those processes but also their function as information centres for citizens, as facilitators of reading groups, and as "public gathering spots" [9, p. 95], [11]. Riddle [19] has dedicated a complete article to the question of how academic libraries can contribute to service learning projects. His answers vary, from providing students information beforehand about the community where they are going to have their project, to information science students who provide instruction in public libraries, for instance about web search or page design. This last example provides profits to the students as well as to society.

The role of teachers in community projects is merely considered as providing guidance and feedback [16, 25] instead of instruction, although Newell [10] considers the teacher also to be a 'co-learner'.

4 Conclusion

The main conclusions from the results can be expressed as an educational environment with four different spaces. Figure 1 represents this environment with two axes, where the vertical axis expresses the learning goals (from interest in social issues to social activism), and the horizontal axis expresses the benefits for the students (an authentic and stimulating learning environment) or those for the society (help for excluded groups, and social justice).

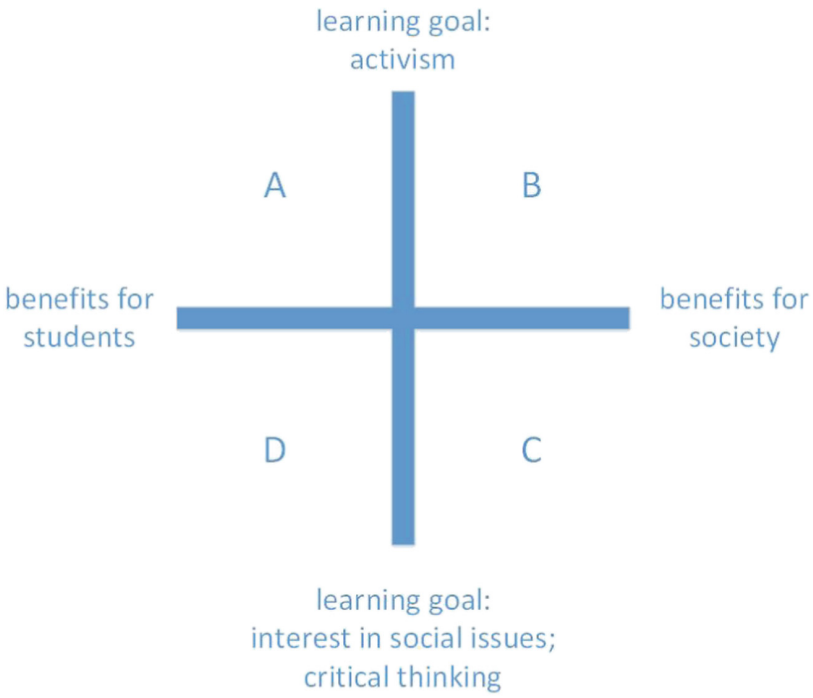

Fig. 1. Learning goals and benefits of civic literacy projects in higher education

Examples in section A of Fig. 1 show projects that support students' activism to improve their own circumstances at university. Section B shows the projects that provide support for citizen groups, for instance legal aid to people who are in conflict with the government or other more mighty organizations. As stated before, activistic projects are more typical for the period 1960–1970, but are less suitable for today's educational projects. Section C shows social projects, for example, helping lower educated people with their tax forms or with legal issues, and section D shows projects that have social impact but are conducted within a more academic setting.

The boundaries between the four sections are more fluid than solid. The above-described fact checking project at The Hague University of Applied Sciences has characteristics of a section D project (we stimulate the students' interest in news and social issues and define clear learning outcomes for the students) but we do our best to let the citizens of the city of The Hague profit from the results.

5 Discussion

This research is limited in that the described projects are all situated in 'higher education'. This limitation was part of the research question and can be motivated with the background of our own institute, a university of applied sciences. It can be remarked that information literacy research is more focused on higher education than on elementary

and secondary education [5]. This is why we did not expect that we would have found many different insights if the limitation to post-secondary education was not applied.

Another limitation of the research is that almost all of the literature reviewed was from North American universities. The phenomenon of 'service learning' is much more practiced in the USA and Canada than in Europe, and it might be that some topics are just called a bit differently in European countries. This does not mean that the information we found is not useful to apply in our own Dutch context. The content of the literature and the visualization of it in a two dimensional educational environment helped us to place the fact checking factory project in a broader frame. In the project evaluation with the students we asked them in which space they would place their finished project. Not surprisingly they put it in section D.

We are seriously considering the opportunities of moving the current project from section D to a place that has elements of both D and C (and maybe even B). In order to obtain this goal, it is recommended to invest extra time in collaboration with professionals from the community centres in the city districts and maybe even elementary and secondary schools. As previously mentioned, this is because the latter seems to be groups that earn more attention from information literacy research [5, p. 10]. It would be great to see the theory in this manner contribute to solve practical societal questions.

Appendix 1

See Fig. 2.

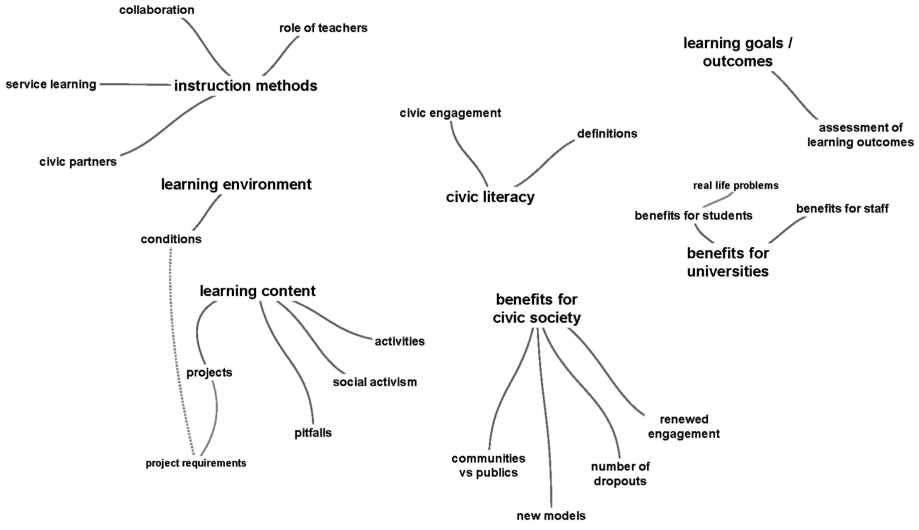

Fig. 2. Systematic overview of codes for the qualitative analysis of literature on 'civic literacy'

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The Relationship Between Media Literacy and Civic Participation Among Young Adults in Latvia

Agnese Davidsone(✉) and Vineta Silkane

Vidzeme University of Applied Sciences, Valmiera, Latvia
{agnese.davidsone,vineta.silkane}@va.lv

Abstract. The aim of this study is to examine the relationships between different aspects of media literacy as an increasingly needed life-skill, and practices of active citizenship. In our empirical work, we rely on the notion of media literacy as a multidimensional concept consisting of: (1) functional consumption, (2) critical consumption, (3) functional prosumption, and (4) critical prosumption of media. Our sample consists of 406 respondents (36% males and 64% females) in the age group of 18–30. Results show that civic activity is predicted by the functional prosumption, and critical prosumption of media. Based on our results, we argue for media literacy promotion in school and university curricula with an increased emphasis on various practices of information production and sharing as forms of self-expression and media prosumption being a vital part of active citizenship and citizen engagement.

Keywords: Media literacy · Media consumption · Media prosumption · Civic participation · Participatory democracy

1 Introduction

Recognition of young people's rights to participate in decision making about issues concerning their education, well-being and other issues is growing [1]. Therefore, decreasing levels of civic participation among young people have already bothered scholars, policy makers and educators for some decades [2]. For quite a long time the belief was that the rapid development of various Web 2.0 based technologies, and promotion of media literacy and digital skills in school curricula might stimulate civic and political engagement among youth [2, 3]. However, as the previous studies indicate [4, 5] (for a meta-analysis of previous studies see [6]), civic engagement does not naturally arise from active use of digital media and the Internet. Consequently, one must ask what kind of civic activity youth prefer and how it fits with their digital and media skills and practices online. The weak connections between media use and civic engagement has triggered suggestions that different types of media literacy are related to different forms of civic engagement [7]. Respectively, taken as a whole, digital media use does not appear to relate to civic engagement, but when examined by the type of media use, the relationship appears to be much more complex.

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Media literacy is widely understood as a multidimensional concept comprising abilities to access, gather and analyse information in traditional and new formats and platforms, and to create informed opinions, and share them with others, again, by using a variety of traditional and new platforms and formats. Recently, new promising theoretical models of media literacy have emerged to measure the specific competences that people need to fully participate in digital media environments. In the current study, we make use of the theoretical model that distinguishes between four domains of media literacy: functional consumption, critical consumption of media, functional prosumption, and critical prosumption of media [8–11]. We employed this four-dimensional model and a variety of measures of civic activity to study the relationships between media literacy practices and civic participation among young adults in Latvia (age 18–30). In the context of digital media use and civic participation, Latvia makes an interesting case. It is among the countries with the highest levels of Internet use on a daily basis [12], but at the same time, a country where young people's civic knowledge and intentions for civic activity repeatedly score notably below the average EU level [13, 14]. Thus, in this article we ask the following question: how are the functional and critical dimensions of media consumption and prosumption related to civic participation activity among young adults in Latvia?

2 Theoretical Models of Media Literacy for the 21st Century

The rise of new media and the emergence of Internet technologies and mobile communication tools demands a new kind of media literacy. Traditionally media literacy is understood as the skill to critically investigate media types, examine media effects, consciously access and use media, distinguish and evaluate media content [15]. Being media literate in the 21st century means also to be able to use media for one's creative expression, participation and engagement in the public sphere via written and electronic media content, such as text, image, audio and video [16–18]. The new focus of media literacy is on the collective creation of media content over static media content consumption, social interaction instead of isolated surfing, and active participation and engagement with and through media content over passive reception [19]. In the digital media environment, the boundaries between sender and receiver become blurred, leading to a convergent *"participatory"* culture where it is difficult to distinguish between media producers and consumers, and new forms of participation in media emerge, based on the technical and socio-cultural characteristics of the digital tools [19]. A participatory culture shifts the focus of creation from the individual to community engagement, to collaboration and networking [20]. Toffler's [21] concept of prosumer is often employed to describe the practices of an individual who is a producer and a consumer simultaneously, producing his/her own imagery drawn from his/her consumption of popular mass media. According to Jenkins et al. [20], prosuming competence, besides artistic expression and sharing skills, comprises some social, emotional and cognitive aspects as well, namely: *"In a participatory culture, members also believe their contributions matter and feel some degree of connection to one another (at the very least, members care about others' opinions of what they have created)"* [20, p. xi)].

Chen et al. [8] employed the concept of prosumer and proposed a new theoretical model of media literacy conceptualizing it as two continuums: (1) from consuming to prosuming media literacy; and (2) from functional to critical media literacy. Media literacy skills of consuming in this model refers to competencies to access media messages, and employ media at various levels, while prosuming media literacy, in contrast to consuming competences, are skills to produce media content and participate in media environments through the use of pre-existing media content, artifacts, and the technical benefits of digital tools. Drawing on Buckingham's definition of functional and critical media literacy, Chen et al. [8] defined functional media literacy as competencies to operate media tools in order to access and create media messages and understand them on the textual level, while they viewed critical media literacy as competencies to analyse and judge media messages at various contextual levels [8].

Lin et al. [10], in their theoretical model, took the work of Chen et al. [8] further and proposed a model consisting of four domains of media literacy: functional and critical consuming, and functional and critical prosuming. In the functional consuming literacy domain Lin et al. [10] distinguished between consuming skills and understanding abilities. In the crucial consuming literacy domain they distinguished between analysis, synthesis and evaluation [10]. A critical media consumer, according to this framework, can identify biased or manipulated messages, and can critically engage in the deconstruction and verification process. Functional prosuming literacy, according to Lin et al. [10], comprises three aspects: prosuming skills, distribution, and production. Prosuming skills are technical abilities to use various technologies for digital content creation such as combining, rearranging and duplicating text, audio, and video pieces into digital media formats. Finally, critical prosumtion comprises participation as one's interactive engagement in digital media platforms by sharing, engaging in meaningful discussions and negotiations with others, identifying deception and respecting the diversity of values and ideologies. Koc and Barut [11] developed these two previous theoretical models of media literacy by putting more focus on some unique affordances of digital media environments, especially in the domain of critical prosuming, and creating an operational tool to measure an individual's media literacy in Web 2.0 environments.

3 Civic Participation and Media Literacy

Active citizenship has usually been associated with the power of individuals in the process of civic and political decision making [22]. Since Masterman [23] published his seminal works, scholars and educators have hoped that media education and media literacy will positively influence pro-social activity and make young people more engaged in social and political matters [24]. It is clear that the Internet and especially Web 2.0, indeed have affordances that support various forms of engagement and participation. Digital media in some sense provide what Habermas [25] called the *"ideal speech situation, where everybody with the competences to act and speak is allowed to participate, everyone can introduce and/or question any assertion, and express her or his attitudes, desires, and needs"* [25, p. 86]. Therefore, young people's general enthusiasm for using digital tools is perceived as promising in terms of

promoting active citizenship, and political socialization through direct experience with online publishing, debate, and collective action [3, 26, 27]. The processing of information resources promotes the emergence of a collective identity, which is an *"individual's cognitive, moral, and emotional connection with a broader community, category, practice, or institution"* [28, p. 285].

New technology promotes the emergence of new forms of engagement that are sufficiently different from the traditional notions of civic participation [29]. Digital technology enables us to expand beyond the traditional so called *"minimalist"* democratic participation [3] where being politically active means being involved in institutionalized politics, have an interest in government matters, and participate in elections [1]. The much broader concept – *"maximalist"* democratic participation [3] – manifests itself through various pro-social practices spanning many spheres, including work, home, family, church, and school, revealing the dynamics of changing political and social conditions [30].

Civic engagement is linked to general habits of media use [31], and specifically the use of social networking sites [32, 33]. Active participation in video production is found to correlate with a positive attitude towards news consumption and intent towards civic engagement among youth [34]. Previous studies have demonstrated that a search for information online is a significant predictor of civic involvement and participation in online discussions [7, 35]. Purdy [7] also found that a socially expressive use of the Internet such as content or opinion sharing online, positively relates to online civic activities. In addition, positive links appeared between news consumption online and participation in interpersonal discussions about socio-political issues as a form of offline civic activity [36]. However, several studies [1, 4, 5] indicate that civic engagement neither online nor offline does not naturally arise from the active use of digital media and the Internet. Actually, for some youth, active use of the Internet and social media has been shown to be a powerful distraction from becoming active in their communities [1], or developing an interest in civic matters, and political efficacy [37]. Some [4, 16, 30] argue for more civic education in schools, with a special emphasis on interactive, project-based, peer-to-peer approaches that include media creation, content sharing, and other participatory practices, which is strongly echoed by other authors, (see [15, 38]). Such mixed results indeed call for more studies where individual aspects of media literacy are taken into account, and their relationships with various civic participation practices are examined.

4 Methods

Participants. In this study we employed data from a larger project in which we collected data about a number of different variables related to media literacy, civic engagement activities, digital self-efficacy, and various demographic factors. Our initial sample consisted of 798 participants (62.9% female respondents and 37.1% male respondents, age 18 to 72). For the purposes of this particular study we made a subsample consisting of participants in the age group of 18–30 and focused specifically on the aspects related to media literacy and civic participation. This subsample

consisted of 406 participants: 64% females and 36% males (M = 22.22, SD = 3.35). The education levels of the subsample were: primary (5.9%), secondary (64.5%), and higher education (29.6%).

Instruments. The participants filled in the questionnaire consisting of: New Media Literacy Scale [11] and an original Civic Participation Questionnaire, as well as respondents' demographics such as age, gender, and education. The New Media Literacy Scale [11] was adapted in Latvian as part of this study. The New Media Literacy Scale consists of four sub-scales: functional consumption (e.g., It is easy for me to make use of various media environments to reach information), critical consumption (e.g., I can combine media messages with my own opinions), functional prosumption (e.g., I am able to use the software necessary for developing media content (text, image, video, etc.), and critical (e.g., I am able to develop original visual and textual media content such as videos clips and web pages). The instrument contained 35 items, and a five-point scale was used for answers: 1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree. In previous studies, Cronbach's alpha varies from .85 to .93 [11]; in the current study, the variation was from .84 to .92.

We developed an original Civic Participation Questionnaire during the study. It consisted of 20 items comprising various civic participation activities: participation in elections (e.g., I participated in the last municipal elections), participation in public debate (e.g., I have publicly expressed my views/opinion on issues of public interest), civic activities (e.g., I have participated in legal demonstrations or pickets), participating in an NGO (e.g., I have volunteered for a non-governmental organization), belonging to a political organization (e.g., I am a volunteer in a political organization), social responsibility (e.g., I have boycotted products of a particular manufacturer for ethical reasons or in protest of globalization). A dichotomous scale (1 – yes, 0 – no) was used. Cronbach's alpha of the questionnaire was .76. We developed the original instrument to focus on people's pro-social behaviour and their experiences with civic participation. The previous instruments we found to be not suitable for the purposes of our study, because they focused either too heavily on civic attitudes, with little attention to civic behaviour [39], or on people's future motivation to engage in pro-social activity [36]. The final list of 20 items in our questionnaire was compiled based on literature studies [e.g., 40] drawing on different types of civic participation. We ensured that items referring to online and offline pro-social activity were included in our original scale.

Procedure. In spring 2017 data were collected by using Google forms. Respondents were invited to participate in the study by using social networking sites such as Twitter and Facebook, and also e-mails. We distributed the link for the questionnaire both from institutional and personal accounts, and we urged our respondents to share the questionnaire link with their networks. All in all, we arrived at a combination of convenience sample and snowball sample. Respondents were informed about the topic of the study and informed about anonymity. Participation in the study was voluntary.

Data Analysis. Correlation analysis and hierarchical regression analysis was performed. The results were considered at the level of significance $p < .05$, $p < .01$ and $p < .001$.

5 Results

Hierarchical regression analysis was performed to determine the role of media literacy in predicting civic participation. The assumptions of linearity, normally distributed errors, and uncorrelated errors were checked and met. Means, standard deviations and correlations are presented in Table 1.

Table 1. Descriptive statistics, Cronbach alpha and correlations of civic participation and media literacy subscales

Variable	α	*M*	*SD*	2.	3.	4.	5.	6.
1. Age		22.22	3.35	.15*	.08	.04	.001	.22**
2. Functional consumption	.84	3.98	.61	–	.71**	.56**	.51**	.28**
3. Critical consumption	.89	3.90	.82		–	.54**	.58**	.22**
4. Functional prosumption	.92	4.12	.74			–	.59**	.32**
5. Critical prosumption	.92	3.48	.79				–	.31**
6. Civic participation	.76	6.29	3.38					–

Note. $^{**}p < .01$, $^{*}p < .05$

Age and education were included in the first step of hierarchical regression analysis. In the second step of hierarchical regression, we included all four dimensions of media literacy: function consumption, critical consumption, functional prosumption, and critical prosumption. In the first step of regression analysis, all controlling variables explained 10% of the variance (F (2,403) = 22.88, $p < .001$), with education ($\beta = .28$, $p < .001$) as the most significant predictor. When all media literacy aspects were added, they improved the prediction, and 20% of the variance was explained (F (6,399) = 17.07, $p < .001$). Young people with a higher educational level showed higher civic participation levels. Critical prosumption ($\beta = .20$, $p < .01$) and functional prosumption ($\beta = .15$, $p < .05$) appeared as significant predictors of civic participation. All standardized coefficients and R square change are presented in Table 2.

Table 2. Stepwise regression analysis for media literacy variables predicting civic participation

	R^2	Adjusted R^2	R^2 change	*F*	*B*	*SE B*	*β*
Step 1	.10	.10	.10	22.88***			
Age					.06	.06	.06
Education					1.73	.35	.28***
Step 2	.20	.19	.10	17.07***			
Age					.09	.05	.09
Education					1.34	.34	.22***
Functional consumption					.52	.37	.09
Critical consumption					−.46	.37	−.08
Functional presumption					.70	.28	.15*
Critical presumption					.84	.26	.20**

Note. $^{***}p < .001$ $^{**}p < 01$, $^{*}p < .05$

6 Discussion and Conclusions

In the current study we examined the relationships between media literacy practices and civic participation among young adults in Latvia (age 18–30), drawing on a sample of 406 respondents. We distinguished between functional and critical dimensions of media consumption and prosumtion [11]. Our most important finding is the following: young people who are more skilled media *"prosumers"* [21], are also more engaged in civic activity. As it appears from the regression analysis, both the functional prosumption, and critical prosumption dimensions of media literacy play an important role in explaining civic activity. This suggests that those who participate in pro-social activity, are more able to use various technologies to create and share digital artifacts with others on various media platforms, and at the same time, also more able to engage in meaningful discussions and negotiations. Previous research suggests that the links between civic participation and media use as a whole are weak [6], however, what we have found indicates that when examining individual dimensions of media literacy, the results seem to be more complex.

Our findings may be considered not only in an academic sense, but in more practical ways by reviewing and restructuring the school and university curricula that include teaching media literacy. It means guiding young people's general interest and enthusiasm about digital media towards learning how to use the Internet for civic participation. We would support the argument that the very concept of participation should be taken much more broadly by educators, following the definition of *"maximalist"* democratic participation [3] that shifts towards diverse pro-social practices spanning over different areas of young people's lives. As our findings indicate, education, as well, is indeed crucial for empowering students to become more active and engaged citizens. Thus, in order to increase the civic participation levels among young people, more attention during the study process should be paid to the prosumption dimensions of media literacy, focusing more on the ability to produce and criticize media content, and less on the consumption skills of media. Current young generations are to be supported in active and critical involvement in the participatory culture [19] practices, the creation and sharing of original media content, negotiation and exploration of various socio-cultural values and ideologies. Here we agree with previous studies that argue that students feel more engaged when they are able to participate in developing and defending their own standpoints [30]. Therefore, in the study process, young people should be encouraged to become more active media prosumers by sharing self-authored content, creating web-pages, starting blogs, and remixing content that they find online in their own artistic creations. Drawing on previous literature, we also argue for educational content that teaches how to respect the diversity of values and ideologies to be included in school programs, as well. From us, educators, it requires us to acknowledge that citizen identity is dynamic, and there is hardly one single compelling model of what it means to be an *"ideal"* citizen.

In terms of future research, there is definitely a need to study the prosumption practices of young people more closely, especially paying attention to the domain of critical prosumption, for instance, the ways that young people represent their own socio-cultural values and personal stances and beliefs through original content making or through practices of adding new meaning to pre-existing media content. The conceptualizations of civic activity and civic participation should be reviewed further, in order to expand our understanding of what it means to be an active citizen in the 21st century.

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Information Literacy, Health and Well-Being

The Health of a Musician: Identifying Musicians' Unstated/Unrecognized Health Information Needs

Loriene Roy(✉) and Yan Zhang

School of Information, The University of Texas at Austin, Austin, TX, USA
{loriene,yanz}@ischool.utexas.edu

Abstract. One local non-profit organization in Austin, Texas, USA is HAAM (Health Alliance for Austin Musicians). HAAM assists musicians, music teachers, and disc jockeys by providing no- or low-cost health coverage along with dental, hearing, and vision care. Additional programs include Hepatitis-C testing and treatment and discounted wellness services (acupuncture, chiropractic, and massage). Without HAAM, 31% of Austin musicians would be without health insurance. In 2016 HAAM collaborated with the University of Texas at Austin (UT-Austin) Dell Medical School to evaluate HAAM services and measure depression, pain interference, physical function, and social engagement/social isolation. HAAM staff need more details on musicians' barriers to receiving health care. One finding was that the HAAM members did not avail themselves of HAAM basic services. The aim of this paper is to examine the results of this study that identified musicians' stated health information needs and outline the structure of a planned subsequent study on unstated but overt health information needs. The future study will focus also on the place of information literacy, health literacy, and health insurance literacy in assisting musicians in taking wise health actions.

Keywords: Health information literacy · Musicians · Literacy in everyday life · Health needs · Service learning · Graduate education

1 Introduction

While music is created everywhere, the capital city of Texas, Austin, is the "Live Music Capital of the World". A 2016 report found that the Austin music industry contributes $1.8 billion annually to the local economy, largely due to music tourism [1]. Still, local musicians, and others in the music industry, face many challenges. The Austin Music Census, found that 68% of the musicians earned less than $10,000 from their music-related activities with almost one-third making $15,000 or less from all income sources. Three-fourths of the musician respondents earned less than the mean annual wage of the Austin metropolitan area and more than 20% had incomes below the United States federal poverty level [2].

One local non-profit organization that has stepped up is HAAM (Health Alliance for Austin Musicians), a non-profit serving 2,300 musicians in Travis County and five

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adjoining counties in central Texas. HAAM is not a health insurance company and it does not have medical personnel on staff. Instead, HAAM serves to assist its members to navigate the health insurance marketplace available through the U.S. Affordable Care Act (also familiarly known as Obamacare) during the six-week open enrollment period and to find primary and specialty care doctors and/or clinics at a reduced price. Along with supporting its members by providing access to no- or low-cost health coverage, HAAM also provides access to a suite of basic health services: dental, hearing, and vision care. Through the HAAM vision program, members may request a voucher for a free basic eye exam and pair of glasses. Through the dental program, HAAM members may receive up to $600 per year to cover preventative dental work such as a routine visit for cleanings. HAAM members who need more extensive dental care may apply for additional funding. HAAM's hearing program sponsors HEAR clinics three or four times a year. There, members attend for hearing screening. Audiologists are on-site to inspect their ear canals, remove ear wax if needed, and arrange for musicians to receive customized filtered ear plugs worth $250 for a reduced cost of $25 a pair. New programs include Hepatitis-C (Hep C) testing and treatment, as well as discounted wellness services from acupuncturists, chiropractors, and masseurs.

While music teachers and/or disc jockeys may also become members of HAAM, the vast majority of HAAM members are musicians. Thus, we will refer to HAAM members as musicians in the remainder of this paper. To qualify for HAAM membership, a musician must be an active musician, having played music professionally over the previous year. HAAM members must live within fifty miles of Austin and have an annual income of $48,240 or less, calculated to be under 400% of the U.S. federal poverty line. Prospective HAAM members meet with HAAM staff who confirm eligibility; prospective HAAM members are required to bring evidence of their income, residency, and work as a musician. Since there is no national health insurance program within the U.S., without HAAM, nearly a third (31%) of Austin musicians could be without health insurance.

In 2016 HAAM conducted a health assessment survey. HAAM collaborated with the UT-Austin Dell Medical School, enabling HAAM to distribute the survey to its members through REDCap (Research Electronic Data Capture), an online tool available to its partners to collect research data [3]. Questions asked respondents to evaluate HAAM services and measured depression, pain interference, physical function, and social engagement/social isolation. HAAM staff have indicated that they need more details on musicians' barriers to receiving health care as well as answers to questions that probe their responses to questions on the health assessment. Survey results are used internally by HAAM and have not been published elsewhere. In short, HAAM staff felt that musicians likely understate their need for health care information, addressing critical issues rather than long-term issues. As HAAM moves more into services that focus on wellness and preventative care, it asked us to explore techniques for assessing the musicians' needs, including their unstated/unrecognized health needs [4]. In this paper we will provide a brief summary of the current state of HAAM member health needs while introducing the structure for a planned study. We also provide a description of materials that graduate students prepared for HAAM members as a way to help members become more aware of existing HAAM services.

In keeping with the main theme of the 2018 European Conference on Information Literacy (ECI), "Information Literacy in Everyday Life," we are focusing our attention on the health needs of individuals whose daily lives involve music performance. As such, we are examining the connections between health and well being and the needs of musicians to be information literate, especially to demonstrate health literacy and health insurance literacy.

By information literacy we adapted Kulthau's definition to mean the ability of musicians to "use information to construct knowledge for wise action" [5]. By extension, by health literacy we mean the ability to locate, understand, and evaluate information in order to make wise personal health decisions. Health insurance literacy, then, is the "the capacity to find and evaluate information about health plans, select the best plan given financial and health circumstances, and use the plan once enrolled" [6].

Our planned future work is guided by these research questions:

1. What methods might be useful in exploring ways to assess the health care needs of musicians?
2. In studying musicians' health needs, what insight might we gather about their health information needs?
3. To what extent are musicians health literate?
4. To what extent are musicians insurance literate?
5. What services might libraries develop to assist musicians in gaining greater health literacy and insurance literacy?

First, in preparation for this larger study, we will approach the topic from the perspective of health information needs.

2 Literature Review

An information need is "a recognition that your knowledge is inadequate to satisfy a goal that you have" [7]. Scholars in information studies used different terms to refer to this notion, such as an anomalous state of knowledge (ASK) [8] and a problematic situation [9]. Taylor [10] breaks information needs into four levels. The first level is a visceral need, a recognized need that has not yet developed into a question. At the second and the third levels, a conscious need and a formalized need are formed. A conscious need is articulated, but often in ambiguous statements [11], and the formalized need is stated in formalized statements and clearly articulated. The development of the need from the visceral level to conscious and then to the formalized levels is a process that requires information seekers to make sense and define the problem through different means, such as reading papers and talking with friends. These activities eventually lead to a goal or a search task to accomplish. Taylor defined the fourth level of need, the compromised need, to refer to the result of the process through which people adapt their formalized needs to fit the technological affordances of information search systems (for example, short search queries).

These conceptualizations of needs (in other words, ASK, problematic situation, and the four levels of needs), despite the use of different terms, point to an agreement that information needs are dynamic. They develop through a continuous negotiation and

refinement process. Thus information needs are as much social as they are cognitive, as the development is enabled by the information seeker's interaction with various cognitively embodied entities, which could be humans, individual documents (for example, a news article) or information systems. Further, these conceptualizations point out that, in order to better understand the information needs of a specific user or user group, multiple methods should be used, as described in the section on future plans. One single method is likely to shed light on only the information needs at a specific point in time. For example, queries logged in transaction logs would reveal information needs at the point of users' interaction with an information search system, but will not be able to shed light on how the needs are developed over time. The aforementioned conceptualization of information needs tend to assume that information seekers would recognize that they have a knowledge gap and thus an information need, and further, that they can articulate the needs. This articulation of needs indicates that those seeking information have the desire to know, the first stage in information literacy, according to Lenox and Walker [12]. Needs indicate that those seeking information are motivated; individuals with needs might be prime candidates for information literacy instruction and the potentiality of acquiring skills to answer their current and future needs. It must be acknowledged that some people, especially those from disadvantaged and disengaged populations, have little interest in health issues or interest in knowing more about their own health [13]. These people also tend to have significant difficulties in recognizing and articulating information needs, leading to the loss of opportunities for making positive life changes [14].

3 Methodology

As has been mentioned, a large portion of Austin musicians belong to a low-income disadvantaged group [2]. Considering that they may not be willing to talk about health-related topics, we invited HAAM staff to talk about their perceptions of the major health challenges facing Austin musicians, as HAAM has been working with them for a decade and their staff has developed in-depth knowledge of the health needs of the group. We also asked HAAM staff to review multimedia health literacy materials that we created, which we will explain in the methodology section below. For this paper, we studied musicians' information needs through analyzing the survey data from the health assessment survey performed by HAAM in collaboration with the Dell Medical School at UT-Austin and interviews with musicians. HAAM has agreed to share with us data from the 2016 survey with the UT-Austin Dell Medical Center. The survey assesses HAAM-associated-musicians' experiences with HAAM's services as well as their health status, health concerns and needs, and barriers for accessing health care. These quantitative data will enable us to get a big picture of musicians' health status and challenges, and allow us to infer some of the needs that they have but could not recognize or articulate. Note that the survey masks the identity of the respondents by tagging completed surveys with the respondents' HAAM record identification numbers.

In addition to examining these data, we worked to establish a working relationship with HAAM staff by arranging for graduate students in each of our classes in the

UT-Austin School of Information (iSchool) to participate in service learning experiences that enabled the students to contribute to HAAM's mission. Students in the "Library Instruction and Information Literacy" class created short videos to introduce HAAM members to general HAAM services, health insurance terminology, self-care, and audiology services. Students in the "Information Architecture and Design" class created mock-ups to illustrate revisions to HAAM's website, including testing the usability of content areas on the website including information on how to become a HAAM member and a frequently-asked-questions (FAQ) area. The student work would result in practical products for HAAM and thus provided us with the opportunity to learn more about HAAM and HAAM clients. As a result of this mutually beneficial collaboration, during the semester (Spring 2018), HAAM representatives met with the class twice before students produced the videos and websites and staff were instrumental in reviewing the scripts for the videos. A number of follow-up email correspondences were also made between the students and the HAAM representatives to clarify client needs.

In addition, in the "Library Instruction and Information Literacy" class, Four local music artists volunteered to serve as the talent for the videos and contributed through on-screen interviews and/or voice-overs. These musicians were recruited through personal connections, including the mother of a UT-Austin iSchool graduate as well as an alumnus of the iSchool. The goal of these videos was to direct HAAM clients to resources prior to meeting with HAAM staff, hopefully reducing the amount of time that HAAM staff would need to spend on answering routine questions. This collaboration also provides us insight into musicians' health information needs.

4 Results

HAAM administered a health assessment survey to its clients, asking them to evaluate their experiences with HAAM's services as well as answer questions about their health needs. Nearly 90% (87%, n = 1,992) of HAAM's 2,300 members completed the survey. Some 60% (n = 1,200) rated their experience with HAAM through appointments or inquiries as excellent, supporting HAAM's in-house assessment of their positive relationship with their clients. Similarly, clients gave high ratings to the health insurance that HAAM negotiated for them, and found their rates affordable and their time they needed to wait for services generally good, very good, or excellent. Musicians were also pleased with specific HAAM services, including the ability to fill prescriptions for medications.

Still, HAAM members did not take advantage of all of the HAAM services for which they were eligible. One third of HAAM members did not see a medical provider, indicating that they did not pursue the most basic of preventative health care measures, that of completing an annual checkup to monitor general health status. Approximately one-third of HAAM clients used the dental services for which they had access, indicating that two-thirds of HAAM clients did not schedule even a basic dental examination. Even fewer (some 20%) participated in HAAM's vision program to receive a vision check and free glasses or attended a HEAR clinic. Those who did take advantage of the dental, vision, and/or hearing support rated these services as good, very good, or

excellent. And none of the HAAM members reported participating in the new Hep-C program in 2017.

In addition to answering questions about their experience with HAAM, clients provided answers to general questions that impacted their health care. They expressed concerns about finances: nearly half of HAAM clients felt that they had barely enough funding to get by, with 10% noting that they did not have enough money to live on. This finding might impact their ability to access some HAAM services, such as paying for customized earplugs. In fact, half (56%) identified costs as a barrier to their health care. HAAM members noted other barriers to receiving health care, including their busy lifestyles (28%) or the time they spend performing music on the road (24%).

HAAM wanted to know if their services were addressing the health care needs of their clients. They asked whether members had ever been diagnosed with or thought they had specific medical conditions. Members responded that 24% had vision problems, 28% had dental problems, and 17% had hearing loss, all conditions that HAAM addresses through its basic core services. They also reported on issues that HAAM members felt impacted their ability to perform as musicians. Shoulder or arm pain was the most frequent issue mentioned (36%), followed by hand pain (33%), and voice/vocal difficulties (22%). At least one out of five (22%) experienced pain over a year.

Respondents reported on their health concerns, sometimes indicating multiple concerns. Forty-two percent of the respondents indicated that they had been treated for or were experiencing anxiety. Seventeen percent reported receiving treatment for stage fright. Over a third (36%) experienced at least several days of depression a year. These results pointed to the need for HAAM members to avail themselves of mental health care support. HAAM members and their families may also receive services from the locally based SIMS foundation that provides access and financial support for mental health and addiction recovery to Austin music professionals and their family members [15]. This includes counseling for individuals, couples, or musical groups as well as psychiatric evaluations, and help with management of medications. SIMS provides access to addiction recovery such as detox, inpatient treatment, sober living facilities, and tailored psychotherapy.

It is worth pointing out that information literacy, in particular, health insurance literacy influences musicians' access to health care. When asked to rate their barriers to access health care, 11.8% rated "my insurance is hard to use" as a barrier, after "cost," "I am too busy," and "on the road/traveling". HAAM staff confirmed this barrier in the question and answer sessions with our graduate students.

5 Discussion and Future Plans

The analysis of the UT-Austin Dell Medical Center survey and conversations with HAAM representatives have helped us understand musicians' current health status. HAAM staff also provided insight into the musicians' lifestyle that may impact their participation in even free health care assistance. Their lifestyles and approach to HAAM services indicate that musicians do have health needs, do need health information and do need access to HAAM services yet they might not recognize these

needs. Insurance is a projection into the future, whereas their lifestyles are more concerned with day-by-day concerns. They see insurance as a service they turn to during times of crisis and are less apt to employ preventative self-care options. This leads to musicians not recognizing their health care needs or not stating them. HAAM staff also pointed out that many musicians are also addicts and this impacts their behavior. The Mayo Clinic's website is a reputable source of medical information, including the first Health Information Website Brand of the Year, and recognition as one of the best free reference websites from the Reference and User Services Association of the American Library Association [16, 17]. The Clinic's description of substance use disorder provides some insight into addictive behaviors that might impact an individual's ability to follow-through with their health maintenance [18], including not being able to meet responsibilities related to work and engaging in risky actions. In this case, failing to access free or subsidized health care might constitute an action that increases one's vulnerability and, thus, is risky.

If HAAM members are not taking advantage of basic core HAAM programs they might be even less likely to participate in the new programs, including the discounted wellness offerings of massage, acupuncture, and chiropractic. Some may be reluctant to even undergo the free Hep C testing and treatment program due to the stigma attached to Hep C. HAAM tries to mediate this potential concern in its information about this program in identifying who might be at risk for being infected with Hep C:

> "Baby boomers (everyone born 1945–1965), anyone with tattoos or Body piercings done by an unlicensed artist, anyone who has ever injected or snorted illegal drugs, anyone who has ever received transfusion or blood products before 1992, anyone with multiple sexual partners, as well as other risk factors . . . this is MOST OF US … "

We intend to further investigate musicians' health information needs, both consciously recognized and unrecognized needs. Multiple methods approaches will enable us to triangulate the data we gather. Choemprayong and Wildemuth argue that triangulation helps ensure validity of research conclusions [19]. Jick notes that triangulation offers several improvements over a single-methodology research design. It enables researchers to feel more confident of their findings while, through examining a question from several points of view, it helps identify outliers or cases that are not in conformity with other explanations. Triangulation can also help when research is based on multiple theories. [20] One single method is likely to shed light on only the information needs at a specific time point. For example, queries logged in transaction logs would reveal information needs at the point of users' interaction with an information search system, but will not be able to shed light on how the needs are developed over time. First, we will conduct several focus groups with musicians to elicit their perspectives on their information needs and information seeking behaviors, including sources used to seek information to identify opportunities to serve this underserved population. We will next conduct two or three focus group interviews with people who have knowledge about musicians' health, are willing to share their views of musicians' health information needs, and who have first-hand experience of living with musicians and of caring for their health. We also plan to interview HAAM staff about their perceptions of the major health challenges facing Austin musicians. Because HAAM has been working with musicians for over a decade, their staff developed in-depth knowledge of the health

needs of this user group. Focus group questions will build on those asked on the UT-Austin Dell Medical Center survey while also probing more deeply. Recognizing that it may be difficult to eliciting their needs without any prompts, we also plan to utilize visual prompts, such as videos, during the interviews. Students in the information literacy class created an insurance literacy video and students in the information architecture class created an insurance literacy sub-section under the health benefit section to educate HAAM members about basic health insurance concepts and terminologies. In the future, we will use these videos as well as the websites as a starting point to interview musicians about their health insurance literacy.

Second, we will observe musicians' public performances. We will take notes about the physical demands of performance, the late hours of the work, the possible noise/loudness of the environment, and conversations the musicians enter into, as well as other factors we observe that might impact musician health. At the same time, we will analyze the content that musicians post on their public websites and Facebook groups. Analysis will include content analysis of websites and Facebook groups, as well as focus group conversations and observations of live music events. The HAAM survey results revealed that, while Austin musicians support HAAM and apply to be HAAM clients, they might not address their health issues except under emergencies. These multiple methods will enable us to find evidence that Austin musicians have health needs that they might not address through HAAM and assess their ability to find quality information to respond to those needs. We will seek approval for the methods from our Institutional Review Board and, if needed, adjust our plans accordingly.

6 Conclusions

Austin musicians are an underserved group. A large number of them suffer from health conditions, particulary stress, shoulder and arm pain, dental, and hearing issues, but they face serious financial and literacy barriers in accessing health care. Some non-profit organizations, such as HAAM, are dedicated to help musicians access affordable care. However, limited sources are available to understand musicians health information needs and health literacy, their ability to make wise personal health decisions. In their desire to use health care support, including insurance, largely for emergencies, musicians may have health information needs that they do not acknowledge, state, or recognize. This study presents some initial efforts to address this issue, including creating educational videos and websites targeted at improving musicians' health literacy. In the future, broader efforts are needed to enhance musicians' health literacy and information literacy that would lead to them making wise health care decisions. Such an effort might, ultimately, lead to the design of more integrated and comprehensive information literacy skills and tools to help enhance musicians' health literacy and their health insurance literacy.

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Developing Health Information Literacy in Disadvantaged and Dependent Circumstances: The Everyday Role of Family Nurses

Steven Buchanan(✉) and Emma Nicol

University of Strathclyde, Glasgow, UK
{steven.buchanan,emma.nicol}@strath.ac.uk

Abstract. This paper examines the challenges of developing health information literacy (HIL) amongst disadvantaged and dependent populations from the perspective of non-information professionals occupying everyday support roles. Our participants were a team of UK Family Nurses providing outreach support to vulnerable young mothers from areas of multiple deprivations. Our data collection methods were observation, interviews, and focus groups. Our participants all believe that they have an important role in developing HIL in clients but are unfamiliar with fundamental overarching information literacy (IL) concepts and models. Consequently, their confidence in their own ability to develop HIL skills in clients is limited. We discuss that to extend primary healthcare practices beyond HIL support to HIL education requires not only IL training, but also an appropriate pedagogical approach adaptable to semi-structured problematic situations. We raise important questions regarding approaches to developing HIL in disadvantaged populations.

Keywords: Health information literacy · Information literacy · Information behaviour · Information intermediary

1 Introduction

This paper explores the role of primary healthcare professionals in providing health information literacy (HIL) education to disadvantaged (socioeconomic) and at-risk (health and wellbeing) populations in the everyday context. HIL is understood as information literacy (IL) in the health context. Recent studies by Buchanan et al. [1, 2] have evidenced low IL as a significant issue in disadvantaged at-risk populations, and, in relation, identified an important information intermediary role in primary healthcare professionals [2]. We sought to explore how far this role extends beyond support to education, and, in so doing, explore IL education in the problematic and understudied everyday context.

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2 Background

Our understanding of information literacy (IL) outwith education and the workplace is limited. Martzoukou and Sayyad, in a recent review of empirical research examining IL in the context of everyday life, report that, "Despite the clear value of information literacy within the everyday life context, most empirical research has been conducted within educational and workplace settings" [3, p. 2]. They report that:

> …the implications of lacking IL skills within the everyday life environment have not been sufficiently researched… It is further unclear how people can be supported and empowered to develop effective information literacy practices within the different realms of everyday life [3, p. 29].

Similar issues regarding lack of contextual understanding are raised within health fields. For example, McCormack et al. [4] highlight a need for a broader social ecological perspective of health literacy that takes into account multiple and complex levels of influence and interaction. The authors conclude that, "Despite these calls for a broader perspective, there have been no systematic attempts to expand conceptualization of health literacy and increase patient engagement" [4, p. 9].

Two recent empirical studies of human information behaviour by Buchanan et al. [1, 2] have contributed to our understanding of context, and provided direction for this current work.

Buchanan and Tuckerman [1], in the first study of adolescent information behaviours in disadvantaged and disengaged circumstances, worked with UK youth aged 16-19 not in education, employment or training (NEET), and their support workers. NEET youth can be considered an at-risk group. Delinquency rates are higher than peers, as are rates of substance abuse and mental health issues [5, 6]. The authors report low levels of IL amongst NEET youth; with NEET youth demonstrating a wide range of unmet information needs, passive non-motivated information behaviours often abandoned, and a dependence upon support workers when seeking information. Such issues are compounded by an impoverished and insular existence and disengagement with state services including libraries, schools and colleges. The authors report that due to such issues, support workers would not leave NEET youth to find information independently, but would provide or guide them to information. An important support role is identified, but with, "no evidence of proactive transitions to independent information seeking from either party, nor of basic literacy issues being explicitly addressed" [1, p. 543]. Remedial IL education is recommend as an immediate priority.

Buchanan et al. [2] further explored the everyday support role of non-information professionals via work with UK healthcare professionals providing support to young (<21) vulnerable mothers from areas of multiple deprivations. Young mothers are also an at-risk group. They are more likely to be single parents, to have experienced family conflict/trauma, not to be in employment or education, and at risk of mental health issues [7]. Buchanan et al. report low levels of IL amongst young mothers, and similar to NEET youth [1], report this issue compounded by general disengagement with state services and structured learning programmes. Young mothers are reported to have multiple, interrelated, and, at times, competing information needs, not always apparent or revealed, and often within sensitive situations. Many information needs are reported

as unmet without support worker intervention. The authors evidence and define an important information intermediary role amongst support workers with three key contributions to information behaviours in disadvantaged circumstances [2]:

1. In situations of multiple needs, information intermediaries facilitate information needs recognition, and considered purposeful action, that takes account of the problematic context.
2. In situations of insular existence, information intermediaries are a key source of information in themselves, and a key integrative connection to other external sources not otherwise accessed.
3. In situations of poor comprehension, information intermediaries tailor and personalise information for relevance, and communicate via incremental and recursive cycles that take into account individual learning needs.

However, whilst identifying and defining an important information intermediary role, Buchanan et al. [2] also note that evidence of dependent relationships also raises important questions regarding transitions to independence in disadvantaged and disengaged circumstances. This study sought to explore such questions further, and in particular, the role of support workers.

3 Methodology

A purposive approach to sampling defined participant inclusion criteria as being a professional directly engaged in support to a disadvantaged population. Our participants were a team of UK National Health Service (NHS) Family Nurse Partnership (FNP) nurses providing outreach (home) support to vulnerable young first-time mothers from areas of multiple deprivations. Nurse visits are from pregnancy to child age two years. Visits are weekly initially, then fortnightly scaling down to monthly towards end of programme. The study zone (team area) was confirmed via the Scottish Index of Multiple Deprivation (SIMD) as within the 5% most deprived decile in Scotland [8].

Young mothers from areas of multiple deprivations, as previously noted [7], are a disadvantaged and at-risk group. Infant mortality rates are higher than for older mothers [9], and babies at greater risk of poor nutrition and care [10]. Stress and anxiety are heightened, as are rates of depression [11]. Low literacy is also reported [12]. Notwithstanding such issues, motherhood can be a positive experience for young people; however young mothers can also be subject to societal stigmatisation that encourages marginalisation and disengagement [13].

Our theoretical framework was provided via concepts and models of information literacy (IL). IL was defined as per the American Library Association definition [14], "Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information."; and placed in the health context via Scottish Government NHS definition [15, p. 3], "Health Literacy is about people having enough knowledge, understanding, skills and confidence to use health information, to be active partners in their care, and to navigate health and social care systems". The Big6 was used as a reference model during discussions to illustrate processes and relate to nurse practices.

Our data collection methods were observation, semi-structured interviews, and focus groups, conducted over six months, and designed to explore nurse information interactions with mothers and approaches to IL education. Nurses were provided with a tablet PC and mobile Internet access. Tablets were bookmarked to YoYo [16], a digital resource tailored to the information needs of young mothers and providing access to state and third sector information sources. Nurses were free to use tablets as deemed appropriate and were under no obligation to use YoYo during their interactions with mothers. Previous to provision of equipment, nurses had no means of digital access during home visits beyond their own personal mobile phones.

Observation was conducted prior to interviews to provide a degree of immersion and appreciation of the research environment. The researcher attended team meetings, and accompanied nurses on home visits. Two rounds of individual semi-structured interviews followed observation. The first round explored the nurse role in helping mothers locate, access, and use information. The second round explored nurse understanding of IL concepts, and approaches to IL education. A focus group followed interviews and began with semi-structured discussion, followed by open discussion. Participants were provided with summarised interview findings to comment on validity. Participants were then asked to discuss their IL role, approaches to IL education, and factors influencing IL interactions.

Data analysis incorporated deductive and inductive elements, with data disaggregated into meaningful categories via identification of patterns and regularities through iterative pattern coding and thematic analysis. Initial start-list codes were based on concepts of IL. Further codes were emergent, in particular those relating to IL education, and influencing factors.

Ethical approval was obtained via Institutional Ethics Committee, with the study run in strict accordance with the University Code of Practice on Investigations of Human Beings.

4 Findings

Our six family nurse participants, who formed the area team, were aged 36–51 (average 43). All were University qualified, and collectively possessed 105 years professional experience in healthcare (average 17.5), with the majority of time spent in family community support roles. Their combined caseload was 89 young mothers, with the majority yet to give birth.

When asked how frequently participants used digital sources of information for their own professional and personal purposes (to ascertain general levels of digital engagement of participants), the median response for both was 5, equating to ‘very often’.

4.1 Observation

Observation was primarily intended to sensitise the researcher to the research environment; however some observations are notable. Nurses were observed taking time to discuss individual everyday needs of mothers (many poverty related), and flexibility accommodating such needs alongside delivery of FNP programme specified learning

outcomes (for example, mother health, homebuilding, personal development, pregnancy, and child care, relationships). Nurses were also observed bringing various resources to deliver and support individual learning needs, ranging from the provided tablet PCs to leaflets and visual and demonstrative props such as foetal dolls. Information interactions could thus be considered semi-structured, nurses being responsive to everyday needs alongside prescribed and planned programme aspects.

4.2 Interviews

When asked how frequently participants used and/or referred to digital sources during their interactions with mothers, the median response was 2, equating to 'not very often'. One participant had no digital interactions whatsoever. Whilst digital use was low, all participants felt digital had an important role and valued YoYo for providing direct access to trusted and tailored information. Examples discussed included providing access to visual resources to aid learning, such as videos of children's games and nursery ryhmes, and techniques for effective breastfeeding; and in sensitive situations such as instances of domestic abuse, being able to refer clients to digital sources that avoided leaving print material behind that perpetrators might see (note: YoYo includes a domestic abuse link to Scottish Women's Aid). YoYo was also valued as an alternative to Google searches. For example, one participant commented:

> I'm probably not using it [YoYo] to its full potential at the moment but… it could be really helpful… if I got used to using it in visits with my clients, hopefully… that would be their first port of call… when they want information they'd go to that cos of as you know, learned behaviour is what you do. I think the majority… it was Google, Google, Google.

Low digital interactions were largely attributed to access issues. For example, one participant commented, "Technical issues just due to where you are and maybe not having Internet access". Participants also discussed how many mothers had limited or no digital access, and whilst public libraries offered access, they were not used. For example, one participant commented, "…the majority they don't go to the library… if they've got phones they've got limited data or they have poor network connections". And another, "I've got a couple of clients who don't even have a phone never mind a Kindle or laptop or anything…"

Another challenge to digital interactions was time. For example, one participant commented, "Each of our programme visits usually would last about an hour and we've got a certain amount of information that we would try and share… and we know that if you deliver the programme… you are more likely to get the outcomes for the young women and their children". And another, "We do have a lot of paper… that's the programme that we're delivering that takes a lot of time in those visits as well as addressing whatever other issues will be there for clients. Getting time to sit with the pad [tablet] and spend time, that can be quite challenging". Further challenges related to interpersonal communication preferences. For example, one participant commented, "I just feel that the mums themselves are thinking, 'well I can look that up later'. They are more kind of wanting the time for a kind of one to one verbal kind of chat." And another, "To try and fiddle about with your phone, to try and skip along is not particularly easy… when you are trying to engage with them".

When asked if prior to interviews, participants had been familiar with the term IL, five responded no, and one yes. When asked if they had completed any IL training or qualification, five responded no, and one yes. For the participant who responded yes, this was in relation to a postgraduate healthcare degree. When asked if IL had been explicitly covered they replied, "I suppose probably not specifically". When participants where asked if they were familiar with IL models or frameworks, five responded no, and one yes; however, the respondent who replied yes could not recall a specific model or framework.

When asked how confident participants felt in their ability to develop IL in clients, the median response was 3 equating to 'somewhat'. Several participants explained that whilst not familiar with IL concepts, they had a degree of confidence in their ability to develop IL skills in clients due to feeling that they understood IL concepts as presented to them during discussions (see methodology). For example, one participant commented:

> I think because that's the first that I have seen that model [IL reference model], so I like to get more information and look at things and make sure that I am doing it right, so it's probably just because that's the first I am seeing that, that when you talk about information literacy I think yeah OK – when you explain it I know what you're talking about so I should be able to implement that in practice OK.

All participants felt that they had a IL education role in relation to the overaching goals of the FNP programme to develop client self-efficacy (i.e. client belief in their own abilities). For example, one participant commented, "Well we're not going to be with them forever… we're trying to give these girls the skills to find out information in life". And another, "I do feel I have a [IL] role because… part of the FNP programme is about self-efficacy and about people being able to do things independently and get the best possible information for the best possible outcome for them and their baby".

When asked how they developed IL skills in clients, the majority discussed this in the context of meeting information needs, and conducting searches for mothers. For example, one participant commented, "I think it's [IL] something we do on a day to day basis… well for a lot of our clients it's really helping them understand their needs before you can even move forward to how we go about meeting those needs". And another, "I suppose… it probably depends what the topic was, if I was able to find that information, but it's then about navigating through that particular system then as well in order to find the right answer for them as well too".

All participants discussed how for interactions to be effective, it was important that information was meaningful. For example, one commented, "…it's got to be something that they are interested in, it's got to be something that they want to hear". Several discussed using the elicit-provide-elicit motivational technique to understand and meet needs. For example, one commented, "…it's finding out what they know, what they need to know, because… everybody has different information, everyone has different knowledge". Participants also discussed the need for sensitivity to circumstances. For example, one commented, "…you are trying to maintain a therapeutic relationship… a lot of these young women are quite volatile because of their situation and in order to change, sometimes you have to push a wee bit".

Participants discussed several challenges to effective information interactions, categorised as: determining individual information needs, changing online behaviours, transitioning from dependent relationships, and participant digital skills.

All participants discussed dealing with multiple and varied information needs on an individual basis. For example, one commented, "all clients are different", and another, "everybody's individual". Participants also discussed how individual needs could be difficult to elicit. For example, one commented, "Some of the clients can be really quiet you know… and they might not feedback much", and another, "I have one client who is very, very quiet… I think she potentially finds it difficult to communicate verbally". Low self-esteem and confidence were considered significant contributory factors. For example, one commented, "…she has lots of issues with low esteem and low confidence coming from her own adverse childhood experiences", and another, "Sometimes they don't want to know. Sometimes they don't have the confidence". Such issues impeded effective interactions. For example, one participant commented, "…they feel really judged… they don't want to ask questions so that's not helpful, they don't fully talk about the issues which they have because they think somebody is going to judge them". Individual learning needs were also highlighted. For example, one participant commented, "…some don't have the literacy skills, they are not able to read and write".

All participants discussed difficulties in directing mothers to reliable information sources. For example, one discussed how when she had asked mothers if YoYo had been used between visits, had received a common reply of, "No, I just used Google". The participant commented, "I think it's a cultural thing. It's just what they're used to doing and I think I probably need to be better at kind of keeping going back to the resource and maybe it will start to kind of mirror them using it I suppose". Another participant also highlighted the importance of regular reinforcement, commenting, "I think its just about all the time reinforcing what the helpful sources are". Another participant, also discussing a reluctance amongst her clients to use trusted sources such as state websites, commented:

> They would start to do it [use state provided information sources] and then it would get a bit complicated and… then they would give up I suppose and maybe even get sort of waylaid… find it difficult to know where it is pointing them to… maybe the language isn't always particulary useful for them or they don't maybe understand it.

Several participants felt that they themselves would benefit from digital skills training. For example, one commented:

> I would love someone to help me to go in and work certain things out… on the phone or computer… to help me be better at doing that kind of thing so that I could then pass that on or at least be more knowledgable than I am at the moment about… carrying out searches and things cos you know I'm probably not brilliant at doing that…

Another commented:

> I think for… nurses or practitioners in general it would be great just to get more information ourselves and maybe more training… perhaps have something that would… be specific to the FNP programme that you could always get information from… that the client could also use… and we could all be singing from the same song sheet really and you would know it was correct up to date info… that would be beneficial.

Transitioning mothers from dependent relationships could also be a challenge. For example, one participant commented:

> …a lot of them expect maybe their parents…, or… older siblings, to do a lot for them… I think they are maybe used to other people carrying out these kind of tasks for them, so sometimes they then maybe expect myself to then go and kind of do it for them too.

4.3 Focus Group

Participants agreed with summarised interview findings including confirmation that they all felt that they had an IL education role. In the discussion that ensued, a number of influencing factors were identified: alignment with primary care priorities and constraints; relevance and application of IL models; role modelling as an instructional tool; and participant training needs.

Participants discussed the challenges of attempting to develop IL skills alongside primary care responsibilities and FNP learning outcomes. For example, one commented:

> We usually have at each visit a lot of written material… we do a lot of agenda matching as well but we still have a lot of information at each visit… we may also have a developmental review to do… we're also maybe going into visits where the situation is chaotic or our clients have their own agendas that we have to address first… sometimes even trying to get any learning into a visit for some of our clients is a challenging thing to do… if I was to say what probably the most difficult thing is, it would be the time factor…

Another commented, "I think at times it [IL] can be our role but at other times then we can't get too embroiled in things like that cos we need to still look at what we're in to look at". And another, "I suppose we've got to prioritise each visit and what that's about and obviously the child is at the centre of that as well, but aye [have an IL role]".

Participants discussed whether or not an IL reference model would be useful during interactions, and whilst initially dismissed, was upon further discussion, considered relevant. For example one commented, "Naw [no]. I don't think so." However another commented, "That [IL reference model] might be quite helpful as a facilitator in terms of discussing it with them… how do they start to go about searching for information that's relevant… cos some of them do need it broken down". The participant who had dismissed the model then replied, "Aye [yes], actually I done all those stages" and later commented, "I think it would be good reflection if they've done something then say 'Look, you've done this' [refers to IL reference model]". However several participants also voiced concerns regarding how such a model might be understood by mothers. For example one commented, "I don't know how well our clients would be able to understand a model like that", to which another replied, "Just a few of them I suppose", and the first to reply, "Probably the ones that would understand it would be the ones that wouldn't have the same amount of difficulties in the first place".

Participants felt that the best way to impart good IL practices would be to do so through role modelling. For example, one commented, "Role modelling…, doing it yourself, doing the steps and showing them how to do it themselves – so if you did it enough times then perhaps they would go through the stages". Another commented that an IL pocket guide would help:

> If you had it [IL model] laminated in your diary and you maybe said 'right we've got a problem, why don't we try and break it down like this', and then… use role modelling… and using it as a framework [to] tick boxes – right I've done that stage, I've done that stage.

Participants also discussed gradual transitions to self-efficacy. For example one participant, discussing mothers with no understanding of state welfare entitlements and processes, commented:

> There's a bit of a need for fixing initially… we sometimes get involved in supporting them… you are doing things initially and gradually over time you try to kind of withdraw. I suppose you can think about sharing information in a similar way, initially you are pointing them to where things are and then you are gradually withdrawing - so they have a site [information source] that they feel confident going into.

In relation, participants discussed how it could be difficult to change bad practices amongst mothers. For example, one commented:

> A lot of our clients look for a kind of quick fix. That reflects the society we're in… we've got the time to be talking about [information topics] over a long period of time so… that they've got a better understanding… but that can be challenging if you are trying to work through a process… and they go on a blog or social media and somebody has given them, 'this is how you cure this, this is how you do this', which probably isn't the case…

Participants also discussed their own training needs to be able to develop IL skills in clients. For example, one commented, "I think I would appreciate any [IL] training really – if I was going to be able to help my clients then obviously it would be good for me to feel very confident in what I was saying…". And another, "It [IL] is a critical part of our job when you think about it… although we do a bit around MI [motivational interviewing] in the training, there's nothing really about IL". And another, "I think it's [IL] probably something we would do, it's just we didn't know that it was called that". And another, "We are using it [IL] a lot, but you know I think I didn't really understand there even was a [IL] framework".

5 Discussion

Our participants play an important role in supporting and meeting the information needs of disadvantaged young mothers. Alongside delivery of the FNP programme, interactions are responsive to the everyday information needs of mothers. An important information intermediary role appears evident, supporting previous findings [2]. Digital resources are recognised as important, but are not used often during interactions, primarily due to issues of access and time. Our study draws further attention to

enduring issues of digital access amongst disadvantaged groups, and, notably, evidences such issues extending to frontline professionals providing outreach support, professionals who prior to this study, had no means of digital access in the field apart from via their own personal phones. Several of our participants also felt that they would benefit from digital skills training.

Our participants all believe that they have an important role in developing information literacy (IL) in young mothers, but the majority are unfamiliar with IL concepts, have not received any IL training, and are not familiar with any IL frameworks. Consequently, whilst feeling that they intuitively understood IL concepts as presented during discussions, they are only 'somewhat' confident in their abilities to develop IL skills in their clients. Further, there is limited evidence of transitions to independent information seeking or underpinning pedagogical practices to achieve such goals, supporting previous findings in similar disadvantaged and dependent circumstances [1, 2]. Notably, our findings evidence an IL skills gap amongst primary care health professionals, and raise important questions regarding approaches to developing IL in disadvantaged and dependent populations. It could be argued that our nurse participants do not have a responsibility for the IL education of their clients, but if not them, then who? Librarians appear an obvious alternative, but this study supports previous findings that young mothers do not use libraries [2]. In contrast, our nurse participants appear used, and importantly, trusted by a vulnerable, stigmatised, and disengaged group [2, 12]; and by the nature of their intermediary role, appear ideally placed to deliver IL education via meaningful tasks focused on real information needs, a factor considered integral to effective IL programmes [17]. Further, the Scottish Government, in their *Health Literacy Action Plan 2017–2025*, have articulated an important IL role amongst primary healthcare staff, and have a stated aim to, "embed ways to improve health literacy in policy and practice" [18, p. 21] that includes to, "develop practitioners and design services that are responsive to people's health literacy needs" [18, p. 39]. Thus an IL role is evident in practice, and warranted in policy. The challenge appears to be how to extend health professional practices beyond IL support, to IL education. We reserve this important question for future research.

6 Limitations and Further Research

Whilst drawing on the cumulative experience of a team of health professionals, we nonetheless report within the constraints of a single case study. However, given the potential significance of our findings, we would call for further research to explore our findings with further groups.

Further research is also required into appropriate pedagogical approaches to IL education that are adaptable to semi-structured everyday situations, and implementable by non-information professionals in the problematic context. Recognition of information need appears particularly problematic, and whilst being a fundamental first step in IL models, it is arguably not addressed in sufficient depth within existing models for semi-structured everyday situations such as this.

7 Conclusion

Our family nurse participants play an important role in recognising, understanding, and progressing the information needs of vulnerable young mothers. An important information intermediary role is evident in participants, but with limited evidence of transitions to independent information seeking in clients, or of underpinning pedagogical practices to achieve such goals. Our participants all believe that they have an important role in developing IL in clients, but are majority unfamiliar with IL concepts, have not received IL training, and are not familiar with any IL frameworks. Consequently, their confidence in their own ability to develop IL skills in clients is limited. Further challenges include how to incorporate IL education into primary care responsibilities, and issues of digital access.

Our findings suggest that to extend the practices of healthcare professionals beyond IL support to IL education requires not only staff training, but also an appropriate pedagogical approach adaptable to semi-structured and problematic everyday situations. In relation, information need recognition appears particularly problematic.

Beyond empirical and theoretical contributions, our findings also have practical implications. We evidence an IL skills gap amongst primary healthcare professionals, and raise important questions regarding approaches to self-efficacy in disadvantaged populations.

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Differences in Health Information Literacy Competencies Among Older Adults, Elderly and Younger Citizens

Isto Huvila[1,2(✉)], Noora Hirvonen[2,3], Heidi Enwald[2,3], and Rose-Mharie Åhlfeldt[4]

[1] Department of ALM, Uppsala University, Uppsala, Sweden
isto.huvila@abm.uu.se
[2] Information Studies, Åbo Akademi University, Turku, Finland
[3] Information Studies, University of Oulu, Oulu, Finland
{noora.hirvonen,heidi.enwald}@oulu.fi
[4] University of Skövde, Skövde, Sweden
rose-mharie.ahlfeldt@his.se

Abstract. To address the research gap on age-based differences in health information literacy (HIL), we investigated how younger (born 1960–) and older adults (1946–1960), and elderly citizens (–1945) differed from each other by their HIL competencies. Data were collected with an online survey of patients using the Swedish national electronic health record system. Altogether, 2,587 users responded. One-way ANOVA with post hoc tests revealed several differences between the groups: younger adults were less likely to value health information than older adults; older adults and elderly were least likely to compare information from multiple sources and had trouble in determining health information needs; older adults were most likely to have trouble understanding health terminology and the elderly to have difficulties in understanding medicinal package labels. The study shows that HIL is not necessarily improving or declining but adapting to challenges of advanced age.

Keywords: Health information literacy · Older adults · Elderly · Young

1 Introduction

In spite of the growing corpus of research on older citizens and their health information literacy (e.g. [1–5]), there are still relatively few studies that have investigated how older people deviate from other age groups in their competencies to find, evaluate, and use health information [6]. To address this research gap, this study examines age-based differences in health information literacy competencies with a focus on older adults. An adequate understanding of the health information literacy of older citizens is crucial for providing health information for this group in a manner that would encourage and help them to become better informed in health-related matters.

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1.1 The Concept and Measurement of Health Information Literacy

The concept of health information literacy refers to information literacy competencies in health settings or the combination of the concepts of information literacy and health literacy [7]. The Medical Library Association based its health information literacy definition on the American Library Association's [8] definition of information literacy. According to it, health information literacy refers to "the set of abilities needed 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 analyze, understand, and use the information to make good health decisions." [7, p. 294]. The definition is not far removed from recent health literacy definitions [9, 10] and most of them present obtaining information central in gaining an adequate health literacy level [11]. However, the concept of health information literacy places emphasis on information discovery and the active role of individuals in seeking health information from various sources [11, 12] and draws from research on information behavior and practices.

While in health literacy research so-called objective measures are typically used to evaluate health literacy levels, empirical studies on health information literacy have focused on people's self-evaluated competencies. Niemelä et al. [13] as well as Eriksson-Backa et al. have developed screening tools with which these competencies can be evaluated. Both measures include statements that are meant to describe key elements of health information literacy: the ability to identify health information needs, to find information, evaluate its credibility, and to use this information in decision-making.

Niemelä et al. [13] suggested, based on a pilot study among upper secondary school students and a factor analysis, that their tool, consisting of ten statements, could be divided into three separate factors, namely, motivation, confidence, and evaluation. Besides these three factors, the perceived ability to understand health related terminology was considered an essential element of health information literacy and therefore analysed separately. Moreover, a question about a diagnosis of dyslexia was included into the screening tool. The tool by Eriksson-Backa et al. [4] includes eight statements and was first used to examine the health information literacy of elderly Finns aged 65–79 years.

1.2 Health Information Literacy and Age

Previous research on the HIL of specific age groups have focused on young people (for example, [4, 14, 15]) and elderly citizens [1–5, 16, 17]. For example, Enwald et al. [5] used a four-item version of the screening tool by Niemelä et al. [13] and examined the HIL of a random population-based sample of older people (65 or more). According to the results, older people were rather motivated to seek health information but faced difficulties in assessing the reliability of information from online sources and understanding health terminology. Many of them also found it difficult to know whom to believe on health issues [5]. In addition, the relationship between everyday health information literacy and attitudes towards mobile technology among older people were investigated. The users of both traditional and mobile information technology differed from non-users in that they were more confident in their abilities in evaluating online health information, determining who to believe in health issues, and understanding

health related terminology. Also, positive opinions towards mobile information technology were linked to perceiving fewer problems in the areas of everyday health information literacy [5].

Eriksson-Backa et al. [4] found that among Finnish seniors (65 to 79 years old), HIL was associated with both interest in health information and health information seeking activity. Furthermore, HIL was associated with education and health; those who had higher education and rated their health as good were also likely to be confident in their abilities to find and use information. No differences were observed among age groups and gender was connected only to confidence in the ability to use obtained information in order to take care of one's own health [4]. Older people and issues relating to their health information literacy has also been a subject of a review study by Suri et al. [18].

In turn, Hirvonen et al. [14, 15], using the screening tool by Niemelä et al. [13] studied the HIL of young Finnish men and found that they lacked motivation to seek health information but were confident in their abilities to find and evaluate it. Among young men, HIL was associated with education as well as health promoting behavior and physical fitness [14, 15]. Enwald et al. [19] found that when compared to these young men, adults with high risk for metabolic syndrome, with a mean age of 45 years, were more highly motivated to seek health information but lacked confidence to find, understand, and evaluate it. Based on previous research, there are indications of age-based differences in health information literacy but few studies have focused on comparing age groups to each other.

1.3 Aim and Research Questions

The aim of this study is to increase understanding of age-based differences in health information literacy. This is examined among people using a patient accessible electronic health record system in Sweden. The research questions are:

Q1. How do people perceive their health information literacy abilities?
Q2. What kind of differences can be identified in these perceptions between different age groups?

2 Materials and Methods

2.1 Data Collection

The data were collected with an anonymous national survey of patients who had consulted their medical records online using the national patient accessible electronic health record system (Journalen) in Sweden. All users logging in to the system were prompted to take the survey between January and June 2016. Altogether 2,587 users responded. Aspects related to health information literacy were measured using 11 items focusing on information literacy, self-perceived competence and capability to obtain and use health information, and to influence one's own health (see Table 2). They were based on the measures by Niemelä et al. [13] and Eriksson-Backa et al. [4].

2.2 Data Analysis

The questionnaires were categorised into three groups based on the respondents' age: Elderly (born–1945), Older Adults (1946–1960), and Younger Adults (1960–). Group-wise differences in responses were tested using one-way ANOVA in SPSS 24.0 with Tamhane T2 post hoc test. The measures were treated as continuous variables.

3 Results

3.1 Respondent Characteristics

The respondents were from 18 to 98 year old people with a mean age of 50.65 (SD = 52). Of the respondents who indicated their gender (n = 2,427 of the total number of respondents 2,587), 67% (n = 1629) were women and 33% (n = 798) were men. The number of respondents who indicated their age (n = 2,456) in age-based groups can be found in Table 1.

Table 1. Respondents grouped by age.

Category	N	%
Younger Adults	1415	57.6
Older Adults	707	28.8
Elderly	334	13.6
Total	2456	100

3.2 Health Information Literacy

Overall, most respondents agreed that it is important to be informed about health issues (Table 2). Some 80% of the respondents thought they were able to influence their own health, knew were to seek health information, and applied health information to their own lives. Around 70% of them liked to get and compare health information from a variety of sources, and around 60% found it easy to determine when health information is needed.

More than one third of the respondents found it difficult to understand health related terminology and some 12% had trouble in understanding medicinal package inserts, labels, or prescription. Fewer than one in ten thought they get too much health information and six percent did not want to think about health issues.

Table 2. Responses to the health information literacy statements.

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)	N
It is important to be informed about health issues	2231 (91.5)	166 (6.8)	42 (1.7)	2439
I like to get health information from a variety of sources	1779 (73.9)	445 (18.5)	183 (7.6)	2407
I compare the health information I have received from various sources	1638 (68.4)	498 (20.8)	260 (10.9)	2396
It is easy to determine in what situations I need health information	1520 (63.4)	654 (27.3)	225 (9.4)	2399
I know where to seek health information	1915 (79.7)	327 (13.6)	160 (6.7)	2402
I apply health related information to my own life and/or that of people close to me	1841 (78.1)	382 (16.2)	135 (5.7)	2358
Health related terminology and statements are often difficult to understand	874 (36.8)	462 (19.5)	1038 (43.7)	2374
It is easy to understand the medicinal package inserts, labels or prescription	1794 (74.6)	310 (12.9)	300 (12.5)	2404
I get way too much information about health	206 (8.7)	865 (36.6)	1293 (54.7)	2364
I don't want to think about health issues	145 (6.2)	450 (19.1)	1762 (74.8)	2357
I can influence my own health	1778 (78.3)	321 (14.1)	172 (7.6)	2271

Table 3. Significant group-wise differences in responses (n = 2198; Elderly n = 262; Older Adults n = 614; Younger Adults n = 1322) to HIL statements.

Statement	I	J	Mean Diff. (I − J)	Std. Error	Sig.
It is important to be informed about health issues	Older Adults	Younger Adults	.102	.032	.004
I compare the health information I have received from various sources	Elderly	Younger Adults	−.185	.069	.023
	Older Adults	Younger Adults	−.196	.055	.001
It is easy to determine in what situations I need health information	Elderly	Younger Adults	−.178	.064	.016
	Elderly	Older Adults	−.170	.069	.044
Health related terminology and statements are often difficult to understand	Older Adults	Younger Adults	.173	.063	.018
It is easy to understand the medicinal package inserts, labels or prescription	Elderly	Younger Adults	−.240	.073	.003
I get way too much information about health	Elderly	Younger Adults	.195	.065	.008
	Older Adults	Younger Adults	.160	.048	.003

3.3 Differences by Age

Significant group-wise differences were found between the three age groups (see Table 3). The Older Adults were more likely than the Younger Adults to agree that it is important to be informed about health issues. However, there were no significant differences between the Elderly and Older Adults, or Younger Adults and Elderly. In turn, Older Adults and the Elderly were least likely to compare information from multiple sources and to think that it was easy to determine when they need health information. In comparison to Younger Adults, Older Adults considered that health related terminology was difficult to understand, and to Elderly that it is more difficult to understand medicinal information. The Older Adults and Elderly also considered that they got too much health information.

4 Discussion and Conclusions

In this study, we examined age-based differences in health information literacy among users of Journalen, the Swedish national electronic health record system. The results indicated that, when compared to younger adults, older adults were more likely to value the importance of being informed about health issues but also had difficulties in understanding the terminology used. Both older adults and the elderly were less likely than the younger adults to compare information from multiple sources and more likely to think they obtained too much information, in other words, experience information overload. In turn, the elderly were likely to have difficulties in understanding medicinal package labels and to determine when they needed health information.

In line with previous studies [4, 5, 19], older adults seem to be motivated to find health information but faced difficulties in understanding it. Interestingly, older adults were most likely to have difficulties in understanding health related terminology whereas the elderly had trouble in understanding information in medicinal packages and prescriptions. At older age, people often face health concerns and are therefore in need for information on health issues. In a study by Enwald et al. [5] elderly citizens faced difficulties in assessing the reliability of information from online sources and understanding health terminology. Therefore, even when the respondents logged in to an electronic health record system and, thus, were possibly more motivated in health issues than the general population, they seem to be facing the same difficulties than elderly citizens in other studies. In this study, it is to be noted however that the overwhelming majority (91.5%) of all respondents considered that being informed about health issues was important.

Studies on health literacy indicate that inadequate health literacy is more prevalent in older age [20]. In the light of the findings of this study as well as previous research, age differences could be found as well. However, it seems that the health information literacy skills of the respondents are not necessarily improving—or declining—but changing and adapting to new issues and challenges of advanced age. An awareness of the importance of health issues was increasing in this phase of life. The results give indication of the varying environmental and situational challenges populations face when obtaining and evaluating health information in everyday situations.

When interpreting the results, it should be noted that the respondents of this study did not represent the Swedish population as a whole since they were all users of the Journalen and volunteered to participate. Moreover, women were overrepresented in the sample. The HIL measure was based on self-evaluated abilities that may not indicate actual, measurable, skills but reflect people's views on how their own skills align with the demands they were faced with.

The study contributes to previous research on health information literacy by increasing understanding of age differences among citizens. A better understanding of the health information literacy of older citizens is useful in providing health information to make them better informed in health-related matters. Libraries devoted to teach health information literacy could tailor their education according to the age-related information needs and on how people perceive their health information literacy abilities. In the light of the findings, older citizens appear both as interested in health information and having difficulties in understanding, comparing, and coping with larger amounts of it. This would seem to call for specific measures to address this particular group and moreover, to work proactively to prepare older adults with appropriate information literacies to cope with their developing information needs and problems. Also, generally speaking, national electronic health record systems are getting more common and also librarians might come across questions relating to their use. Future studies should attempt to achieve randomised population-based sampling. The users of electronic health records should also be compared to non-users as usage may indicate differences in motivation, health concerns and status, as well as technical skills.

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Which Approaches and Methods Are Most Appropriate for Exploring Health Information Behaviour?

Marianne Paimre(✉)

Tallinn University, Tallinn, Estonia
marianne.paimre@tlu.ee

Abstract. The aim of this paper is to establish the approaches preferred in studies focusing on online health information seeking behaviour (OHISB). Based on the content analysis of 70 articles on OHISB retrieved from *EBSCOhost databases,* five larger groups of studies were identified: (1) quantitative approach (39%), (2) qualitative research (25%), (3) mixed methods design (9%), (4) meta-analysis and bibliometric aspect (10%) and (5) other studies (e.g., theoretical aspect, online health information quality). Thus, quantitative research does dominate, but only to a degree. The qualitative aspect has grown considerably over time. Subject to the analysed literature, it may be concluded that the mixed methods seem to have generated the most comprehensive approach for studying OHISB in all its variety and complexity. However, this design was in fact least used in the analysed studies compared to quantitative and qualitative research.

Keywords: Health information · Online health information behaviour · Methods · Approaches · Studies

1 Introduction

In a contemporary society people tend to value their health more highly than ever before. We all are expected to make adequate decisions regarding our health [1, 2]. For this, relevant information is needed. The Internet has proven to be a readily accessible source for retrieving health information with ease and anonymity [3, 4]. Thus, it no wonder, that millions of people worldwide have turned to the Internet for health information [5, 6], and it is the most important health information channel for Estonians as well [7].

In Estonia, where the majority of the adult population is avid users of the Internet, the number of health issues caused by wrong lifestyle choices has never been more apparent [8]. The rise in the average life expectancy of Estonians has slowed down and, instead of a growth and there is a decrease in healthy life years. Also younger people are beset with health conditions adversely affecting the quality of their everyday life. This raises a justified question – if the Internet boasts an abundance of health information, then why is it not used to improve one's health? And even though top quality

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information is retrieved, it is still not acted upon in the interest of promoting healthier lifestyles.

In order to make adequate interventions to improve public health, patterns of online health information seeking behaviour should be rigorously monitored. This is imperative for improving information services too. But which should be the preferred methods? Which are fruitful methods in enabling identification of trends in OHISB and which ones provide a deeper insight into people's information behaviour? OHISB is a complex notion involving people's motives and preferences in information retrieval, how they retrieve and assess information and many other aspects. OHISB is related to various societal and individual factors of the information seeker as well as culture and community components. Thus, there is every reason to believe that in order to get a complex picture one should incorporate various aspects of OHISB.

The aim of this paper is to provide an overview of the approaches and methods in studying OHISB. It will focus on the following aspects: (1) how studies on OHISB could be grouped subject to the approaches and methods used and (2) which approaches/methods enable exploration of OHISB in all its complexity? (That is, what are the ways to explore OHISB in an integrated and comprehensive manner taking into account various aspects and factors, thus enabling provision of an overview of major trends and offering deeper insight into people's behavior).

Although OHISB has been researched by many scholars from different disciplines (information scientists, health experts, sociologists, psychologists, and others), there is lack of studies providing a clear overview of applicable methods in this field. This study intends to fill the gap.

The next section of this paper provides a brief overview of the sample and methods used in the study followed by a discussion of findings. The paper ends with a summary and conclusions.

2 Sample and Method

Using a method of content analysis, the study focused on 70 most relevant articles on OHISB published and entered in the EBSCO databases during the last ten years (See Appendix A for list of EBSCO databases searched).

The inclusion criteria that a potential source had to meet were the following: (1) the article was intended to focus on online health information seeking behaviour; (2) it had to be written in English; (3) only those articles which were published within the last 10 years were included; (4) the article was supposed to be peer reviewed and (5) the database included the full text of the article.

To find relevant papers this study employed the EBSCO Discovery search engine in January 2018, and used phrases "online health information behaviour", "online health information seeking behaviour", "health information behaviour AND internet" and "health information seeking behaviour AND internet". The searches resulted in thousands of matches (e.g., just the phrase "online health information seeking behaviour" produced 4103 matches). Articles that appeared first in the result list were included in the study.

The content analysis consisted of several categories: author(s) of the article; country; sample size; topic; approach used; method; limits of study. All the articles were encoded and analysed using the SPSS program. With respect to assessing appropriateness of studies the study took into consideration whether or not the authors expressed satisfaction with their chosen methods and what they considered the main advantages and disadvantages of their study, as well as whether the approach took into account various aspects of OHISB.

3 Outcomes

The multidimensional and complex nature of research on OHISB has given rise to a variety of methodologies and approaches. Subject to the applied approaches/methods, five larger groups were identified in those studies (see Fig. 1).

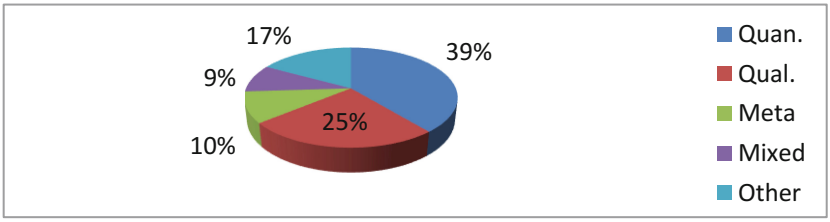

Fig. 1. Groups of studies on OHISB based on the approaches and methods used

Over the past ten years, the bulk of academic papers related to this topic in EBSCO databases originate in the U.S (39%), UK (23%); China (21%) and Germany (7%). The studies could be grouped into three larger sets: (1) studying associations between OHISB and various determinants (incl. health literacy), (2) focusing on information retrieval practices and (3) dealing with other aspects (source criticism, overview of earlier research etc.). Thematically, the variety of underlying issues was wide, including gender and ethnicity aspects, e-Health literacy, exclusion of certain groups (e.g., elderly), logic and motivation of information retrieval. Information and computer scientists, and psychologists were the most prolific researchers to publish articles on online health information seeking.

Following is an overview of the results of this research divided into five broad categories subject to the approach used.

3.1 Quantitative Research on OHISB

The largest group of studies resulted from quantitative research, comprising 39% of the articles analysed (see Fig. 1). Such studies relied on big datasets and used statistical analysis. They focused on the associations of various determinants and the context of OHISB.

The online survey was the most popular method (76%) followed by questionnaires, face-to-face surveys, and structural equation modelling. Quantitative analysis using SPSS was often conducted, and linear and binary logistic regressions were completed.

The data were often derived from national trends surveys and cross-sectional nationally representative surveys. For example, Gonzales and colleagues used the adult population file of the 2011–2012 California Health Interview Survey, analysing Internet use, online health information-seeking behaviour, and confidence in filling out online forms using binary logistic regression among 27 289 Latinos [9]. In a study conducted by Faith and colleagues [10] the data from 7674 people from all over the US were derived from the Health Information National Trends Survey. Te Poel [11] from the Netherlands conducted a 4-wave longitudinal survey study among 5322 respondents aged 16–93. Usually the sample size was smaller, for instance, an online cross-sectional survey conducted by McCrabb *et al.* [12] used data obtained from 819 orthopaedic trauma patients.

In quantitative research, no theme was prevalent. The studies could be categorised into four groups:

(1) demographic factors affecting OHISB (gender, age, ethnicity aspects) (29%)
(2) physical and psychological determinants (e.g., users' health condition, type of illness and social engagement) of information seekers (28%)
(3) e-Health Literacy and OHISB (17%)
(4) impact of online information on health behaviour and patient-physician relationship (20%).

In many instances, a study covered various aspects. For instance, scholars identified associations between OHISB and eHealth Literacy (eHL) and various demographic factors, such as gender, age and ethnicity and other aspects. In addition, Tennant *et al.* [13] from the US explored the extent to which sociodemographic, social determinants, and electronic device use influence eHealth literacy and use of Web 2.0 for health information among baby boomers and older adults. Baumann and colleagues [6] focused on gender specific determinants, daily Internet use and socio-economic aspects among Germans. They revealed that age and degree of satisfaction with one's general practitioner were gender-specific determinants of access to OHISB. Daily Internet use and a strong interest in health topics were revealed to be more important predictors than socio-economic status. Cao [14] tested part of Wilson's second model of information behaviour, including source characteristics and activating mechanisms, and to identify the relationships among perceived access, perceived expertise credibility, reward assessment, Internet self-efficacy, and online health information-seeking behaviour in China.

Articles on the quantitative component were most often published in the *Journal of Medical Internet Research* (29%). Furthermore, the journals *International Journal of Medical Informatics*, *Health Education Journal*, *Computers in Human Behaviour,* and *Health Communication* published more than one article on OHISB.

The quantitative approach enabled development of a better understanding of trends in information behaviour and full grasp of the wider issues in question; however, this design does not allow an in-depth exploration of OHISB. Some quantitative studies explicitly emphasized the need to explore OHISB as well from a qualitative point of

view [11, 15]. The studies failed to produce compelling arguments, as the data presented was not illustrated with concrete examples. However, this approach enabled detection of certain trends, for instance, which factors affect information behaviour and which are the most popular searches.

The quantitative aspect declined over time, constituting the bulk of the analysed studies (81%) in 2008, but only 49% in 2017.

3.2 Qualitative Studies

The qualitative research comprised a quarter (25%) of analysed articles on OHISB. The main aim of this kind of research was to assess people's logic, beliefs, deep motives for using the Internet, values, skills and difficulties in finding relevant information, and to explore perceptions and experiences with OHISB.

Interviews (semi-structured or in-depth) were used in most qualitative studies (70%), whereas the think-aloud technique, deemed highly efficient in information behaviour research, was adopted in only three instances [16–18].

Scholars from various countries have conducted qualitative research on OHISB (USA, UK, Poland, Portugal, China). For example, Mendes and colleagues [19] from Portugal explored the health information-seeking practices of healthy young adults and how they assessed and ranked sources of information. Fifteen interviews were conducted and these included the collection of basic sociodemographic data. Fergie [20] from the UK studied young adults' experiences of seeking online information about diabetes and mental health in the age of social media. They conducted 40 semi-structured interviews with young adults, with experience of diabetes and other diseases.

In qualitative studies aspects affecting OHISB were assessed. For example, Wu and Li from China [3] explored the behavioural patterns of Chinese elderly people when searching for online health information, and revealed that education and familiarity with Internet searching were found to significantly affect task performance. Health, Internet search experience, and information credibility influenced the decision to seek information online. Primary challenges were lack of technical skills, Internet search skills, and medical knowledge.

This approach enabled study of OHISB in more detail and collection of useful information. One of the drawbacks of this method that could be established was the inability to make generalisations. As Mendes [19] noted: "…the limited size of the sample restricts the scope to generalize the findings of information-seeking practices more broadly, but it provided us with very interesting meta-themes to contribute to literature. Although our aim was not to make generalizable empirical claims, rather to understand the data qualitatively, data collected from larger samples might reveal additional insights on the topic; mostly, it allows comparisons taking into consideration socioeconomic and demographic variables." Thus no wonder that the use of the qualitative approach has expanded in time.

The qualitative research was published in *Health Communication, Qualitative Health Research, Library and Information Science Research*, and in some other journals.

3.3 Mixed Methods Design (MMD)

In the mixed method design and combined studies (9%) various methods were applied. This approach enabled researchers to explore the object in a multidimensional setting and to study the phenomenon in all its complexity. For instance, the research carried out by Morrison and colleagues [21] examined the specific effect on engagement of providing two different design features - tailoring and self-assessment. A qualitative study explored participants' engagement with each version of the intervention and a larger quantitative study systematically compared participants' use of the intervention and self-reported engagement using a partial factorial design.

Most often surveys and interviews were used. For example, the study conducted by Yi [4] aimed to examine users' self-perceived health information behaviour according to their health literacy ability. The study conducted self-administered surveys with 131 public library users and semi-structured intensive interviews with 20 users as a follow-up. Surveys found that most participants had proficient levels of health literacy, and there was an association between health literacy and some demographic characteristics such as gender and educational level. The majority assessed their health information behaviour as high. Interviewees identified critical barriers to seeking, evaluating, and using health information delivered by public libraries.

The Parks [23] made a semantic network analysis on breast cancer information. The study used online discussion forums whose participants were Korean Americans living in the USA. A mixed methodology of both content and semantic network analyses was used for data analysis.

Despite the fact that for instance Mueller and her colleagues were even critical towards their outcomes, to some extent stating that they had to be cautious in generalizing from their purposive interview sample to the wider population [24], scholars in general seemed to be satisfied with the mixed methods approach. As Mayoh [22] wrote: "Findings indicate that if the study had used a single research method in isolation, something would have been lost or misunderstood regarding the phenomenon…".

Articles using mixed design were published, for instance, in *Health Communication, Journal of Communication in Healthcare, British Journal of Health Psychology*, and *Journal of Applied Gerontology.*

3.4 Meta-Analysis, Overviews and Bibliometric Aspect

Meta-analysis and overviews comprised 10% of articles analysed. Their aim was to systematically review existing research on OHISB. For example, bibliometric analysis based on PubMed was conducted to investigate the publication trends of research on Internet health information seeking behaviour [25]. The study revealed ten research hot spots:

(1) behaviour of Internet health information seeking about HIV infection or sexually transmitted diseases
(2) Internet health information seeking behaviour of students
(3) behaviour of Internet health information seeking via mobile phone and its apps
(4) physicians' utilization of Internet medical resources
(5) utilization of social media by parents

(6) Internet health information seeking behaviour of patients with cancer (mainly breast cancer)
(7) trust in or satisfaction with Web-based health information by consumers
(8) interaction between Internet utilization and physician-patient communication or relationship
(9) preference and computer literacy of people using search engines or other Web-based systems
(10) attitude of people (especially adolescents) when seeking health information via the Internet.

van Genugten and colleagues [26] from the Netherlands were interested in which combinations of techniques and modes of delivery in Internet-based interventions effectively changed health behaviour. Their review included effect sizes from 52 online interventions targeting a variety of health behaviours. The research also developed a taxonomy for coding the usability of interventions. They found that factors related to usability of the interventions influenced their efficacy. Specifically, subgroup analyses indicated that more efficient interventions (those that take little time to understand and use) were more likely to be more effective than less efficient interventions. They found that the interventions that take little time to understand and use were more effective than those that required more time.

Chebli et al. from Australia conducted a systematic literature review of the effectiveness and treatment outcomes of Internet-based interventions for smoking cessation, problematic alcohol use, substance abuse and gambling [27]. All the sixteen studies analysed demonstrated positive treatment outcomes for their respective addictive behaviours. The review concluded that Internet-based interventions are effective in achieving positive behavioural change through reducing problematic behaviours.

This kind of research was very useful, because it enabled quick understanding of what has been done in this field in the past. 55% of articles in this field were published in *Journal of Medical Internet Research*.

3.5 Other Studies

The fifth group consisted of articles with research that did not correspond to any of the clusters mentioned above. For example, this study classified articles on source characteristics, goal orientation of individuals, and information seeking via mobile phones into this group, which represented an intermediate version of quantitative research and MMD.

For example Deng, Liu and Hinz studied health information seeking and usage behaviour intention of Chinese consumers through mobile phones. They used a two-step approach of structure equation modelling based on testing the measurement model and hypothesis model. The outcomes revealed that information quality, perceived value, and trust had positive effects on both the intention to seek and to use health information, and that the intention to seek affects the intention to use [28]. Zhan and his colleagues studied predictors of the authenticity of Internet health rumors. They found that there are measurable differences between true and false health rumours on the Internet. [29] Sadasivam and colleagues from the US were interested in what is the next frontier for computer-tailored health communication (CTHC) research [30]. Various methods enabled them to describe limitations of current CTHC systems and make future predictions in this field.

4 Summary

This study looked at the approaches and methods used in online health information behaviour by analysing the content of 70 articles in EBSCO databases of the past 10 years. On the basis of the analysis conducted, five larger groups of studies could be distinguished, of which, quantitative research accounted for the largest group (39%). Quantitative research was the most preferable approach when authors wanted to identify the main trends in OHISB and to explain the role of different socioeconomic and individual factors affecting people's information behaviour.

Qualitative methods were used in the quarter of studies analysed. This approach enabled provision of deeper insight into people's information practices, how they conduct their information searches and why they use certain search logic. It seems that nowadays, scientists tend to favour the qualitative aspect when studying health information behaviour considerably more than a decade ago. The most common method used in qualitative research was an interview. The think-aloud method, which is also an effective knowledge elicitation approach, was seldom employed.

Thus one cannot say that one approach is better than another in OHISB research area. This depends on the research focus, aims and research questions as to which methods to prefer. It is obvious that when trying to provide a big picture about the research object it is more relevant to use quantitative methods, and that the qualitative approach enables focus on concrete aspects in a more profound way.

Taking into consideration that OHISB is a dynamic and multifaceted concept including how people retrieve, assess and use health information, and bearing in mind that OHISB is related to different factors (societal and individual components of the information seeker as well culture and community norms), it is obvious that a multi-dimensional approach enables description of the object in its complexity. Researchers using MMD expressed explicitly their satisfaction with the selected methods while scholars exploiting a single method expressed some criticism with respect to their outcomes, and pointed out the need to explore the object further using some other methods. It seemed that mixed methods enabled study of OHISB in the most exhaustive way. Taking into account the advantages of the MMD, this researcher will follow this design as well in a study of patterns of OHISB among Estonians.

With this study, a bit of clarity has become apparent in the field, regarding which approaches and methods are used in studies of OHISB, and which ones enable exploration of it in its complexity.

A Appendix

The EBSCO Discovery of the Library of the Tartu University I conducted the search consists of the following databases: MEDLINE, Science Citation Index, Complementary Index, Academic Search Complete, Scopus@, ScienceDirect, Supplemental Index, British Library Document Supply Centre Inside Serials & Conference Proceedings, Health Source: Nursing/Academic Edition, Directory of Open Access

Journals, OpenAIRE, Dentistry & Oral Sciences Source, J-STAGE, SciELO, Social Sciences Citation Index, MasterFILE Premier, JSTOR Journals, PsycINFO, Health Source - Consumer Edition, SPORTDiscus, GreenFILE, Business Source Complete, BioOne Complete, Central & Eastern European Academic Source, IEEE Xplore Digital Library, Oxford Reference, ELibrary.RU, Digital Access to Scholarship at Harvard (DASH), Regional Business News, McGraw-Hill Medical, HeinOnline, PsycARTICLES, Communication & Mass Media Complete, ERIC, Arts & Humanities Citation Index, Oxford Scholarship Online, Library, Information Science & Technology Abstracts, eArticle, Cairn.info International Edition, Teacher Reference Center, Philosopher's Index, ProjectMUSE and MathSciNet via EBSCOhost.

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Finnish School Health Education Viewed Through an Information Literacy Lens

Noora Hirvonen[1(✉)], Tuula Nygård[2], Laura Palmgren-Neuvonen[2], Anna-Maija Huhta[1], and Maija-Leena Huotari[1]

[1] Information Studies,
University of Oulu and Medical Research Centre Oulu, Oulu, Finland
{noora.hirvonen, anna-maija.huhta,
maija-leena.huotari}@oulu.fi
[2] The Department of Educational Sciences, University of Oulu, Oulu, Finland
{tuula.nygard, laura.palmgren-neuvonen}@oulu.fi

Abstract. In Finland, health education is included as an independent subject in the core curriculum for basic education where it is suggested to promote students' health literacy. In this qualitative study, we examine Finnish health education in schools through an information literacy lens. The material comprises the most recent Finnish core curricula for basic education (2004, 2014) and health education textbooks (n = 4), which were analysed with content analysis guided by theoretical conceptions of information literacy. The concept of information literacy is not used in the core curricula, but there are closely related learning objectives especially in the most recent curriculum. Textbooks cover information evaluation topics but focus less on information access and use. The study contributes to understanding the potential of information literacy promotion in school-based health education. Yet, future studies should examine health education practices to reflect how the ideas presented in the documents are implemented in practice.

Keywords: Information literacy · Health education · Schools

1 Introduction

In Finland, health education is an independent subject in basic education and suggested to promote health literacy [1]. Health literacy includes competencies such as critical thinking and evaluation of knowledge sources [2], which in information studies are conceptualised as information literacy. These competencies are especially relevant in health contexts as health information is dynamic and found in a variety of sources [2]. In this study, we examine Finnish core curricula for basic education and health education textbooks through an information literacy lens. Although school-based health education is not built with this perspective in mind, we argue that this approach is valuable in this context. The study asks (1) how are information literacy competencies addressed in documents guiding health education in Finnish secondary education, and (2) what trends can be identified in the documents with regard to these competencies?

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1.1 Health Education in Finnish Basic Education

In Finland, health education became an independent school subject with specific learning objectives and evaluation criteria when it was included in the national core curriculum for basic education in 2004 [3]. The subject, called "health knowledge", is taught by a specialized teacher. In the most recent core curriculum from 2014, *health literacy* was taken as its learning objective [1, 2]. Health literacy, previously viewed as basic reading and numerical skills needed in healthcare settings, is now understood to cover capabilities such as critical thinking, problem-solving, information seeking, and communication [4]. A Finnish study analysing curricula, textbooks, and other documents and a Delphi questionnaire data, showed that besides a balanced diet, analysing one's own lifestyle, and the link between physical activity and health, the ability "to source credible information online" was viewed as a key learning outcome for health education [5]. The items that ranked high by the Delphi panel but were not represented in the literature included accessing and evaluating reliable online information, assessing nutrition health claims, and sourcing reliable information [5].

Teacher work in Finland is based on the contents and learning objectives of the core curriculum and most teachers use textbooks which they choose from the supply of several publishers. Textbook use has been criticized, with claims that textbooks imply individual literacy practices and lead to surface learning. Instead, authentic and interactional learning material has been suggested [6]. Yet, textbooks can help structure lessons and facilitate scheduling, and also provide a basis for productive classroom talk [6]. Finnish health education textbooks have been examined regarding their representation of specific topics such as addictive substances [7] and sexuality [8] and from the perspectives of knowledge construction [9] and pedagogical style [9, 10]. These studies indicate that the textbooks cover core curriculum themes, have a promotional rather than biomedical approach to health [9], and support constructivist ideas of learning [10, 11].

1.2 Information Literacy in the Context of Health Education

The highly cited definition by the American Library Association (ALA) views information literacy as a set of skills to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" [12]. The Association for College and Research Libraries (ACRL) [13], reflecting more recent ideas on information literacy, defines it as "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". The Library and Information Association CILIP's [14] novel definition views information literacy as "the ability to think critically and make balanced judgements about any information we find and use. It empowers us as citizens to reach and express informed views and to engage fully with society". Moreover, it outlines contexts in which information literacy applies, including everyday life, education, and health [14].

Also the concept of *health information literacy* is used when referring to information literacy in health settings. The Medical Library Association defines health information literacy as "the set of abilities needed 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 analyze, understand, and use the information to make good health decisions." [15, p. 294]. This definition is not far from the recent health literacy definitions, which view information seeking central to health literacy [4]. Yet, health information literacy emphasises the active role of individuals in discovering information from various sources [16] and draws from research in information studies.

Despite the differences among the definitions of information literacy, similar elements can be identified, and it has been claimed [17] that most definitions share key elements identified already in the 1989 definition by ALA [12] including information *access* (e.g., "ability to locate"; "reflective discovery"; "identify likely information sources"), *evaluation* (e.g., "ability to—evaluate"; "understanding of how information is produced and valued"; "think critically"), and *use* (e.g., "use effectively", "use of information in creating new knowledge"; "use the information to make good health decisions"[1]). This simplified categorisation is applied in this study.

2 Materials and Methods

The material includes texts of the most recent Finnish core curricula (2004, 2014) for grades 7–9 (Chap. 7.10 [3], 15.4.9 [1] Health Education, and 15.2 Transversal Competencies [1]) and of four health education textbooks. Vire published in 2008 (V08, 300 pages) and Syke, published in 2013 (S13, 399 pages) are based on the 2004 curriculum and their revised editions Vire, published in 2016 (V16, 284 pages) and Syke, published in 2017 (S17, 392 pages), on the 2014 curriculum. V08 and V16 are published by Otava Publishing Company, a major Finnish publishing house, and S13 and S17 by Edita Publishing, a Finnish publisher that also provides information and learning services. The texts were analysed with content analytic techniques in two phases. The first phase included a careful reading of the material and extraction of constellations of words (meaning units) that could be interpreted as relevant to information literacy. In the second phase, these meaning units were coded with a simplified analytical frame covering three information literacy elements: access, evaluation, and use.

[1] In essence, all *learning* can be understood as information use. This study focused on tangible uses and outcomes of information such as information creation and effects of information.

3 Findings

3.1 General Description of the Material

The 2004 core curriculum for basic education states that health education is based on a multidisciplinary foundation of knowledge and pursuits to promote students' competence in health, wellbeing, and safety. Health education is said to develop students' cognitive, social, emotional, functional, ethical, and emotion regulation capabilities. The starting point for instruction is an understanding of health as physical, psychological, and social capability (p. 196). Further, the curriculum describes the core contents of health education as ranging from growth and development, to health in choices in daily life, resources and coping skills, to health, society, and culture (p. 197).

In the 2014 curriculum, the text on health education has almost doubled (from approximately 800 to 1,500 words). It states that the goal of health education is to develop students' versatile *health literacy* including knowledge, skills, self-awareness, critical thinking, and ethical responsibility (p. 688). Objectives of instruction are divided into growth and development supporting health, factors supporting and harming health and prevention of illnesses, and health, communities, society, and culture (p. 689). Besides the independent subjects, so-called transversal competencies (T) are included: thinking and learning to learn (T1), cultural competence, interaction, and self-expression (T2), taking care of oneself and managing daily life (T3), multiliteracy (T4), ICT competence (T5), working life competence and entrepreneurship (T6), and participation, involvement, and building a sustainable future (T7).

The textbook editions (V08 and V16; S13 and S17) cover roughly similar contents, but also significant alterations have been made. For example, in V16 an entire chapter (pp. 18–23) is dedicated to *health online*. In S17, a chapter is included on the concept and influencers of health and subchapters (pp. 23–27) on the concept of health literacy (p. 23) and health on the media (pp. 252–258). Common to the textbooks is a combination of text types (main text, short fact texts, narratives, tables, figures, images, captions, summaries, tasks), citation of sources mostly in connection with statistics, and the inclusion of a table of contents, an index, and image sources, but not a reference list. In the following subchapter, curricula and textbook texts are examined in the categories of information access, evaluation, and use.

3.2 Information Access, Evaluation, and Use

Information Access. The 2004 core curriculum [3] states that health education develops important skills for "the acquisition of information" (p. 196). Students should learn to utilize relevant concepts and information acquisition methods (p. 197) and have knowledge of key health care services (p. 197) including those provided by the school and municipality (p. 198). The 2014 core curriculum reads that "health education shall support the pupils' individual and communal information acquisition and construction" (p. 688). Students should learn to use concepts (p. 688), seek health services (p. 695), and search for reliable information from different sources (p. 696). The transversal competencies T1, T3, T4, and T5 include notions on information access (Table 1).

Table 1. Information access in core curricula and textbook texts

Curricula	Textbooks	
2004: Developing skills for the acquisition of information; utilising concepts and information acquisition methods relevant to health and disease; gaining knowledge of key health care services, also those provided by the school and municipality **2014:** Supporting individual and communal information acquisition and construction; using concepts specific for the field of knowledge; ways to seek health services; acquiring information related to health and illness; searching reliable information related to health from different sources. T1 Seeking new information, looking for answers and listening to others' views; reflecting on personal inner knowledge; T3 Learning to find information on well-being, health, and safety; T4 Obtaining information in different modes, contexts, situations with various tools and different types of texts alone and together; T5 Seeking information diversely and using sources of information in versatile ways	**V08:** Students guided to recognize information sources; sources mentioned; tasks mainly based on textbook content **V16:** Notes various information sources; acknowledges information access as a right; tasks with information seeking including online and media sources	**S13:** Sources mentioned; tasks mainly based on textbook content **S17:** Notes that information seeking is part of health literacy and critical thinking; acknowledges that search engines are not neutral and that different keywords should be used; tasks with various information sources

V08 notes that there is a vast amount of information in various sources such as the Internet, magazines, television, radio, and the media and students should *recognize information sources* (p. 12). Possible sources are mentioned in connection with different topics, including health care services. Also, students are guided to use information in food packaging when making decisions. V16 notes that health information has come close to everyone and that it is ubiquitous. Besides the sources included in the previous edition, it notes novel public services such as electronic prescription, the medicine database, and electronic patient records (p. 269). Moreover, it acknowledges that the right to have information on sexuality is a part of young people's sexual rights (p. 153).

S13 mentions information sources, for example, by noting that in case there are concerns about one's health, these issues should be talked about with own parents, teachers, school nurse "or another adult you can trust" (p. 49). It advises that sometimes one should visit the doctor (p. 49, 87) and argues that the school nurse is the one who is primarily responsible for students' health (p. 86). S17 notes that health information can be obtained from various sources, including friends (p. 23), media, and social media (pp. 253–255). Moreover, it states that besides health knowledge, skills such as recognizing when to seek professional help are needed (p. 24). It describes information seeking skills as part of health literacy, critical thinking (p. 25), and media literacy (p. 254). It notes that search engines may direct one to commercial sources (p. 254) and students are instructed to seek information with different keywords (p. 275) (Table 1).

Information Evaluation. The 2004 core curriculum states that health education is to promote critical consideration of the values in health and wellbeing (p. 196). Moreover, it notes that students should learn to evaluate the meaning of environment, lifestyle, and culture and media from the perspectives of safety and health (p. 197) and should know how to critically evaluate various health information sources (p. 198). The 2014 core curriculum states that students' individual and communal information evaluation should be supported (p. 688), including evaluation of reliability (p. 696), and the connections of media, ICT, and health (p. 696). The transversal competencies T1, T3, T4, and T5 include notions on information evaluation (Table 2).

V08 notes the differences of measured and experienced health in scientific research (p. 10) and ways to measure mental, social, and physical health (pp. 18–19). It describes scientific knowledge as trustworthy, and school health education as providing a reliable basis to fostering health and to help in understanding the significance of students' own health behaviour. It notes that it is difficult to keep up to date when, for instance, health regimens change. An example is given of the treatment of back pain, as previously, rest was recommended whereas nowadays physical activity in encouraged. It states that nothing *prevents* one from using his or her own reasoning and checking the source of information, and that as a *consumer* one has the right to ask and receive responses to questions (p. 12). Moreover, it mentions trust of one's *own intuition* and *inner wisdom* (p. 16). It discusses the role and influence of media and marketing to smoking (p. 55), sexuality (p. 152), and diet (p. 207), and advertisements' and media's influence on purchasing decisions and beauty standards (pp. 207–209). V16 points out that the media serves people by providing information, but its content should be interpreted and used wisely. It notes that *media skills* helps in understanding media contents, acting safely and appropriately online, and helps in developing critical thinking and a healthy stance towards oneself and others (p. 19). Also, it considers source criticism (p. 19), challenges of online communication such online bullying (pp. 20–21), and the way health is portrayed and discussed in the media (p. 22). It states that a critical stance should be held when considering the contents of websites and instructs students to pay attention to sites' administrator, purpose, and the time of latest update. It notes that some of the material is produced for marketing purposes, can be highly biased, and can get hacked, and are then harnessed to present information different from the original purpose (p. 20). It further states that appropriate and professionally produced information is available, but there is also false information and

Table 2. Information evaluation in core curricula and textbook texts

Curricula	Textbooks	
2004: Promoting critical consideration of values linked with health and well-being; assessing the importance of the media; critically assessing various sources of health information **2014:** Individual and communal information evaluation; evaluating communication related to health and illness; the reliability and importance of communication; the reliability of health-related information based on multiple factors; T1 Learning to evaluate, opportunities to analyse a topic critically from different viewpoints; T3 Examining advertising critically; T4 Evaluating information in different modes, contexts, situations, and with various tools; T5 Practising source criticism, evaluating the way information is produced	**V08:** Acknowledges different ways to gain knowledge on health; notes that scientific information is credible, that information sources can be checked; learners guided to recognize the role of media and marketing in smoking, beauty and sexual ideals, and diet **V16:** Credibility evaluation criteria for online health information sources; media skills; source criticism; tasks on evaluating information	**S13:** Discusses contradictory information as linked with substance use; the role of marketing and sexual imagery in building beauty standards; notes thinking skills; acknowledges the difference between subjective and objective health; tasks on interpreting statistics **S17:** Learning to discern types of knowledge; to identify and critically evaluate health related trends; cues to evaluate credibility online; credible information sources named; tasks on distinguishing text types, evaluating health communication and information credibility

material that is based on people's own experiences. Credible information sources are listed: the school health nurse, a doctor, information gained from health education lessons, information produced by health care organizations, helplines, and professionals' Q&A columns (p. 22), and sites run by public sector and non-profit organizations (p. 20). It also addresses the influence of media and marketing in connection with tobacco products (p. 56), diet (p. 199) and overweight (pp. 194–196; 199), mental health (p. 128), and sexuality (p. 156) (Table 2).

S13 brings up the challenge of knowing who to believe in health issues in a chapter on substance use. It notes that there is a lot of information on substances in magazines, on the Internet, music, fashion, and sports and from friends and teachers, and there are groups who speak in favour of substance use (p. 97). It discusses the role of marketing in building beauty standards (p. 152) in relation to self-image as manipulated images can create pressure on appearance and increase dissatisfaction (p. 152). It notes that sexual imagery and topics abound in media, and one can encounter sex sites when

seeking information online (p. 197). In a section on the slimming business, it notes that there is a lot of hooey – marketing without a basis in reality (p. 269). Moreover, it states that reliance on authorities (others' opinions, for example) is a means for self-regulation (p. 159). S17 states that the ability to seek and use credible information requires independent critical thinking and media skills. With the help of these, one can learn to discern scientific knowledge, opinions, and advertisement from each other and to identify and critically evaluate health related trends (p. 25). It discusses the differences between experienced and measured health (pp. 13–14), and notes that when seeking information on health and illnesses, it is important to know how to evaluate the credibility of information sources (p. 25). Moreover, it dedicates an entire chapter to health in the media (pp. 252–258) where different health information sources and their critical evaluation are discussed in more detail. It notes, for example, that blog posts are based on opinions and can include commercial motives. When evaluating a text, students are instructed to ask, for example, what the information is based on, which sources are used, who is behind the text, and what agendas it might have. Further, each main chapter involves a skill that is to be practiced including, for example, evaluation of health communication (p. 251) and the credibility of information (p. 275) (Table 2).

Information Use. The 2004 core curriculum states that health education develops important skills for application of information (p. 196) and by through the use of concepts and information acquisition methods relevant to health and disease, promotes health (p. 197). Moreover, various sources of health information should be used (p. 198). The 2014 core curriculum emphasises support for students' individual and communal information construction and use, application of knowledge and skills related to health, safety, and illness, and means of involvement in learning environments and local communities (pp. 696–697) The transversal competencies T1, T4, and T5 include notions on information use (Table 3).

V08 describes knowledge as a key element of health promotion (p. 12) and as a tool for decision-making (p. 16). It further describes health education as aiming to inspire students to know more, to present relevant questions and their own thinking about health, utilise the information obtained, in order to ease health related decision-making. It encourages students to discuss health topics at home so that others can benefit from the health knowledge obtained in school (p. 15). It discusses health as a societal issue including the ways societal actions, services, and communication influence health and the role of one's power to influence others' thoughts and behaviour (pp. 15–16). New to V16 is that it touches on copyright issues (p. 19) in terms of Internet content and notes that one cannot copy text or images from online sources without permission and that source information should be mentioned if used (p. 20). Moreover, it notes the risks connected with Internet use as the content created for the Internet stays there indefinitely, spreads widely, and can be used for many purposes, also illegally (p. 21). Further, it recognises that the users of media are also producers, and *media skills* help create media contents independently and act safely and appropriately online (p. 19).

Table 3. Information use in core curricula and textbooks texts.

Curricula	Textbooks	
2004: Important skills for application of information; pupils will utilize concepts and information acquisition methods relevant to health and disease, and benefit from them in promoting health; using various sources of health information **2014:** Individual and communal information use; using information related to health and illness; using the sources mainly in an appropriate manner; supporting pupil's ability to find responsible solutions; applying knowledge and skills related to health, safety, and illness; supporting means of involvement in his or her learning environment and local communities; T1 Editing, producing, sharing information; using new information as a basis for reviewing thinking; formulating ideas and views; using information independently and with others e.g., for problem-solving; T4 Combining, modifying, producing, presenting information in different modes, contexts, situations with various tools; producing texts alone and together; T5 Producing information diversely, using ICT in information management; in exploratory and creative work; in communication and networking	**V08:** Notes that health knowledge helps make good decisions; a pupil can influence the thoughts and behavior of others both locally and globally; own thoughts can be shared trough various channels **V16:** Discusses netiquette, including copyright issues; tasks on netiquette, on creating texts and thinking about how to act in a situation	**S13:** Notes that health education increases knowledge and skills to promote one's health; notes communication skills and abilities to express and interpret emotions; tasks on creating different types of texts **S17:** Notes that critical thinking and media skills are needed in using health information; discusses sharing information online; tasks on thinking about how to act in a situation

S13 notes that the correct information on *substances* and their influences builds a sound basis for one's own judgments (p. 96). Without a detailed discussion it stresses the skills of communication (p. 139) and thinking (p. 147), and abilities to express and interpret emotions (p. 155) in terms of health. S17 describes knowledge as the basis for health promotion and takes up-to-date, credible information as a precondition for healthy choices and to help understand and accept own development (p. 23). It argues, that critical thinking (p. 25) and media literacy (p. 253) are needed in using health information. Moreover, it discusses sharing information online and notes associated risks (p. 255).

4 Discussion and Conclusions

The study indicates that information access, evaluation, and use are recognized in the Finnish basic education core curricula for health education and overlap with the transversal competencies of the 2014 curriculum. The notion of information literacy is not explicit in the curricula or the textbooks, but closely related learning objectives and contents can be identified. Already in the 2004 core curriculum, seeking and critical evaluation of information were addressed as skills to be included in health education. In the 2014 core curriculum, both individual and collaborative information seeking, construction, evaluation, and use are acknowledged as health education objectives in addition to the transversal competency areas such as 'multiliteracy' and 'thinking and learning to learn'. The textbooks vary in the way information literacy themes are acknowledged. Yet, some general trends can be identified. Information evaluation is more dominant than access or use, and the textbooks tend to include issues that could be characterised as relevant to media literacy rather than information literacy [see 19]. However, information literacy themes are clearly more prevalent in the recent editions.

In the textbooks, information evaluation is addressed especially in relation to media and marketing, and in the editions of 2016 and 2017, to online environments. This is in agreement with findings indicating that obtaining credible information *online* is viewed as a key learning outcome for health education [5]. In the more recent textbook editions, the existence of different types of health knowledge is brought up and noted that it is important to distinguish these (scientific knowledge, opinions, advertisements; measured and experienced health) from each other. This is in line with notions on information literacy in which understanding the way information is produced and valued is seen as its key element [12]. In the ACRL framework, it is noted that different authority types should be recognised and indicators of authority used to determine the credibility of sources [12].

Information access is addressed mainly by discussing the wide availability of information, mentioning appropriate information sources, and including tasks where students are guided to seek information. The more recent editions stress the importance of information seeking skills and include tasks with intertextual information seeking [18]. Previous studies show that teachers have difficulty in supporting students in information seeking [19]. Thus, besides information evaluation, attention should be paid to supporting the development of information seeking competencies and extending a critical perspective to accessing information [see 18]. Demonstrating the

diversity in the conceptions of using information [20], information use in this study covered topics ranging from using information to create different types of texts and taking into account ethical and legal issues in doing so, in order to use information in decision-making and exert control on others locally and globally. A more detailed analysis of information use is beyond the scope of this article but warrants subsequent research.

Besides domain knowledge on health, health education can foster learners' information literacy. Practitioners may find the notion of media and information literacy useful in planning school-based health education as it combines the elements of media literacy and information literacy. UNESCO [21] provides pedagogical methods, curricula, and resources for teachers to integrate media and information literacy into their pedagogical practices. In educating students to become media and information literate, teachers can respond to "their role as advocates of an informed and rational citizenry", and "to changes in their role as educators, as teaching moves away from being teacher-centred to becoming more learner-centred" [21]. This resonates well with the current Finnish core curriculum. An examination of health education materials meant for teachers and other health education textbooks available for Finnish secondary education were beyond the scope of this study. Future studies should fill in this gap. Moreover, health education practices should be examined to reflect how the ideas presented in the documents are implemented in practice. Nevertheless, the study contributes to understanding the potential of information literacy promotion in school-based health education.

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Understanding Health Literacy Through the Lens of Phronesis: The Case of Coronary Artery Disease Patients

Venkata Ratnadeep Suri[1(✉)], Shaheen Majid[2], Schubert Foo[2], Hannah Trinity Dumaual-Sibal[3], and Yun-Ke Chang[4]

[1] Indraprastha Institute of Information Technology Delhi, New Delhi, India
ratan.suri@iiitd.ac.in
[2] Nanyang Technological University, Singapore, Singapore
{asmajid,sfoo}@ntu.edu.sg
[3] Ngee Ann Polytechnic, Singapore, Singapore
hannah_trinity_javier_dumaual@np.edu.sg
[4] Higher Colleges of Technology, Abu Dhabi, United Arab Emirates
ychang@hct.ac.ae

Abstract. In research as well as in clinical settings, health literacy is often measured using self-rated psychometric instruments. Research has, however, shown that although patients perform poorly on health literacy measures, over time, they tend to develop skills and strategies to empower themselves to manage their chronic disease conditions. In this study using focus group interviews as a methodology, and information landscapes and phronesis as conceptual building blocks, we tried to understand how patients acquire, evaluate, and use health information to deal with their chronic disease conditions. Phronesis refers to practical knowledge and wisdom that people develop through experience and is enacted by patients to make health-related decisions and engage in healthy behaviors. Results show that patients enact a number of strategies that reflect phronesis when managing their chronic conditions. Findings from this study are discussed to evaluate phronesis as an important concept for understanding successful chronic disease self-management. Implications for theory and practice are also discussed.

Keywords: Health literacy · Phronesis · Coronary artery disease · Chronic conditions · Critical health literacy

1 Introduction

Health literacy is defined as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" [1, p. 263]. The predominant approach to measuring health literacy and health outcomes assume an epistemic objectivity; In other words, that health literacy skills are quantifiable and measurable [2]. This epistemic objectivity allows scholars to quantitatively measure health literacy skills and create intervention strategies for improving health literacy in low literate populations. Health

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literate citizens on the other hand are expected to critically appraise health information and exhibit skills that are equivalent to competence in evidence-based medicine [3]. Current discussions on health literacy also hold that its purpose is to enable patients to use their knowledge to play an active role in managing their health and in making independent health decisions [4]. This view has expanded the concept of health literacy by including essential dimensions of medical knowledge and a number of skills that people need in order to find, evaluate, and apply health information to address their health issues [1, 5, 6]. There are two important challenges associated with this conceptualization of health literacy. First is understanding what some of these skills actually entail [7]. Second, and the more serious concern is, in the light of skills that empower a person to take independent health decisions, it is no longer clear how the competences that patients need to acquire differ from those of physicians [2]. The research on health literature does not address this issue. However, attempting to clarify this distinction between health literacy and professional expertise leads to a paradox. On one hand, if patients' knowledge and skills (literacy) are not commensurate with those of the doctor, then the notion of attaining skills that health literacy espouses, leads to the patient being a pale shadow of the physician. In such a situation, health literacy may empower patients and make them more independent, but it would result in a dangerous precedent. It might lead to a situation wherein the patients may overestimate their real competencies and may make health choices inspired by insufficient expertise. On the other hand, hypothetically, if a patient's knowledge and skills are close to those of a doctor, then health literacy is tantamount to making the patient into a health professional. However, this goal is unrealistic and cannot be achieved [2]. In this paper, we argue that health literacy must be re-conceptualised in a manner such that it avoids this paradox but, at the same time, also holds value as an important skill set that helps individuals to manage their health. To do this, we draw on research in the area of information literacy landscapes to suggest that health literacy should neither be defined by its objective and skills-based characteristics, nor as a series of de-contextualized skills. Instead, health literacy must be defined and explored from the patients' perspective. We must understand how patients engage with health information and make health-related decisions, and re-ground the concept of health literacy in individuals' experiences [8].

In this study, we use phronesis as a conceptual lens. Phronesis is defined as the practical wisdom that is often developed through experience and is then enacted by patients [9, p. 2]. In this manner, phronesis can shed light on the capacities of patients to make health-related decisions and engage in healthy behaviours. This concept must be differentiated from scientific knowledge or epistime and must be viewed as less systematic and procedural than the habitual performance of professional practice or techne [12, 13]. As such, phronesis entails experiential knowledge gained through practice and is tied to activities and reasoning skills that allow individuals to cultivate good and healthy lives. Accordingly, phronesis involves not only deliberative skills including self-reflection, communication with others, and situated performance [15,16], but also the "embodiment" and enactment of habits that support the creation of a healthy life [17]. In the current research work, we explore how patients enact various strategies for evaluating and using health information by drawing upon their experiences from their "patient journey," that empower them to manage their chronic conditions.

2 Method

2.1 Sampling Method

The current study was conducted in Singapore. Participants for this study were patients with coronary artery disease. We chose this population because they were expected to play an active role in managing their health and therefore were more likely to engage with health information [10]. A purposive sampling method was used to recruit participants from a pool of patients who received support from a health non-profit organization. Using the database maintained by the non-profit organization, patients were contacted by phone or email with the help of the organization's staff members. Consenting participants were given detailed information about the goals and objectives of the study. Participation was voluntary and written consent was obtained from the subjects. To obtain the broadest possible range of opinions and insights, participants were recruited to ensure diversity in age, race, and gender. Data was collected using focus group discussions. In total, 6 focus group discussions were conducted in English and Mandarin, and dated between May 2017 to July 2017. The demographic data of the participants is as follows: Patients (n = 19), age range 41–50 years = 3 (15.7%), 51-60 years = 5 (26.3%), >60 years = 11 (57.8%); Male = 14 (73.6%), Female = 5 (26.3%). Caregivers (n = 17) age range 41-50 = 3 (17.6%), age range-51–60 = 2 (11.7%), and age range >60 = 12 (70.5%), Male = 14 (73.6%), Female = 5 (26.3%). Therefore in total, (N = 36) participants took part in this study. We chose to include caregivers in the study because many senior patients often depended on their caregivers (children, life partners) to manage their health and hence, they played an important role in the disease management process. The study was reviewed and approved by IRB of Nanyang Technological University, Singapore IRB:2015-03-042.

2.2 Data Collection and Data Analysis

Data was collected using the method of focus group discussions, which were found to be effective and useful in health behavior research [18]. A semi-structured interview protocol was used to guide the focus group interviews. Discussion topics broadly focused on obtaining patients's perspectives on their experiences with their chronic condition, information needs, information environments, challenges they encountered when trying to find and use health information, and their strategies for obtaining, evaluating and using information. Emphasis was placed on generating rich interactions among participants [19]. The group size was limited to 5–6 members per session to facilitate a productive discussion [20]. Participants were encouraged to articulate their experiences in their own terms and were encouraged to give specific real-life examples. In addition to the above, other strategies such as neutral agreement, asking for additional information, summarizing, and paraphrasing were also used to encourage discussion among participants and to seek clarification on specific issues [21]. The focus group discussions were transcribed and analysed using qualitative methodology, which involved critical reading and the examination of the texts for conformity and variation of emerging themes [22]. The primary code reflects the conception of phronesis and comprised two essential elements: (a) the participants demonstrated an experiential

insight about a health or a related issue, and (b) enacted concrete steps to address the issue. İt is important to note that the coders were not so much looking to see whether or not there was an instance of action by the patient which was then coded as phronesis. Instead, we attach our concept of phronesis to insights that participants express in terms of episodes that resulted in the gain of experiential knowledge and the steps that they took as a result of this knowledge [3], or if they displayed an instance of active involvement in his or her own healthcare (activated patient) [23].

3 Results

The results from our analysis are presented below and discussed in the context to "patients' journeys" [24]. There was strong consistency between the distinct themes identified by the three authors. In addition, four participants, who followed up to verify results, all conveyed their agreement with the themes identified.

3.1 Identifying and Understanding Their Health Condition, and Knowing How to Respond to Different Health Situations

Discussants highlighted how people are often reactive in healthcare in that, if nothing was perceived to be wrong, people often paid every little attention to their health, or take proactive steps that would, in theory, keep them healthy and or allow them to detect the onset of chronic conditions such as coronary artery disease, at an early stage. It is only when patients face a trigger event or a health crisis that they start focusing on their own health. Drawing from their experiences, patients underscored the importance of monitoring their own health in order to detect any early warnings, along with how understanding the appropriate response to these situations and managing their health becomes a critical skill set as they progress through with the chronic condition.

> "My husband was healthy all along. He never had any problems […] So it was a shock actually when he had a heart problem because he was a national runner and he was always very slim. Skinny rather, underweight. And he has no cholesterol problem. It is below 200. I think when he had the diagnosis of the problem, his cholesterol level was only about 160. No high blood pressure. […] and so it was a total shock. But after this incident we realised the importance of being cautious. With age it is important for us to pay closer attention to our health, symptoms. Look out for indicators. Watch what we eat. Today we do all this together. We as a family are constantly researching, and managing our diet."

The response highlighted an important challenge—when an individual suddenly begins to deal with a chronic problem that is inherently corporeal in nature, it results in uncertainty and confusion, and triggers the patients into action. Once patients come face-to-face with potential problems, they begin to navigate through the landscape of health and in the, process must develop specific "ways of knowing" and learning how to deal with their health condition [25].

3.2 Ability to Identify Biases in Health Information, Evaluating Health Information Objectively to Establish Its Relevance to Their Own Health Context

An important part of chronic disease management is education, for which navigating through the health information landscape is critical. As chronic disease patients encounter the information landscape, they face several challenges. One cardiac patient clearly outlined the problem shared by several other patients:

> "There is a lot of information out there. There are a lot of information sources out there. However this information is often broad and very general. What is an important challenge is to find the information that is right for us, that is relevant and that can actually be used."

A second important challenge highlighted by patients is the inherent subjective biases that they hold, which in turn can impede their ability to objectively analyze health information or impede their ability to make right choices. This can have an adverse impact on their health. One relatively young male cardiac patient highlighted the issue by sharing an anecdote from his own life:

> "I regularly went to the gym and always ate […] high protein diet. I always believed that high protein diets meant I wont have any problems with fat and cholesterol and that I would not be effected by these problems. However, when I went for my medical check up, it came as quite a shock to me that I am at risk for coronary artery disease and that high protein diets in fact are going to increase my risk. After this I began to do some research on Google and found information that made me realize that there is a link between high protein diets and heart disease. So, it is important for us to do research and gather evidence before we make these decision. Now I make sure I do good research, or talk to the doctor or the nurse before I take any decisions about my health."

Here, the experience of this young cardiac patient underscored the importance of balancing patients' own knowledge with engaging with doctors and medical professionals, as well as with objective and evidence-based medical knowledge as they negotiate the health information landscape. This respondent also noted a connection between experiential knowledge and enactment of new ways of learning, evaluating and verifying information with health professionals, which is an important element in our conceptualisation of phorensis. While seeking help from doctors and other professionals is the most common way in which many respondents often verified health information, some patients also observed their own corporeal responses to make important health-related decisions, as described by the following female patient:

> "I have a heart problem and diabetes problem. Then sometimes we find that things which are good for diabetes is not good for the heart. And if things are good for the heart, it is not good for diabetes and my kidneys. […] So what we are doing now is that we take the medicine say for the heart […] we will look at the figures (test results). When the figures are good, everything is okay. Since the heart is good, we concentrate on cutting down on the sugar. So, by looking at the test results for both the heart and the kidneys, we make decisions about what dosages of medicines I should take so that I can deal with both the problems effectively."

This respondent's example clearly outlined a strategy wherein the person depended on her "corporeal experiential knowledge" to make decisions about whether a particular drug was right for her, and she developed her own drug regimen based on these embodied experiences. In other instances, patients also discussed how they used their

social networks that spanned fellow patients to seek out information from them about their own experiences, in order to make relevant decisions related to their health. A male cardiac patient described this strategy:

> "The best way to find out if some medicine or treatment works is to find out from those who have used it or have taken the treatment. When I had a heart stroke, my wife contacted other patients we know from the Singapore Heart Center. They came up, spoke to us, and told us not to worry. You know they have gone through the same kind of treatment, the same medication they take and things like that. So, their experiences […] helped us to choose particular medicines and treatments."

These participants' responses clearly indicate that their own embodied experiences and that of the other fellow patients are very important sources of experiential knowledge that contributed to the understanding of their chronic conditions.

3.3 Ability to Identify Gaps in Health Knowledge and the Ability to Fill These Gaps

Chronic patients often suffer from several co-morbidities that interact in complex ways to influence their health. They have to choose specific drugs or treatments that do not interact in complicated ways to adversely impact their health. However, often patients operate with only disparate bits of information, and information gaps in their decision making process, which may, infact, increase their risk. One female cardiac patient highlighted this challenge:

> "I was taking a blood thinner-warfarin and also taking some TMC supplements that contained Ginseng. Someone told me that Ginseng can actually cause my blood to clot and cause blockages. This information was never revealed to me, and even my doctor did not tell me. Someone who read it on the Internet told me. So, it is important to gather all the information and connect the dots so that it can reveal some important facts. Today I systematically collect information all my problems and then carefully analyze it. I also take all this information to the doctor and discuss it with him before I take any medicine or treatment."

The above example clearly highlights an important challenge faced by many chronically ill patients when they navigate through the health information landscape. It also brings to bear an important fact that access to the right kind of information may not simply be enough, but what is also required is the ability to fill in the gaps in the existing knowledge so that it helps patients to connect to disparate bits of information, in order to get the complete picture that would help them to make a more informed decision. The fact that the participant enacts strategies for verifying health information for filling in the gaps so that it enables her to make a more informed decision based on her experience with dealing with apparently unconnected bits of information in an earlier instance, demonstrates an instance of phronesis.

3.4 Ability to Understand Limits of Individual Competence, and Knowing How to Address These Limitations

In chronic disease populations, patients assume an important role in managing their own health. This requires them to develop in-depth knowledge about their disease and co-morbidities, and manage a complex regimen of dietary restrictions, medications, and

other aspects. In this context, one common factor that many patients outlined was the complex demands of disease self-management, and the fact that their own limited knowledge and competencies often hindered their ability to manage their health. To overcome these challenges, patients use different strategies. For instance, one common challenge that patients discussed here was gathering and managing health information. Patients revealed that they collected information from different sources and developed different strategies for validating this information. In this manner, patients constructed a bricolage of information and developed strategic ways of verifying and using this information to address their health issues. A male coronary artery disease patient described his strategy of managing information:

> "I can get a lot of information but I am not sure how to judge what is accurate and what is useful for me. I maintain a notebook in which I constantly make notes about information I hear on TV programs or read in newspapers and Websites. I also collect health-related articles from magazines, and newspapers. When I go to my appointment, I discuss this information either with the nurse or with my doctor. It helps me to verify the information I find and use only that information which my doctor or my nurse recommends for me. Sometimes I also post specific questions in Facebook health forums where people who also heart problem like me, to get their opinion. People share their experiences with me, which is very useful for me."

This participant's response indicates that the person is functionally health literate, yet he is also aware of his limitations in terms of his inability to judge the accuracy and relevancy of the information that he is able to collect, read, and comprehend. However, he is also able to overcome this limitation by adopting specific strategies that allow him to meet his health goals. While the above example was highlighting the challenges associated with limited expertise, sometimes, psychological factors may also affect patients' ability to deal with their health. An elderly cardiac patient described his own dilemma in the following way:

> "I know I have to exercise regularly, but somehow, I often fall behind. So, I decided to fix appointment with other fellow heart patients, and so we come to Singapore Heart Center to exercise together. In that way I make an appointment and I keep it. So, I am able to exercise more regularly."

In this response, we find that the patient is clearly aware of what he needs to do in order to maintain his health. However, he is also aware of his psychological impediment that prevents him from adopting a healthy behavior. The patient is also able to overcome this challenge by adopting a strategy that helps him to accomplish his goal successfully, which shows an instance of phorensis.

4 Discussion and Conclusion

The current approaches of conceptualizing, defining, and operationalizing health literacy assumes an epistemic objectivity. However, in recent years, there has been considerable debate about how the concept is measured and what skills people actually enact when they interact with and use health information. In this study, we used two distinct concepts - information landscapes and phronesis–to understand health literacy from the patients' perspective. These concepts helped us to foreground the importance

of contextual factors and their role in shaping peoples' engagement with and the use of health information. The perspectives shared by our participants demonstrate that patients' ability to research their health goals depended on two important factors. First was recognizing the importance of their health goals, recognizing the challenges and barriers that impede one's ability to reach their goals through introspection and self reflection, and thereby, finding a way to overcome these barriers and impediments by coming up with effective strategies. Though these skills are not easy to measure or quantify, they play an important role in managing one's health. This also points to the importance of recognizing the limitations of the current conceptualizations of health literacy and the importance of eschewing the narrow skills-based definition of health literacy or considering health literacy as a set of decontextualized skills: It also point to developing a broader theoretical and operational definition of health literacy. A second important factor that is often linked to health literacy is the concept of empowerment.

Results from our study suggest that the concept of empowerment does not imply that a patient has to operate independently and take autonomous decisions and eschew medical authority and professional help. Instead, some of the anecdotal examples clearly show that patients engage in self-reflection, and equip themselves with basic knowledge and information in order to interact with health professionals and the healthcare system productively. In this way, empowerment is manifested in the patients' ability to recognize what steps one must take to and actually take these steps to reach their health goals. This study makes two important contributions to the literature on health literacy. In terms of theory, this study presents an alternative way of conceptualizing health literacy–predominantly from the patients' perspective, and also foregrounds the importance of context and its role in shaping their health literacy skills. Our findings suggest that health literacy skills must be conceptualized more broadly to include different strategies through which patients identify their health goals and find strategies to fulfill these goals. From a practice point of view, our study helped us to identify several skills that cannot be easily quantified and measured using regular psychometric instruments. Yet, their inclusion in both, theoretically conceptualizing health literacy as well as in health literacy interventions, is of paramount importance. This, we believe, can enhance patients' ability to more effectively manage their health. One important limitation of this study is that it was conducted in a first world country i.e. Singapore, where some unique conditions exist. Health information in Singapore is mostly streamlined and screened before public dissemination and therefore people rely on government–endorsed health information that is made available through online government websites, online promotional videos, mass media channels, and literature distributed by hospitals and non-profit organizations [26]. This, combined with high literacy rates and an efficient healthcare system, likely influences how people engage with health information, navigate the healthcare system, and address their health issues [27]. Therefore, the results from our study may not be broadly generalizable.

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Young People's Digital Safety and Wellbeing: Findings from Philippines and Qatar

Virgilio G. Medina Jr.[1(✉)] and Ross J. Todd[2]

[1] Qatar National Library,
Information Services Librarian – Children and Young Adults, Al Rayyan, Qatar
vmedina@qnl.qa
[2] Department of Library and Information Science,
School of Communication and Information, Rutgers University,
New Brunswick, NJ, USA
rtodd@rutgers.edu

Abstract. This study emphasizes the critical role of libraries as catalysts in fostering digital literacy and digital well-being among young people participating in the collaborative digital and information landscape. Approximate 350 high school students from Philippines and Qatar participated in this study via a library instruction activity and were asked to record their ideas through a collective mind map and present it to the class. With the support of evidence-based action plan, the researchers used this as a guideline to facilitate digital literacy instruction to educate participants developing their digital safety skills by emphasizing various risks within the digital environment. The findings highlight some specificity of technical terms that students use in engaging and participating in an online world and raise concerns about young people's digital safety and digital well-being and the impact of this on their personal, academic, and social roles and identities.

Keywords: Digital literacy · Digital safety · Internet safety · School libraries · Library instruction

1 Introduction

In an educational context, the emergence of the World Wide Web in the early 1990 s has undeniably brought advantages in the development of learning experiences from learning centers, research infrastructure, digital environment, and information access to a pedagogical approach, which seems to become beneficial in fostering the educational enrichment for personal, emotional, and social well-being. In December 2017, Internet World Stats published data showing the exponential growth in global usage. There are roughly four billion Internet users worldwide, with Asia being the continent with the highest number of Internet users at 49%, followed by Europe with 17%. Australia had the lowest number of users, with only nearly 1% out of the total number of worldwide Internet use [1]. Looking towards the future, the unceasing growth of Internet use in the digital era continues to provide opportunities for young learners to adapt, engage, utilize, and integrate digital technologies as part of their everyday lifestyle in the twenty-first century environment.

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Yet widespread pitfalls come with Internet use. Several studies have identified Internet addiction as a common problem among adolescents [2–5]. Several factors were associated with Internet addiction, including:

- mental preoccupation with the Internet
- a need to increase online time on the Internet in order for the individual to be satisfied
- failing to attempt to decrease Internet use time or to leave Internet use
- experiencing deprivation when Internet use is decreased
- being online longer than the initial stage
- experiencing problems with school
- lying about Internet use to family, therapist or others
- using the Internet to avoid problems or to remove negative emotions (Young as cited in [2, p. 64]).

Lee articulates the impact of Internet use in the context of four hypotheses:

- displacement hypothesis, which pertains to the Internet limiting the time spent with families and friends
- increase hypothesis, which explains that Internet improves social interaction
- rich-get-richer hypothesis, which believes that those experienced digital users have a higher advantage by using the Internet
- social compensation hypothesis, which states that Internet supports those people who are "socially anxious and isolated" [6].

These studies support the idea that the Internet continues to create unprecedented impacts in all aspects of human growth as people engage in a digital networked society.

This study aims to present findings from secondary schools of two countries, Philippines and Qatar, and pertains to young people's perception of digital safety and aspects of unsafe websites. The study also seeks to compare technically specific terms and knowledge of students from both countries, particularly how the students present and classify terms based on their own knowledge, insights, and ideas during a brainstorming discussion.

2 Literature Review

2.1 Digital Safety

Whether to ban or to limit the Internet use among young people is a challenge that needs to be addressed [7]. In a collaborative research project of the Berkman Center for Internet and Society at Harvard University and UNICEF, digital safety was broadly defined as a "diverse set of issues that are directly or indirectly related to physical and psychological well-being of children who use digital media, focusing not on a particular access technology, such as an Internet connection, mobile phone, or some other means but on the broader characteristics of digital media" [8, p. 6].

This collaborative project sought to explore various online safety risks to children in developing countries and to identify gaps, opportunities, and resources that could be utilized for possible digital agendas and initiatives for children's personal, educational, and social development. The objectives of this research were to heighten the awareness of digital safety and its role, to determine a big picture of existing issues, which are addressed by insights that are research-based centered, and to establish a research framework through consistent research collaboration and education communication between developing and developed countries. The project concluded that digital safety continues to be a key issue that needs to be addressed in today's information world.

Hobbs, a distinguished professor of Communication Studies at the Harrington School of Communication and Media at the University of Rhode Island and Founder and Director of the Media Education Lab, pioneered the release of the "Digital and Media Literacy: A Plan of Action" [9]. In this report, Hobbs recognized the role of Internet use as an integrated dimension to facilitate pedagogical agendas in educational institutions where digital and media literacy are considered. Hobbs defines digital and media literacy as a "full range of cognitive, emotional and social competencies that includes the use of texts, tool and technologies; the skills of critical thinking and analysis; the practice of message composition and creativity; the ability to engage in reflection and ethical thinking, as well as active participation through teamwork and collaboration" [9, p. 17].

Within these competencies, Hobbs believes that challenges, risks, and threats of digital and media technology should be addressed through a curricular-based instructional intervention coupled with strategic actions. Hobbs specifically identifies these risks, as introduced by European Union Kids Online [10], when dealing with the use of digital and media technologies. Content risks include exposure to potentially harmful content, including violent, sexual, sexist, racist or hate material. Contact risks include practices where people engage in harassment, cyber bullying and cyber stalking, talk with strangers, or violate privacy. Conduct risks include lying or intentionally misinforming people, giving out personal information, illegal downloading, gambling, hacking and more [10].

A 2016 cybercrime report initiated by Hackepocalypse, an international firm that documents and reports cybercrimes, reveals a wide range of cybercrimes and cyberattacks continue to increase at an unexpected rate. These crimes include system attacks, such as computer viruses, worms and Trojan horses, hacking and denial of service attacks that shut down or misuse websites or computer networks, and electronic vandalism, such as defacing a website, or sabotage. Cybertheft, where computer access is used to steal money or other things of value from individuals and organizations, is another issue addressed by Hackepocalypse. Forms of cybertheft include embezzlement, ATM and consumer fraud, theft of intellectual property, theft of personal or financial data, file sharing and piracy, counterfeiting, and forgery. The report also covers cybersecurity incidents, such as spyware, adware, hacking, phishing and other Internet scams, spoofing, pinging, port scanning, using fake emails to get information from Internet users, and theft of other information, regardless of whether the breach was successful. Cybercrime also includes user-targeted attacks, such as misusing personal information or identity theft, invasion of privacy, harassment and cyberbullying, distributing child pornography or tracking and luring minors, spreading hate

speech and inciting terrorism, and grooming, which is defined as making sexual advances to minors [11].

Pornographic websites are another concern for youths online. In an annual report released by Covenant Eyes [12], 32% of teens attempted visiting pornographic online sites; of these, 43% reported doing so at least once a week. According to a study by Mitchell, Wolak and Finkelhor, pop-up ad links could make youth more vulnerable to various inappropriate sites [13]. Teenshealth, which operates under the Kidshealth family of websites, is a non-profit organization that promotes online safety among teens and has become active in publishing various parental guidelines and online tips on how teenagers could be safe online. One of its research guidelines encouraged teens to access ".edu" websites, which are considered to be reliable and safe for use [14].

In addition, music piracy became a phenomenon when sharing technology started to develop [15]. In a survey conducted by the Barna Research Group, it was concluded that illegal downloading of music is very common among teenagers. Therefore, there is high probability for teenagers to have encountered a virus through their online file-sharing activities.

One of the findings of Lenhart's study was that "more than half (56%) of teens—defined in this report as those ages 13 to 17—go online several times a day, and 12% report once-a-day use" [16]. In the Philippines, Grace Cruz mentioned that "six out of 10 young people aged 15 to 24 years old are regular Internet users and more than half have social network and email accounts" [17]. In Qatar, Facebook and WhatsApp are the most used online platform for social media, as indicated by 87% of respondents in a 2014 survey [18].

In 2016, Medina and Todd conducted a study titled "Empowering Students for a Digital World: Global Concerns, Local School Evidence and Strategic Actions" [19]. This research explored students' online confidence and competence and developed local evidence-based instructions around digital safety. Students from two countries (Philippines and Qatar) participated in the study as part of the library class. This study also revealed some discrepancies between students' confidence and the competence with which they engage in a digital world. Based on the feedback collected from the students regarding the level of assistance they needed from school librarians, the researchers were able to propose an instruction model for digital competence. This model can be viewed in Fig. 1.

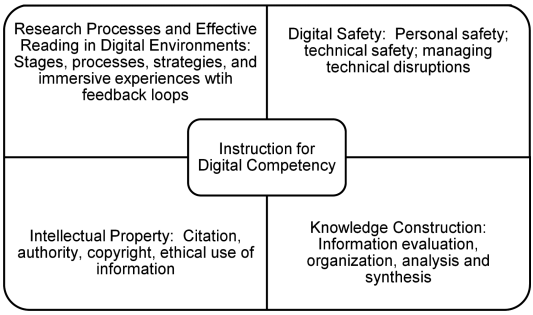

Fig. 1. Instruction for digital competency [19, p. 15]

The Medina and Todd model is based on 112 responses to the question: "What do you think that the (school) library can do for you to help you to become a good online learner?" The responses were classified into five categories. The first, intellectual property, was defined as when students recognized a range of difficulty in acknowledging their resources. The second, information organization, analysis and synthesis, was found when students expressed a desperate need for help finding, analyzing, organizing, and synthesizing key points or ideas from various online resources. The third category, digital reading, was created when students asked for further assistance in becoming effective online readers, particularly when retrieving links that were disrupted. The fourth category, research process, was examined when students sought strategic tips on how to become effective researchers by finding and evaluating reliable resources for their academic needs. In the fifth category, Internet safety, students clearly stated some curiosity about the concept of digital safety and its nature in helping them to become responsible and safe digital users in an online environment.

3 Methodology

Three public schools in the Philippines and one international school in Qatar participated in the data collection. The Philippines has a bureaucratic process of securing a permission letter from the Department of Education, which occurred when the researchers initially met the superintendents of Division of Las Pinas in Metro Manila to discuss the scope and objectives of the study. After securing the endorsement and permission letter, a meeting was held with the principals of the three schools where research would be conducted to finalize the date when data could be collected. Unlike in Qatar, the data collection in the Philippines was performed as part of the regular class instruction with the approval only from the principal.

The main respondents were fifth through tenth grade students, aged from 12 to 16 years old. Approximately 400 participants joined the survey through a 40-minute library instruction session. In the Philippines, sessions were conducted during the three-day consecutive school visit in 2016 and in a larger space due to the number of students in each class, which numbered about 60 students per class. In Qatar, sessions were conducted in smaller spaces with 19 to 20 students per class as part of the library class.

Prior to the session, the researcher conducted digital safety awareness and gave some strategic actions to the students on how to become effective and responsible digital users as they engage in an online world. After the discussion, students were divided into groups to participate in a group activity. Each group was asked to brainstorm about their insights on digital safety and unsafe websites. Before they started, a sample mind map was provided as an example to show the desired output from the session. A mind map is a "graphical technique for visualizing connections between several ideas or pieces of information" [20]. To record their discussion, students produced a mind map outlining and providing a list of terms they associated with the theme. Students wrote notes on each paper while doing the exercise. Finally, each group selected a team representative to present their output in front of the whole class. Members of each group varied from five to 10 depending on the number of students who joined in the session (Fig. 2).

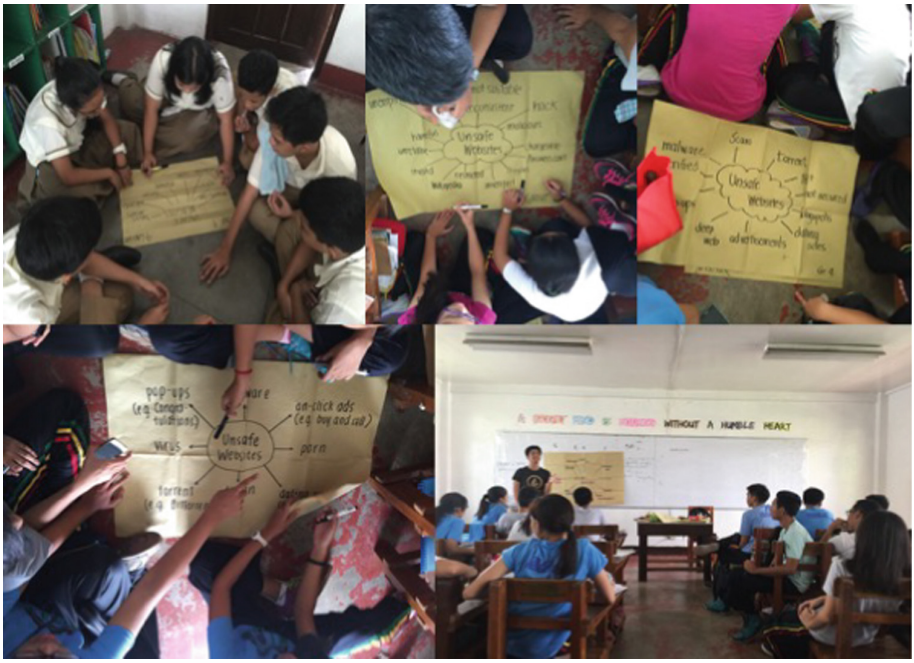

Fig. 2. Students recorded and presented their data about unsafe websites during the library instruction

4 Findings and Discussion

Initially, students wrote their insights on a large sheet of paper during the library instruction. These maps were then encoded into a mind map software in order to produce some illustrations. Figures 3 and 4 show the sample mind maps created by students from the two countries.

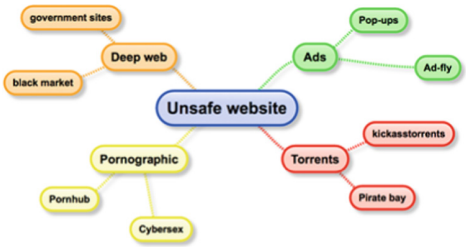

Fig. 3. A sample mind map from group activity on unsafe websites in the Philippines

Fig. 4. A sample mind map from group activity on unsafe websites in Qatar

Table 1 shows the data collected in the Philippines, from which Category 4 (Technical Errors/Virus/Auto Download) appears to become the most associated category with unsafe websites. A total of 248 terms were collected from 30 groups with approximately eight to 10 students in each group.

Table 2 presents data collected in Qatar, which mostly pertains to Category 2 (Malware, Pop ups, and Spam) as unsafe websites with 41 words or terms. The overall response was 127, the number of students of each class who participated in research study.

The study used six categories identified in the previous study conducted by Medina and Ross [21]. These categories are based on the summary thematic responses made by students as to how they define unsafe websites.

In Category 1, Sexual and Violent Contents, students in the Philippines recorded 58 terms related to sexual and violent contents, which ranked second to the highest number of terms associated with this category. For Qatar, Category 1 placed as the third to highest number of terms mentioned by students. Some of the specific responses include "18 and above," "For adults only," "xxx," "warning content," "porn," "cybersex," and other publicly accessible pornography websites.

In Category 2, Malware Pop-ups and Spam, "malware," another term for malicious software, is defined as "software programs designed to damage or do other unwanted actions on a computer system" [22]. Students in the Philippines had 42 frequent terms related to this category; it ranked third highest number of associated terms. However, students in Qatar listed 41 terms related to this category, which placed it as the highest ranked category. Category 2 is associated with these following terms: "Pop ups," "Counter Click," "Ads," "Fake advertisements/promotions," "Online Surveys," "Free stuff."

In Category 3, Privacy and Security Issues, respondents from the Philippines documented 29 words in relation to privacy and security issues. This ranked the category as second to last. Qatar students indicated 13 words, identifying Category 3 as the lowest category associated with unsafe websites. Some terms such as "no safety lock," "privacy statement," "lock icon," ".com," "unknown extensions," "unfamiliar domain," and "no restrictions" were described as unsafe by respondents from both countries.

Table 1. Data responses collected in the Philippines

Group	Column 1	Category 1: sexual and violent contents	Column 2	Category 2: malware pop-ups and spam	Column 3	Category 3: privacy and security issues	Column 4	Category 4: technical errors/virus/auto download	Column 5	Category 5: social media	Column 6	Category 6: search engine	Total
1	0	%	3	50%	2	33%	1	17%	0	–	0	–	6
2	1	17%	1	17%	3	50%	1	17%	0	–	0	–	6
3	5	63%	0	–	2	25%	1	13%	0	–	0	–	8
4	1	10%	2	20%	1	10%	6	60%	0	–	0	–	10
5	1	17%	3	50%	1	17%	1	17%	0	–	0	–	6
6	0	–	1	9%	1	9%	1	9%	4	36%	4	36%	11
7	1	17%	1	17%	1	17%	3	50%	0	–	0	–	6
8	13	93%	0	–	0	–	0	–	1	7%	0	–	14
9	6	67%	1	11%	0	–	2	22%	0	–	0	–	9
10	1	13%	4	50%	2	25%	1	13%	0	–	0	–	8
11	0	–	4	50%	2	25%	2	25%	0	–	0	–	8
12	2	25%	1	13%	0	–	3	38%	0	–	2	25%	8
13	1	10%	0	–	0	–	0	–	7	70%	2	20%	10
14	0	–	0	–	0	–	0	–	6	75%	2	25%	8
15	1	13%	2	25%	0	–	4	50%	1	13%	0	–	8
16	0	–	1	20%	1	20%	3	60%	0	–	0	–	5
17	3	33%	2	22%	1	11%	3	33%	0	–	0	–	9
18	6	50%	3	25%	0	–	3	25%	0	–	0	–	12
19	2	15%	2	15%	4	31%	3	23%	0	–	2	15%	13
20	1	11%	1	11%	1	11%	6	67%	0	–	0	–	9
21	5	71%	0	–	0	–	1	14%	0	–	1	14%	7
22	2	20%	1	10%	0	–	0	–	6	60%	1	10%	10
23	0	–	0	–	1	33%	2	67%	0	–	0	–	3
24	0	–	2	25%	1	13%	5	63%	0	–	0	–	8
25	2	50%	0	–	2	50%	0	–	0	–	0	–	4
26	0	–	0	–	1	14%	1	14%	3	43%	2	29%	7
27	0	–	1	17%	0	–	1	17%	1	17%	3	50%	6
28	3	25%	4	33%	0	3%	2	17%	3	25%	0	–	12
29	0	–	0	–	0	0%	6	100%	0	–	0	–	6
30	1	9%	2	18%	3	27%	3	27%	3	27%	0	–	11

Table 2. Data responses collected in Qatar

Group	Column 1	Category 1: sexual and violent contents	Column 2	Category 2: malware pop-ups and spam	Column 3	Category 3: privacy and security issues	Column 4	Category 4: technical errors/virus/auto download	Column 5	Category 5: social media	Column 6	Category 6: search engine	Total
1	0	0%	2	40%	1	20%	0	0%	0	0%	2	40%	5
2	0	0%	1	20%	0	0%	1	20%	1	20%	2	40%	5
3	1	25%	2	50%	1	25%	0	0%	0	0%	0	0%	4
4	0	0%	3	60%	0	0%	2	40%	0	0%	0	0%	5
5	0	0%	5	71%	0	0%	0	0%	1	14%	1	14%	7
6	0	0%	2	50%	1	25%	1	25%	0	0%	0	0%	4
7	2	18%	3	27%	1	9%	3	27%	2	18%	0	0%	11
8	3	38%	2	25%	1	13%	1	13%	0	0%	1	13%	8
9	1	8%	1	8%	1	8%	3	23%	4	31%	3	23%	13
10	1	8%	0	0%	2	17%	3	25%	1	8%	5	42%	12
11	3	21%	5	36%	2	14%	3	21%	1	7%	0	0%	14
12	1	10%	3	30%	1	10%	2	20%	2	20%	1	10%	10
13	2	29%	1	14%	1	14%	2	29%	1	14%	0	0%	7
14	5	23%	11	50%	1	5%	3	14%	2	9%	0	0%	22

In Category 4, Technical errors/Virus/Auto Download, data collection in the Philippines revealed 65 terms concerning this category. This made Category 4 the highest ranked. In Qatar, 24 terms were compiled, making Category 4 the second most associated. "Virus warnings," "unauthorized downloads," "errors," "log," "free downloads," "exe," "attachments," "Trojan," and "torrent sites" are some of the examples that students provided when talking about unsafe websites.

In a global networked society, social media plays a significant role in the lives of young people, specifically in connecting and communicating with their family and friends. Category 5, Social Media, collected responses from the Philippines reported 34 words confirming that social media is an unsafe digital environment, while responses from Qatar indicated 15 terms. Almost all popular social media networks were mentioned, including "Facebook," "Instagram," "Twitter," "YouTube," "WhatsApp," "Skype," "Tumblr," "9GAG." Additionally, "Yahoo mail" and "Gmail" were counted by the students as unsafe.

In Category 6, Search Engines, students from the Philippines expressed 19 words related to search engines, making it the lowest ranked category. Fifteen students in Qatar indicated this category as untrustworthy for online environments. Respondents cited "Olx.com," "Answers.com," "Wikipedia," "Yahoo answers," "Bing," "Google," and "Ask.com."

This research revealed specific online threats and risks that need to be taken into consideration by teachers, librarians, educators, and policy makers. The insights among the respondents also proved the complexity of their knowledge about specific unsafe websites, which signifies:

- that their digital identity is at risk
- that their personal information is exposed to online threat and cyberbullying
- that their curiosity can lead to pornographic or suspicious sites
- that online predators can use their information for scamming
- that their personal devices or gadgets can get computer viruses or malware
- that other unpredictable impacts of cyber and digital threats can happen when engaging in a digital networked environment.

5 Conclusion

This study revealed that today's young learners continue to access the online world in a limitless and borderless manner where everything is permissible. Based on the findings, future research can address to what extent teachers, school librarians, educators, policy makers, and school management should intervene in promoting digital well-being. Additional research can potentially identify a more systematic and objective measure that explicitly explores the negative impacts of unsafe websites to young people's academic growth, including their digital footprints and the content they publish online. Determining young people's activities, transactions, and contributions in the online world can also be taken into account in order to deepen the understanding of digital well-being.

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Workplace Information Literacy and Employability

Workplace Information Literacy of Croatian Fitness and Conditioning Personal Trainers

Kristina Feldvari, Kornelija Petr Balog(✉), and Sanjica Faletar Tanacković

University of Osijek, Osijek, Croatia
{kfeldvari, kpetr, sfaletar}@ffos.hr

Abstract. The paper presents findings collected in the study on workplace information literacy (IL) of Croatian fitness and conditioning personal trainers. The purpose of this study is to identify the level of IL and information behaviour of fitness and conditioning personal trainers with different educational backgrounds in kinesiology. The study addresses the following research questions: (1) What are information needs of personal trainers with formal education and those with informal or without any education? (2) What type of information sources do those two groups use and for what purposes do they usethem? and (3) Is there a difference in the manner in which those two groups of respondents retrieve, evaluate, and utilize information at their workplace? This is the first such study to be conducted in Croatia, a country with an increasingly overweight and obese population.

Keywords: Conditioning trainers · Fitness trainers · Information behaviour · Workplace information literacy · Croatia

1 Introduction

The concept of information literacy (IL) was first introduced in the 1970s [1] and has been evolving ever since. Lloyd [2] emphasizes that Zurkowski was first to talk about the concept of what is now known as workplace information literacy, but it was too early and did not take hold. Zurkowski linked IL to economic and organisational goals. zyhe ability of workers to develop IL related skills that would enable them to solve computer-related workplace tasks [1]. However, workplace IL has lately been an important topic in the body of literature on IL. Modern workplaces have become fast places that blend traditional and new versions of work and ways of working [3]. They are characterized, among other things, by rapid change of work practices, seamless integration of modern technology, the broadening of networks, and incorporation of social media, email, and other multimedia platforms [4]. Employees are today better connected but they are also more likely to be interrupted. Research suggests that they may be interrupted every 4–11 min, but they also must stay connected or they might not be seen as "team-players" [5]. Therefore, they are under constant pressure to accommodate to changes at the workplace and provide responses to various challenges. The workplace becomes increasingly "messy", which results in the growth of formal and informal sources of information and the growing importance of employees being

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able to identify, locate, and share "quality" information. Today employers expect their employees to demonstrate information resilience (in other words, the capacity to respond to uncertainty by learning to operationalize information skills and activities to gain access to information resources) [3].

This paper focuses on workplace information literacy of Croatian fitness and conditional personal trainers. Croatia as a nation records the growing number of health issues connected to obesity. According to Eurostat data from 2014, out of 16 EU countries, Croatia holds the fourth place in the number of obese men (preceded by Malta, Hungary, and Slovenia) [6]. A 2014–2015 health survey in Croatia found that 45.8% of men and 30.5% of women were overweight, with 20.1% of men and 16.2% of women obese. Fifty two point nine percent of Croats exercised less than 60 min a week [7]. Being overweight is a critical issue for health and well-being. It may lead to a number of serious illnesses such as type-II diabetes, cardiovascular and metabolic diseases, and several cancers [8]. There are efforts at the national level to increase the level of exercise and health among citizens (for example, the nationwide project Active Croatia brings together several partners including Faculty of Kinesiology in Zagreb and Croatian Medical Chamber [9]). Group and individual physical exercise for citizens in fitness centers is also becoming increasingly popular. Fitness centers' clients vary in age, social and economic level, and physical condition. Their objectives include weight loss, greater muscular strength, general wellness, improvement of body-image, or a combination of the above [10, 11]. Those who want personalized service and training plans tailored especially for their needs, very often use the services of fitness or conditioning personal trainers.

Personal trainers in Croatia have different and varied educational background: there are those with BA or MA diploma in kinesiology from academic institutions, those who have taken an educational training programme recognized by the Croatian Ministry of Science and Education (CMSE), or still those who have participated in some kind of informal training programmes. Only the first two groups of personal trainers are officially recognized and they are legally allowed to work as personal trainers. However, the officials are presently not enforcing the law and as a result all three groups of personal trainers can be found working in fitness centers across Croatia.

Considering the level of trust between personal trainers and their clients, personal trainers have extremely strong influence on their clients' training and nutrition plan. Considering that not all personal trainers have the same educational background, the purpose of this paper was to investigate how proficient personal trainers in our sample were in locating and utilizing information related to either exercise or dietary plan required for performing their job as personal trainers.

2 Literature Review

In the United States, where fitness trainers come with a variety of degrees and diplomas, the lack of nutritional knowledge as well as the absence of relationship between field experience and competency among fitness instructors, has been reported [13]. A study conducted in Switzerland found that although most of the fitness instructors gave nutritional advice to their clients, they were also aware of their lack of knowledge.

The same study also revealed several misconceptions about the topic of sports nutrition among their respondents [12]. In a study of 325 American College of Sports registered fitness professionals, respondents identified various sources of information they use to obtain knowledge on weight control information: textbooks (81%), college class notes (80%), scientific journals (79%), workshops/seminars (78%), past experience (51%), colleagues (49%), and mass media (20%). Respondents holding a Doctorate degree were less likely to use mass media than those holding a Master's degree or less. Those holding a Master's or Doctorate degree were more likely to use scientific journals than those with Bachelor's degree or less [14].

On the other hand, a qualitative study of 10 fitness instructors in New Zealand with various levels of qualifications revealed that they kept current on weight control and exercise prescription through word of mouth (networking with peers), followed by the internet, fitness magazines, seminars, and research papers. Less educated participants were more likely to use the internet and reported difficulty determining accuracy and credibility of information [15]. We may deduce from the previous research that the educational level is the factor influencing the choice of information sources and could be considered as a facilitator or barrier workplace information literacy of personal trainers [14, 15]. The level of education is evident even in the capability of respondents to understand the survey on their nutrition and training competencies and skills. In Switzerland one respondent honestly stated that (s)he had difficulties in understanding the survey that made him/her aware of the gaps in his/her knowledge [12].

3 Research

3.1 Goals and Research Questions

The purpose of this study is to identify the level of IL and information behaviour of fitness and conditioning personal trainers with different educational backgrounds in kinesiology. This includes looking into the type of information and information sources they use in order to perform their work as well as how they find the required information, how they evaluate it, and, finally, how they utilize it in their work.

The study tried to answer the following research questions: (1) What are information needs of personal trainers with formal education and those with informal or without any education? (2) What type of information sources and for what purposes do those two groups use them? (3) Is there a difference in the manner in which those two groups of respondents retrieve, evaluate, and utilize information in their working practice?

3.2 Methodology, Instrument and Sample

Our sample consisted of 100 respondents. The data were collected by a paper and online survey. Since one of the authors of this paper is a personal trainer herself (currently a student at the Faculty of Kinesiology and with work experience in several fitness centers in Osijek and Zagreb) she personally distributed a paper survey in two Zagreb fitness centers – 22 out of 30 surveys were returned (73.3% response rate).

The online survey was distributed through a Facebook page of that author and the rest of the sample (78 respondents) was selected by the snowball sampling method. The only selection criterion was that respondents had to have been working as personal trainers for at least a year at the moment of the survey.

The questionnaire consisted of a mixture of closed and open questions, which were later analyzed using the statistical software SPSS (descriptive statistics, correlation analysis and ANOVA test). The questions were grouped around the following topics: reasons for searching for workplace information, frequency of searching, types of information sources used and selection criteria for the choice of information sources.

The convenience sample consisted of two groups of personal trainers – those with formal professional education, and those with informal or without any education. In the sample, 65% of the respondents were men and 35% women. Fifty two percent of them have a degree from the Faculty of Kinesiology, and 48% do not have a degree, out of which 26% are still studying at the Faculty of Kinesiology. Out of those who do not have a formal degree 29% have finished an educational training programme recognized by CMSE, 7% have finished an educational programme that has not been recognized by CMSE, whereas 12% of them are self-taught personal trainers without any formal educational background in kinesiology. All the respondents are aged between 20 and 51, the mode being 31.

3.3 Limitations of the Study

The authors decided on the convenience sample of 100 respondents because in Croatia there is no register of personal trainers that might give us even a vague idea of number of people working in this area. Consequently, it was almost impossible to determine the size of target population and size and structure of the representative sample. As a result, all our findings should be taken only as indication of trends until an additional, more comprehensive study, be conducted.

3.4 Results

Only 16% (N = 6) of respondents who received a formal education at the Faculty of Kinesiology reported that they learned during their studies how to find, evaluate, and apply information that will be needed in their future job (for example how to find reliable information in order to reply to their clients). Thirty six percent (N = 16) of respondents with a degree in kinesiology indicated that they did not study this topic during their studies. Out of those who do not have a formal education, but finished an educational training programme endorsed by the CMSE 21% (N = 21) replied positively to this question. Nineteen percent (N = 19) of those who have a second degree from another field of education (most of them have a degree in Economy) had a chance to acquire this knowledge in the course of their other studies.

Respondents were then asked about reasons behind their search for workplace information. The majority search for information in order to find out about the clients' diet (65%). This is followed by information about the physiology of the human body (56%), the impact of exercises (54%), symptoms of certain illnesses (52%), new exercises (50%), and their performance (48%). A total of 46% look for new training

methods and 41% look for new ideas and try to educate themselves, either by consulting other personal trainers (31%) or reading scientific papers (30%). Three respondents chose the option 'something else' and supplied their answers: widening my horizons, gathering more knowledge and biomechanics. The ANOVA analysis showed there was no statistically significant difference ($p > 0.05$) regarding the reasons for searching for information between the two groups of respondents (those with formal education in kinesiology and those without formal education or without any education in kinesiology) (Table 1).

Table 1. Reasons for search for information in the sample

Reasons	N (%)	FE*	I&NoE*
Clients' diet	65 (65.0)	14 (63.6)	51 (65.4)
Physiology of human body	55 (55.0)	12 (59.1)	43 (55.1)
Impact of exercises	54 (54.0)	11 (50.0)	43 (55.1)
Physiology symptoms	52 (52.0)	13 (59.1)	39 (50.0)
New exercises	50 (50.0)	11 (50)	39 (50)
Performance of exercises	48 (48.0)	10 (45.5)	38 (48.7)
Information about training methods	46 (46.0)	13 (59.1)	33 (42.3)
New ideas from other trainers	41 (41.0)	10 (45.5)	31 (39.7)
Information about workshops	41 (41.0)	10 (45.5)	31 (40.3)
Self education - other coaches	31 (41.0)	6 (27.3)	25 (32.1)
Self education - scientific papers	30 (30.0)	9 (40.9)	21 (26.9)
Something else	3 (3.0)	3 (3.8)	0 (0.0)

*FE – formal education; I&NoE – informal and no-education

When asked about the frequency of information searching related to their workplace, the majority reported that they search for information on daily basis (61%; N = 61). A total of 20% (N = 20) do it once a week, and 14% (N = 14) several times a month. Only 4% (N = 4) search rarely for information related to their workplace. Again, there was no statistically significant difference among the two groups of respondents.

Respondents search for information related to their workplace most frequently with the help of the following information sources: internet search engines such as Google (66.7%); personal sources, in other words, eye-to-eye discussions with colleagues at their workplace (64.6%); and social media profiles of personal trainers that they consider competent (51%). To a lesser degree, respondents search online databases (46.9%), discuss online with (known and unknown) personal trainers, (41.7%), seek advice from workplace colleagues via telephone, chat or some other IT enhanced application (40.6%), read scientific and professional publications (40.6%), seek for information on different forums, portals and websites (39.6%), check online library catalogues (29.2%), or observe how other trainers perform the exercises (14.6%). The statistically significant difference was identified only in relation to the following variables: internet search engines (Sig. 0.041, $p < 0.05$) and forums and portals (Sig. 0.03, $p < 0.05$) (Table 2), meaning that those with informal or no education rely more on internet search engines, forums, and webportals than those with formal education.

Table 2. Types of information sources used by personal trainers in the sample

Type of information source	N (%)	FE	I&NoE
Search engines*	**64 (66.7)**	**12 (60.0)**	**52 (68.4)**
Trainers at workplace	62 (64.6)	11 (55.0)	51 (67.1)
Social media profiles	49 (51.0)	8 (40.0)	41 (53.9)
Scholarly online databases	45 (46.9)	13 (65.0)	32 (42.1)
Online discussion with trainers at workplace	40 (41.7)	11 (55.0)	29 (38.1)
Advice from the colleague at workplace	39 (40.6)	6 (30)	33 (43.4)
References in scientific papers	39 (40.6)	10 (50.0)	29 (38.2)
forums, portals, websites*	**38 (39.6)**	**5 (25.0)**	**33 (43.4)**
Library catalogues	28 (29.2)	7 (35.0)	21 (27.6)
How other trainers perform exercises	14 (14.6)	2 (10.0)	12 (15.8)

*Statistically significant difference

When asked to indicate their preferred source of information (on a scale from 1 to 5, 1 being the least preferred and 5 being the most preferred) respondents rated personal sources, in other words word of mouth information (Mean 4.16) and professional publications retrieved either through the Internet or library (Mean 4.03) with highest scores. This was followed by online videos (Mean 3.53) and online written information available at websites (Mean 3.21). Social networks were least preferred source of information (Mean 2.81). The ANOVA variance analysis showed no statistically significant difference between the two groups of respondents.

Respondents were then asked to indicate which online sources they use. As expected, the most frequently used sources are Google (87%) and Youtube (71%). This is followed by Instagram (47%) and Facebook (37%). About a quarter of respondents consulted the National Strength and Conditioning Association - NSCA website (26%), PubMed (24%) and websites of different local associations relevant for their work (e.g. Croatian Association of Strength and Conditioning Coaches) (23%). The ANOVA variance analysis showed statistically significant difference regarding personal trainers with formal and informal or any education background in relation to the following variables: Google Scholar (Sig. = 0.027, $p < 0.05$), PubMed (Sig. = 0.010, $p < 0.05$), Medline (Sig. = 0.039, $p < 0.05$), ResearchGate (Sig. = 0.021, $p < 0.05$) and NSCA (Sig. = 0.007, $p < 0.05$). (Table 3) The correlation analysis also showed significant correlations between the level of formal education ($r = 0.267$ till $r = 0.308$, $p < 0.05$) in all these cases. In other words, it is more likely that personal trainers who receive a university degree will be using these information sources to find information they needed online.

When asked if they used scholarly online databases, 41% (N = 41) answered positively, 49% (N = 49) negatively, whereas 10% (N = 10) said they did not know what online databases were. The ANOVA variance analysis identified no statistically significant difference between the two groups of respondents.

Table 3. Preferred online sources used by personal trainers in the sample

Online sources	N (%)	FE	I&NoE
Google	87 (87.0)	18 (81.8)	69 (88.5)
YouTube	71 (71.0)	17 (77.3)	54 (69.2)
Instagram	47 (47.0)	9 (40.9)	38 (48.7)
Facebook	37 (37.0)	9 (40.9)	28 (35.9)
NSCA*	**26 (26.0)**	**11 (50.0)**	**15 (19.2)**
PubMed*	**24 (24.0)**	**10 (45.5)**	**14 (17.9)**
Pages of associations	23 (23.0)	6 (27.3)	17 (21.8)
Google Scholar*	**19 (19.0)**	**8 (36.4)**	**11 (14.1)**
Fitness portals	14 (14.0)	4 (18.2)	10 (12.8)
Medline*	**12 (12.0)**	**6 (27.3)**	**6 (7.7)**
ResearchGate*	**11 (11.0)**	**6 (27.3)**	**5 (6.4)**

*Statistically significant difference

Respondents were then asked to indicate factors that helped them evaluate and select the information source that they intended to use. The largest portion of respondents indicated that they preferred publications and information that were recommended to them by their teachers, trainers, or persons they trust (32.3%; N = 31). After personal recommendation, the second most important factor in selecting information sources was the quality of the content (26%; N = 25). Only 13.5% (N = 13) chose sources that were easily accessible. While 10.4% (N = 10) selected information sources on the basis of authority of the author, 5.2% (N = 5) chose publications with bibliographic entries. A total of 12.5% (N = 12; FE 2; I&NoE 10) of respondents reported that they did not have any need to evaluate the quality of the information they found because they believed they could judge if the information was correct or not on their own. In relation to this question, the ANOVA analysis identified statistically significant difference (Sig. = 0.027, $p < 0.05$) between the two groups of respondents. The data showed that the trainers with informal education and self-taught trainers had the least need to evaluate information they obtained.

On the other hand, a total of 57% (N = 57) respondents indicated that they always evaluated information retrieved from the Internet and tried to verify it in other sources. 37% (N = 37) did it only sometimes and 6% (N = 6; FE 3; I&NoE 3) never evaluated information retrieved from the Internet. Respondents were then asked to self-assess how fast they foundnd founded(1 - very slow and difficult, 5 - very fast and easy). The majority of respondents reported that they found it easily and quickly (Mean 4.04).

4 Discussion and Conclusions

The main aim of the research was to determine the level of IL of Croatian personal trainers and understand their information needs and behavior. We sought answers to the reasons for seeking and searching of information, use of different sources, the way they sought and searched for information and evaluated them at workplace. A special aim of

this paper was to compare the information literacy of personal trainers with and without formal education in kinesiology. As described earlier, while personal trainers in the Republic of Croatia as a rule obtain their degree from the Faculty of Kinesiology or through an educational training program recognized by the Croatian Ministry of Science and Education (CMSE), there are also practicing trainers who do not have any formal education in kinesiology.

Surprisingly, according to our data, very small percentage of respondents reported that they (16% with and 21% without formal education in kinesiology) had a chance to learn during their studies how to find, evaluate, and apply the information needed for their job. However, it is also possible that they did indeed receive such an education during their studies, but in insufficient degree and that they did not pay attention to it at a time. It can be therefore concluded that there is still a great need to offer courses regarding information literacy during the formal education of personal trainers. Those topics might be included in a regular curriculum, for instance, as the integral part of courses on research methodology). Academic libraries might also be considered an important partner that could be involved to support the educational processes at the faculties of kinesiology.

Our sample is rather homogeneous in regard to reasons behind seeking and searching for information. Based on the results of this survey it can be concluded that the two groups of respondents had similar information needs. They were motivated by the same reasons to search for information and that there was no statistically significant difference regarding the reasons for using the sources or the frequency of searching for workplace information between the respondents with and without formal education in kinesiology.

The findings also showed that personal trainers gathered information about the topic they were interested in using internet search engines as their primary source. The Croatian study on the other hand gave similar results as the New Zealand study [15] in the category of communicating with colleagues at workplace (second most frequently used information source following the internet search engines). In this study, although personal resources were highly used, and internet had the prevailing highest score as a primary source. It can be therefore concluded that there is high demand for workplace information literacy education, especially since the survey showed that both test groups of respondents preferred the personal information sources.

Our respondents showed statistically significant differences in regard to types of information sources preferred information sources used – in that regard our findings are similar to those of other studies [14, 15]. Although we did not detect any significant statistical differences regarding the usage of scholarly online databases, or (unfortunately) libraries and library catalogues, we did detect that respondents with formal education chose more often trustworthy information sources (for example, NSCA, PubMed, Google Scholar, Medline, and ResearchGate), whereas those with no formal education were more likely to use less reliable means to obtain the necessary information such as search engines and various internet sources (for example, forums, portals, and web sites). In addition, trainers with informal education and self-taught personal trainers were identified (with the statistically significant difference) as those respondents who had the least need to evaluate information they obtain on the internet.

Therefore, similarly to earlier studies [14, 15], this study confirmed that the educational level as well as the lack of more comprehensive and thorough university instruction in information literacy were determinant factors influencing the choice of workplace information sources by respondents in this study of workplaces information literacy of fitness and conditioning personal trainers in Croatia. In addition, more information literacy courses, possibly in the way of lifelong education, should be offered and made compulsory also to those personal trainers who enter the profession without any formal education. Again, we see libraries as possible partners to conduct this kind of instruction. Only if we cover both formal and informal areas of education and training of personal trainers with information literacy instruction, can we come close to the idea of information resilience [3] that today's employers so much want and expect from their workers.

In addition, similar to the study conducted in Switzerland [12], several respondents left comments in the survey that indicate that they had difficulties in understanding the survey questions and they expressed a need for instruction in the field of searching and evaluating workplace information from different sources.

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Investigating Knowledge Management Practices at OpenStack

José Apolinário Teixeira(✉), Helena Karsten, and Gunilla Widén

Faculty of Social Sciences, Business and Economics,
Åbo Akademi University, Turku, Finland
{jteixeira, ekarsten, gwiden}@abo.fi

Abstract. Knowledge work is comprised of specialists who collaborate by exchanging expertise and skills to develop products and services - this is exactly what happens also in open-source software development communities in a virtual and globally distributed fashion. In this study, we address some of the information practices of a large and well-known open-source community known as OpenStack. More specifically, we take the theoretical notion of information literacy landscapes to analyze the day-to-day information-intensive work practices in the OpenStack community. We collect and analyze naturally occurring trace data derived from the OpenStack project in a qualitative manner. Our findings report a set of ten information-intensive work practices that in our view merit to be presented to an audience that is interested in information literacy and digital work but not necessarily in software development. These ten practices are branching, committing, fetching, pushing, merging, reviewing, continuously integrating, gating, release management, and announcing. While most of these practices cannot be carried out in non-digital environments, the increasing trend towards the digitalization of work practices reiterates the importance of studying the information-intensive knowledge management practices in digital work.

Keywords: Digital work · Information landscapes · Information literacy · Open-source software · Virtual communities · Work practices

1 Introduction

Knowledge work, as argued by Drucker, Davenport and Prusak [1, 2] and others, is comprised of specialists who collaborate by exchanging expertise and skills to develop products and services. As early noted by Awazu and Desouza [3], this is exactly what open-source communities do. In these communities, both professionals and hobbyists leverage each other's know-how and skills to develop software in a virtual and globally distributed fashion [4]. This is a prime example of digital work as open-source software developers develop digital products (i.e., software) by digital means (i.e., by relying heavily on computers connected to each other via the Internet). Open-source communities have already now a high societal impact, as the software developed in them can be found in, for example, mobile phones and cars. In this study, we address some of the information intensive knowledge management practices of a large and well-known open-source community known as OpenStack, a community with many individuals and

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organizations that jointly develop a complex open-source cloud-computing infrastructure capable of handling big data. More specifically, we take the theoretical notion of information literacy landscape [see 5–8] to analyze the day-to-day information-intensive work practices in the OpenStack community. Our goal is to present key knowledge management practices that differ from traditional closed knowledge management practices within organizations [3].

As the key result of our research efforts, we identified a set of ten information intensive work practices that in our view merit to be reported and explained to an audience that is interested in information literacy and digital work but not necessarily in software development. These ten practices are branching, committing, fetching, pushing, merging, reviewing, continuously integrating, gating, release management, and announcing. While most of these knowledge management practices cannot be carried out in non-digital environments, the increasing trend towards the digitalization of work practices reiterates the importance of studying the information intensive knowledge management practices of open-source communities.

2 Theoretical Background

2.1 Information Literacy and Its Landscapes

In this study, we address digital work practices. Our view on practices is closely related to Lloyd's position [7] on information practices. She sees them not as static arrays of routinised action, but as fluid and ongoing array of activities that are enabled or constrained according to the information landscapes associated with the social site. As we are dealing with knowledge management practices and how individuals search, evaluate and use information in an open-source community, we integrate our work with prior work on informational literacy [9–11].

As evidenced by the work of Lloyd, the concept of information literacy landscape [see 5–8] fits well with the study of open forms of distributed digital work, as it takes information practices as socially constructed (not individualized) and as contextual (not independent from its setting). Furthermore, the concept also assumes the materiality and embodiment of information.

"From this perspective, information and ways of knowing are understood to reside in social relations that, in turn, reside in the practices that are intertwined with, and constitute, social life. These relationships influence the modalities of information (e.g., social, epistemic, and corporeal, [6]) and constitute the information landscapes of the setting" [7].

Information literacy landscapes in the workplace can be "messy, complex, and distributed through a range of practices that intertwine to contribute to the collective performance of work" [12]. As pointed out by Martin *information landscape* and *information literacy landscape* are not synonymous [13]. On one hand, information landscape describes the information environment in which the individual interacts. On the other hand, the information literacy landscape is an individual understanding of their experiences with, and attitudes and behaviors towards, information [13]. Here we do not see the individual as a passive recipient of information, separated from their

prior information experiences, we see then the individual's understanding of information as critical, self-reflective and relational.

2.2 Open-Source Communities

Open-source communities seek to extend the intellectual commons into the realm of computer software (for example, the Linux operating system), and digital repositories (such as Wikipedia for encyclopedic entries). Open-source software is released under permissive legal licenses that keep the software and its source code open to the common heritage of all: everybody is free to use, study, modify, and redistribute copies of the software. Most collaborative work is carried out in a decentralized fashion across the globe over the Internet. Open sourcing has gained much multidisciplinary attention since 1980s [14, 15]. Some early voices emphasized the freedom and other philosophical aspects in software development [16], while others emphasized the practical benefits of developing software in more open and transparent ways [17]. Some see it as a model for organizing [18, 19], as a model for producing [20], as a model for innovating [21, 22], as a model for sourcing [23], as a model for coordinating geographically distributed teams [24, 25], or as a cultural movement whose values mimic library values [26].

3 Methodological Design

This study is embedded within a large multi-year research program dealing with information literacy at the workplace. Our sub-project pays special attention to globally distributed work. The case under scrutiny is the software development practices of the OpenStack community.

Our goal is to unveil key knowledge management practices in a large and global distributed open-source community to an audience not necessarily interested in software development. The initial research question "*What are the key knowledge management practices of open-source software communities that allow jointly developing complex and interdependent artifacts?" framed our investigation - this in the context of open, large, and global, computer supported online communities.*

We take a cross-disciplinary approach by design to leverage the distinct disciplinary orientation of the authors (from 'Software Engineering' to 'Information Systems' and 'Library and Information Science'). Therefore, we attempt to cross the different branches, disciplines, sub-disciplines and specialties of scientific knowledge [see 27]. Prior years of engagement with the OpenStack community led to related research [28–32] and expedited our research efforts.

We collected and analyzed qualitative publicly available and naturally occurring archival data[1] derived from the OpenStack project. This kind of data are not a consequence of our own actions as researchers but they are created and maintained by the

[1] Naturally occurring data in the sense of being collected and created without direct intervention from the researchers. See http://methods.sagepub.com/video/what-is-naturally-occurring-data for a discussion on naturally occurring data by Professor David Silverman.

OpenStack community in their own pursuits of developing an open-source cloud computing infra-structure. We have considered key guidelines on how to conduct qualitative empirical research online [33, 34]. From the initial sources of online data, we followed manylinkstocollectfurtherinformationrelatedtoknowledgemanagementin-OpenStack. The collected data captures not only the OpenStack software source code but also its evolution. Many Internet pages, wikis and blogs supporting the joint development of OpenStack were analysed. The software development documentation guiding the day to day work of the ones contributing to the open-source project also guided our research efforts. Overall, the collected data, left by the developers under public domain, allow us to trace back and understand the individual and collective behavior of different actors involved in the development of OpenStack.

In this sense, we align very much with the ideas of Venturino and Latour on [35] that interactions that pass through digital media leave traces that can be easily recorded, massively stored and inexpensively retrieved.

4 Results

By following the digital traces left by software developers doing their work (i.e., by retrospectively analyzing collective joint development efforts in the project), we could identify four information landscapes influencing its modalities of information.

In addition to the early recognized educational, workplace, and community information literacy landscapes [see 36], broadly proposed by Lloyd in 2010 [6], Most of the investigated work practices deal directly with the technological artifacts being developed (commonly shared work base of OpenStack and other projects as well). Even if many say that in open-source communities ‘code is king’ such commonly shared work bases include not only the OpenStack software source code (aka codebase) but also documentation, automated tests, and infrastructure (e.g., software robots that continuously integrate, build and test what was developed so far).

Also importantly and as the key output of our research effort, we identified a set of ten work practices that in our view are the ones that most merit to be presented also to an audience interested in information practices. These key ten practices are branching, committing, fetching, pushing, merging, reviewing, continuously integrating, gating, release management and announcing. While many of the other identified practices are very contextual, dependent on the actor’s role (e.g., coder, tester or user-interface designer), on the technologies in use (e.g., programming language, hardware), the artifacts’ functionality (e.g., a new software feature, a new user-interface design or a new robot testing other digital artifacts), and the level of engagement with the project (e.g., full-time, part-time, occasional contributor), these ten practices are found to be recurrent across OpenStack. In other words, we found that independently of the type of work being done (e.g., software, testing, design or documentation) and its context (e.g.,

situated goals, technology, affiliated company), it is very likely that all actors involved in the OpenStack community experience these ten practices.

The ten recurrent practices found in OpenStack are orchestrated by *Git* – the version control and distributed revision control system supporting distributed, non-linear workflows in OpenStack[2]. In each of these practices, different actors within the OpenStack interact directly with artifacts orchestrated by *Git*. Being able to work with *Git* is therefore a required skill to contribute directly to OpenStack as the developers interact with the *Git* system as part of their day-to-day work. This is consistent with prior research highlighting the role of the version control and distributed revision control systems as orchestrating the work practices of open-source software developers [19, 32, 37]. While in some open-source projects, the version control and distributed revision control system are two different systems, in our case the *Git* system afforded both. As reported by Davis [38] "learning version control is … a key skill for the libraries and archives of tomorrow" and "Git makes collaborative work much easier" [38].

In our view, the following ten social practices merit being reported and explained to an audience not necessarily interested in software development. Therefore, we here attempted to understand, analyze, report and explain the following practices recurrently practiced in our investigated open-source community.

Branching. A social practice in which developers isolate their own work (in their own computer) from the commonly shared work base (distributed across developers). A practice much influenced by the technological artifacts.

Commiting. A social practice in which developers communicate to other developers what they changed (in their own computer) and why. A practice much influenced by the education, the workplace, the community, and the technological artifacts.

Fetching. A social practice in which developers receive all the changes performed by the other developers (distributed across the globe) to their own computer. A practice much influenced by the technological artifacts.

Pushing. A social practice in with developers share their own changes (in their own computer) to the other developers (distributed across the globe). A practice much influenced by the technological artifacts.

Merging. A social practice in which developers integrate their most recent work (e.g., a new feature implemented in their own computer) with the commonly shared work base (distributed across developers). A practice much influenced by the community, the workplace, and the technological artifacts.

Reviewing. A social practice in which new contributions (i.e., proposed changes to the commonly shared work base) are both reviewed and evaluated by other developers andanumberofrobots. A practice much influenced by the education, thecommunity and the technological artifacts.

[2] Please note that Git was created by Linus Torvalds in 2005 to support the distributed collaborative development of the Linux operating system.As pointed out in https://github.com/about as of March 2018, 27 million people and 80 million projects use the Git infrastructure provided by GitHub (the main commercial firm providing software development infrastructures based on Git).

Continuously Integrating. A social practice in which humans and robots continuously integrate and test new contributions at a very fast pace. A practice much influenced by the community and the technological artifacts.

Gating. A social practice in which humans and robots keep low-quality contributions away from the officially shared work base. A practice much influenced by the education, the workplace, the community and the technological artifacts.

Release Management. A social practice in which lead-developers decide what contributions are good enough to be included in a forthcoming official product version (a stable commonly shared work base). A practice much influenced by the workplace, the community, and the technological artifacts.

Announcing. After contributions are recurrently tested, reviewed and evaluated by humans and robots and finally integrated with a stable commonly shared work base. The social practice of announcing, communicating and marketing new contributions (new landings in the official master version of the project repository). A practice much influenced by the workplace, the community and the technological artifacts.

5 Discussion

Our main contribution extends prior work on landscapes of information literacy [see 5–8]. Technological artifacts should not be merely considered as an output of work practices. Instead, they hold active inscriptions of practical knowledge that support collective production efforts. As technological artifacts are intertwined in the observed work practices, and as they influence both the social and the material modalities of information, they should be considered an information landscape by itself. When analyzing information literacy practices at in the context of technology development at the empirical level, researchers should not consider technological artifacts merely as the output of work practices nor as a medium holding information - instead, they should consider the potential of technological artifacts as information literacy landscapes that shape social practice.

Furthermore, our findings also reinforce the early view on work artifacts as 'dynamic vehicles' that make knowledge creation, accumulation, and dissemination possible throughout the Internet [19, 37]. Furthermore, we also reinforce views on artifacts as enacting stigmergic mechanisms that enable coordination without discussion or direct communication [25, 39, 40]. In the case of OpenStack, where independent and organizational affiliations work together, these work artifacts are available to any user or potential contributor independently of any age, group, organizational affiliation, and field of endeavour. They belong in an intellectual property regime that allows the incremental innovation that characterizes open-source communities [see 3]. Under the traditional software development (i.e., the proprietary way) such work artifacts are not available. Instead they are controlled, gate, and protected with intellectual property mechanisms. In this sense, proprietary software limits the information landscapes of potential improvers to the software.

Even if developers work mostly alone in front of their own computers in a geographically distributed setting with little face-to-face interaction, they are still doing a vast collective effort. It is important to notice that the practices here described require work artifacts to move from worker to worker with low latency. The work base jointly developed, as well as recent changes to it, move to and from the developers' computer very frequently, often several times a day. In open-source communities, the work base is fully digital and can move around at a very fast pace from computer to computer over the Internet. Such practices would not work with physical work bases (e.g., a building, an airplane, or a ship). Even if most of the here reported knowledge management practices cannot be carried out in non-digital environments, the increasing trend towards the digitalization of work practices reiterates the importance of studying the information-intensive knowledge management practices of open-source communities. After all, their work practices are nearly fully digitalized already.

6 Conclusions

Many have argued that many cross-disciplinary lessons can be learned from the open-source communities [3, 41–45]. In our view, open-source communities are pioneers of digitalization as since their inception they have developed digital artifacts primarily by digital means. In this study, we investigated the information-intensive knowledge management practices of a large open-source community known as OpenStack – a community of individuals and organizations that jointly develop a complex open-source cloud computing infrastructure.

Our research efforts led to the recognition of ten key information-intensive work practices that in our view merit to be presented to an audience not necessarily interested in software development. The reported information-intensive practices embedded in the day to day of the OpenStack development efforts are branching, committing, fetching, pushing, merging, reviewing, continuously integrating, gating, release management, and announcing. While most of these practices cannot be carried out in non-digital environments, the increasing trend towards the digitalization of work practices reiterates the importance of studying information-intensive knowledge management practices in digital work.

When analyzing the reported practices from the perspective of information literacy and information literacy landscapes (see [5–8, 13] for the related theoretical background), we argue that work artifacts should not be merely considered as an output of work practices. Instead, they hold active inscriptions of practical knowledge that support collective production efforts. In the observed context of technology development, work artifacts are intertwined within the day-to-day digital work practices. As they influence both the social and the material modalities of information, they should be considered an information landscape guiding collective information-intensive practices. When investigating the development of complex technology, scholars should not consider technological artifacts merely as the output of work practices nor as a medium solely holding information - instead, they should also consider the potential of technological artifacts as information landscapes that shape social practice.

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Impact of Intrinsic Motivators on Knowledge Sharing in Virtual Environments: Implications for Workplace Information Literacy and Collaborative Practices

Rajesh Singh(✉)

Division of Library and Information Science,
St. John's University, New York City, NY, USA
singhrl@stjohns.edu

Abstract. Although collaboration is considered as one of the most critical workplace skills, simply putting workers together into teams does not guarantee increased levels of collaboration and knowledge sharing. This exploratory study examines 169 LIS students' perceptions of the quality of knowledge creation in virtual teams across seven blended courses in 2011. The perceived quality of knowledge creation was measured and divided into three levels for analysis: enhanced, moderate and baseline. The findings indicate the critical role of intrinsic motivators, including trust, peer influence, and personal outcome expectations in facilitating knowledge sharing and enhancing knowledge creation. The implications of this study could possibly be further extrapolated in developing workplace information literacy instructions about collaborative practices across a variety of organizations.

Keywords: Knowledge sharing · Knowledge creation · Intrinsic motivators · Workplace information literacy · Collaborative learning · Online collaboration

1 Introduction

Workplace information literacy refers to the ability to recognize, access, and apply relevant information for performing various job-related tasks at work [1]. Collaboration is widely recognized in important job-related activities, which contributes to innovation and improvement in organizations. The recent Educause Horizon Report (2016) highlights the findings of a survey of 400 organizations, demonstrating that 96% of employers want prospective graduates to "have higher education experiences that teach them to solve problems collaboratively with people whose views are different from their own, with a strong emphasis on the importance of applied learning and teamwork" [2, p. 32]. These studies suggest that collaboration is considered one of the critical workplace information literacy skills. However, simply putting students or employees together into teams may not always result in increased levels of collaboration and knowledge sharing.

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Although knowledge sharing is considered a crucial process in collaborative projects, individual factors that may motivate or undermine knowledge sharing are not well understood. While several intrinsic and extrinsic factors have surfaced from the literature as having an influence on knowledge sharing behavior, empirical evidence for the existence and influence of these factors is fragmented, and mostly unrelated to virtual teamwork. This study examines the impact of intrinsic motivators on knowledge sharing in virtual environments. More specifically, the study aims to understand the role of trust, mutual influence, and personal outcome expectations on knowledge sharing in virtual environments.

2 Review of Relevant Literature

2.1 Workplace Information Literacy

Learning processes in the workplace can impact an organization's success. Throughout workplace learning processes, employees seek out various sources of information to develop an understanding of their new environment and develop their own professional identities [3]. While employees utilize textual and digital sources of information in workplace learning, studies demonstrate that social sources of information allow employees to gain necessary insight into their work and environment as well [3]. Kirton and Barham explain that information literacy skills can make employees more efficient and productive, thus contributing to the overall success of their organizations [1]. In a broader sense, information literacy practices refer to the "processes which facilitates access to information from social, physical and textual sources of information" [3, p. 187]. This definition can more adequately be applied to the use of information literacy skills in workplace settings because of the inclusion of social sources of information. The development of social relationships in the workplace can promote learning, especially when multiple colleagues collaborate with each other and share knowledge that differs from knowledge of others [4]. Knowledge sharing can be a complex process that is both limited and encouraged by intrinsic motivating factors.

2.2 Knowledge Sharing and Collaboration in Virtual Environments

Knowledge sharing refers to individuals' willingness to share their acquired knowledge, beliefs and assumptions with their peers [5–7]. Knowledge sharing is considered a voluntary action [7] which requires team members to develop a shared understanding of content, process, and each other [8]. Therefore, knowledge exchange and knowledge creation could be considered some of the most important aspects in online collaborative learning.

Collaboration is an important part of the learning process across various environments. In virtual environments in particular, effective communication can help facilitate learning through collaboration. Kennedy and Duffy argue that collaboration, specifically in distance education, is an essential part of the learning process. Although this article focuses on distance education, the ideas presented can be applied to other virtual environments. They explain that in these environments, a sense of community and belonging develops among members [9]. As a result, community members, or

colleagues in virtual environments feel a responsibility to help others within their community. Chen and Hung explain that knowledge sharing between colleagues in virtual environments contributes to effective workplace learning [10]. To promote knowledge sharing in virtual environments and impact workplace learning, it is important to understand motivation for knowledge sharing. Chen and Hung's study found that factors such as interpersonal trust and knowledge sharing self-efficacy impact willingness to share knowledge [10]. Berry claims that even though virtual collaborative work is becoming increasingly common in organizations, lack of in-person interaction creates some implications to sharing knowledge in virtual environments. It may be more difficult to foster social relationships through virtual communication methods. In addition, team members may be hesitant to share knowledge if they believe the other virtual team members will not value it [11]. The present study considers knowledge creation as the outcome of knowledge sharing. This study focuses on students' self- perception of knowledge creation and the role of intrinsic motivators in facilitating knowledge creation within their virtual teams.

2.3 Role of Intrinsic Motivators on Knowledge Sharing

Knowledge sharing is an important part of an organization's progress and success because it often leads to the development of new ideas. Therefore, employees' willingness to share knowledge impacts the value of this knowledge and the organization's overall success. Lin's study highlighted the effects of extrinsic and intrinsic motivators on knowledge sharing in the workplace. Regardless of the situation that may prompt knowledge sharing to occur, intrinsic motivators cause employees to be more willing, or more hesitant to communicate [12]. Lin describes intrinsic motivation as "engaging in an activity for its own sake, out of interest, or for the pleasure and satisfaction derived from the experience" [12, p. 137]. For example, some employees may be motivated to share knowledge with their colleagues simply because they have a desire to do so. In addition, if employees believe that their knowledge will help others to complete a task and achieve an important organizational goal, they are more motivated to share this knowledge [12].

While there are many intrinsic motivators that promote knowledge sharing between colleagues, there are also several intrinsic reasons why colleagues hesitate to share knowledge. For example, Durmusoglu, Jacobs, Nayir, Khilji and Wang explain the idea that employees feel they are more valuable to their organization when they have more knowledge [13]. Some employees believe that their value or power may decrease if they share knowledge with colleagues. Employees experience provides them with advantages to having more knowledge than colleagues, such as higher productivity, so they hesitate to pass this knowledge onto others [13]. Kennedy and Duffy similarly state that competition could prevent willingness to collaborate or share knowledge [9]. Although their study focuses on collaboration between students, Kennedy and Duffy explain that past educational environments could contribute to forming competitive personalities and habits [9]. For example, students' desire for success often prompts them to focus on their own individual achievements, rather than the success of their team. Against this backdrop, the present study specifically focuses on the role of some intrinsic motivators namely trust, peer influence, and personal outcome expectations.

3 Methods and Materials

While this study utilized groups participating in a collaborative learning project, it is the individual's self-perception of knowledge creation which was the primary unit of analysis. The research data was collected through a questionnaire survey from 169 graduate library and information science (LIS) students from seven blended courses in 2011 at a small Midwestern University. The courses of four different instructors have been utilized for the purpose of this research. There were a total of 40 teams ranging from 2 to 7 students, who were assigned to a collaborative learning project in their courses. The students were adult learners who participated in this study. They utilized a number of collaborative technological tools namely, Adobe Connect, Wiki, Skype, Wimba Pronto, and email. The convenience sampling technique was utilized to collect the data when students gathered for their face-to-face class meetings at the university's regional locations in Kansas and Oregon. The participants' response rate was 100%.

This study expands on previous research done by Nelson and Cooprider – mutual influence and trust [14], by Farmer on the effectiveness of a wiki as an online learning collaborative tool [15], and by He who examined factors that affect knowledge sharing and students' attitude toward their experience within virtual teams by analyzing their participation in online discussion boards [16]. The overall goal of the present research is to understand the role of intrinsic motivators that facilitate knowledge sharing and enhanced knowledge creation within virtual teams. In brief, this study discusses the following factors:

Knowledge Creation– students' perception of their learning activity through the collaborative learning project.
Level of Trust– students' perception of trust among group members during the collaborative learning project.
Peer Influence– students' perception regarding the presence and contributions of their peers during the collaborative learning project.
Personal Outcome Expectations– students' perception as to their personal outcome expectations with the collaborative learning project.

A construct called "knowledge creation" was developed by summing up the mean of the following statements:

- I learned new skills and knowledge in this project.
- I was satisfied in regard to the quantity of my learning in this project.
- I was satisfied in regard to the quality of my learning in this project.
- I feel that the collaborative learning project was very useful for learning.
- I engaged in brainstorming to generate ideas/direction for the project.
- The collaborative learning project was an important learning component of this course.

Three different kinds of knowledge creation groups were identified through the use of ANOVA analysis:

- Enhanced Knowledge Creation (mean = 3.0000; the top 25% of knowledge creation; n = 42)
- Moderate Knowledge Creation (mean = 2.8039; the middle 50% of knowledge creation; n = 85)
- Baseline Knowledge Creation (mean = 1.9603; the lower 25% of knowledge creation; n = 42).

This study is exploratory in nature, and the outcome is primarily qualitative. ANOVA test has also been utilized in order to analyze the relationship between knowledge creation construct and other variables such as role of trust, peer influence, and personal outcome expectations. The mean, F value and significance level for the role of trust, peer influence, and personal outcome expectations are presented in the Appendix 1.

4 Findings

Level of Trust. Trusting fellow team members has been shown to be a key factor in facilitating effective knowledge sharing among students [17, 18]. Survey questions measured the extent to which other team members were considered to be trustworthy, considerate, friendly, and reliable. The results show that the students in the enhanced (mean = 2.9464) and moderate (mean = 2.8764) knowledge creation groups demonstrated higher levels of trust in their collaborative learning projects. Their prompt communication and prior relationships from previous classes helped enhance the level of trust in their respective groups. In contrast, with the enhanced and moderate knowledge creation groups, students from the baseline (mean = 2.7083) group appeared to demonstrate slightly lower levels of trust. It seems that some students in this group appeared to dislike the "collaborative" nature of their learning project due to team dynamic issues and personality characteristics.

Peer Influence on Knowledge Sharing. Peer influence is the degree to which team members affect each other when executing tasks during the collaborative learning project [19]. The impact of mutual influence was analyzed with regard to the consistent presence of team members and their timely communication and contributions. The findings from the enhanced (mean = 2.4603) and moderate (mean = 2.8392) knowledge creation groups show that the active presence of peers and their contributions seemed to positively affect the work and performance of their team members. Prompt communication and proactive participation appeared to be an expectation for collaboration. Members from the moderate knowledge creation group (mean = 2.8392) also highlighted the role of peers' contributions and communication as a positive influence on the collaborative process and knowledge sharing. While members demonstrated the highest level of mean regarding the role of peer influence on knowledge sharing, some members had mixed feelings about the nature of collaborative work. Members in the baseline knowledge creation group demonstrated the lowest mean (mean = 2.4063)

regarding the role of peer influence on knowledge sharing and how it negatively affected their team members' performance. Members' comments from the baseline knowledge creation group reveal that they were unable to develop a mechanism for accountability for their project tasks due to some personality characteristics that hampered knowledge sharing.

Personal Outcome Expectations. While the primary goal of any collaborative learning project member is to complete the tasks diligently, they may have additional personal outcome expectations from the collaborative project. The personal outcome expectations might include making friends, developing collaborative skills and interpersonal relationships, enhancing their reputation, as well as being viewed as skilled, knowledgeable or respected [20]. The findings highlight that members in the enhanced (mean = 2.8175) and moderate (mean = 2.7765) knowledge creation groups had higher personal outcome expectations from the collaborative learning project. The comments from these groups reveal that members expected their peers to be active in knowledge sharing, building professional relationships, and developing a mechanism for team members' accountability for their project tasks. While members in the moderate knowledge creation group (mean = 2.7765) acknowledged the importance of collaborative work and knowledge sharing, some of them appeared to have mixed feelings about the nature of collaborative projects and were concerned about team dynamics issues. Nonetheless, they recognized some key takeaways, such as communication, delegation, and project scheduling. In contrast with the enhanced and baseline knowledge creation groups, members in the baseline (mean = 2.5159) group did not appear to benefit from collaborative work due to procrastination and personality characteristics (Table 1).

Table 1. Mean of trust, peer influence, and personal outcome expectations in three knowledge creation (KC) groups

Variables	All participants N = 169	Enhanced KC N = 42	Moderate KC N = 85	Baseline KC N = 42
Level of Trust F = 6.014; p = .003	2.8536	2.9464	2.8794	2.7083
Overall, the people in my team were very trustworthy	2.8225	2.9762	2.8353	2.6429
We were usually considerate on one another's feelings on this team	2.7619	2.9524	2.9294	2.7619
The people in my team were friendly	2.9172	2.9048	2.9647	2.8333
I can rely on those with whom I work in my team	2.9172	2.9048	2.9647	2.8333

(*continued*)

Table 1. (*continued*)

Variables	All participants N = 169	Enhanced KC N = 42	Moderate KC N = 85	Baseline KC N = 42
Peer Influence on KS F = 13.457; p = .000	2.7663	2.9127	2.8392	2.4063
In general, other team member's constant presence in team meetings' discussion added incentive for me to continue active participation in the collaborative learning project discussion	2.7633	2.9524	2.8353	2.4286
In general, other team members' timely communication affected or shaped my own work positively	2.7515	2.8810	2.8118	2.5000
In general, other team members' contribution affected or shaped my own work positively	2.7751	2.9048	2.8706	2.4524
Personal Outcome Expectations for Team KS F = 13.232; p = .000	2.7219	2.8175	2.7765	2.5159
Sharing my knowledge helps me make friends with other members	2.5917	2.5714	2.7176	2.3571
Sharing my knowledge gives me a feeling of happiness	2.7574	2.9286	2.7882	2.5238
Sharing my knowledge builds up my reputation	2.6923	2.7381	2.7412	2.5476
Sharing my knowledge strengthens the ties between other members in my team	2.7337	2.8810	2.7412	2.5714
Sharing my knowledge enables me to gain better cooperation with other members in my team	2.7663	2.5476	2.8118	2.5476
Sharing knowledge within teams expands interpersonal relationships	2.7929	2.9048	2.8588	2.5476

5 Discussion and Implications

The study examined students' self-perception about knowledge creation and their relationship with intrinsic motivators within virtual teams. This study highlighted the critical role of prompt communication in fostering trust among team members in the enhanced and baseline groups. Other important factors such as fair division of work, benchmarks, and frequent follow ups were also important in developing team camaraderie and trust. Based on comments from the enhanced and moderate knowledge creation groups, three implications can be extracted toward trust development within virtual teams. First, prompt communication is instrumental in fostering a higher level of

trust within team members. Second, prior relationships help facilitate the level of trust. Third, it is important to develop a clear and shared understanding of team members' roles, responsibilities, functions, and time schedule regarding their contributions. The timely communication by team members indicate their intentions and commitments on collaborative learning project, which in turn promotes the development of trust within virtual teams. Therefore, trust is a key factor in affecting students' perception towards knowledge sharing within virtual teams [16].

Peer influence is another important factor in facilitating knowledge sharing within virtual teams. This study demonstrates that the quality of the collaborative learning project was influenced by team members' proactive, timely, and enthusiastic contributions. Additionally, they also volunteered for project tasks willingly, assumed responsibilities for their project parts, and created a mechanism for accountability among team members. As a result, these actions helped create a norm of reciprocity within various knowledge creation groups. Specifically, team members' regular presence in team meetings served as a catalyst for shaping their peers' contributions towards the collaborative learning project. Previous studies also suggest that team members benefit immensely by learning from their peers' feedback [17, 19, 21]. This study also demonstrates how the performance of the baseline group members was affected negatively due to team dynamic issues and personality characteristics. Consequently, a reciprocity norm also appeared in this group but in a negative way, which resulted in mediocre contributions from members and impeded the knowledge sharing within the baseline group members.

While the importance of personal outcome expectations has been acknowledged in prior studies, it has received considerably less attention in empirical studies [20]. As a result, it is not well understood why individuals would be motivated to spend their valuable time and effort on sharing knowledge with their peers in virtual environments. The members of the enhanced knowledge creation group demonstrated higher personal outcome expectations than their counterparts towards knowledge sharing, building professional relationships and developing a mechanism for team members' accountability for their project tasks. Therefore, it would be reasonable to conclude that there is a positive connection between members' personal outcome expectations and their quantity of knowledge sharing.

In spite of the extensive effort undertaken to complete this research, some limitations could not be avoided. These limitations include a convenience sample, format of blended courses, and instructors' pedagogical styles. The future studies should also take into consideration the virtual collaborative tools that have evolved during the last few years. As the concept of workplace information literacy continues to draw attention, it would be important to develop appropriate information resources about collaborative practices in various organizational settings. The findings suggest that it would be helpful for instructors to teach students the best practices possible about effective team management strategies in academic environments. Similarly, organizations in other contexts could also take the initiative to develop workplace literacy instructions for their workers about the best collaborative practices. This could be supported by successful collaborative project templates, examples, relevant literature, research reports, and case studies about collaborative practices. It is also important to ensure that workers have an awareness about information resources, and possess the

tools necessary to retrieve the best information [22, 23]. As technology changes, and more organizations utilize virtual environments as workplace settings, it is critical to understand the intrinsic motivation impacting employees' knowledge sharing behavior and ultimately, the creation of new knowledge. Consequently, this knowledge would help develop appropriate workplace information literacy instruction about collaborative practices and knowledge sharing. The implications of this study could possibly be further extrapolated in developing workplace information literacy instruction about collaborative practices across a variety of organizations.

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Do We Need (Digital) Archeology Literacy?

Mihaela Banek Zorica(✉) and Rajna Sosic Klindzic

Faculty of Humanities and Social Sciences,
University of Zagreb, Zagreb, Croatia
{mbanek, rsosic}@ffzg.hr

Abstract. The field of archeology with its traditional and digital environment presents a complex field that is not only influenced by the advancement of technology but also dependent on the cultural context. Although technology made a huge difference with the time needed for excavations and data gathering it has created a whole array of the new challenges. As new challenges are created, new solutions required. The question of digital archeology literacy has emerged as one of the solutions. This pilot study was conducted with field archeologists in order to identify their positions in digital archeology. The results show that there were no digital archeologists in Croatia. The majority of archaeologist were still in the digitization period, juggling between traditional and digital archeology. They are still struggling with the digital technology and the abundance of data created with it. The lack of data literacy and information management as well as the emergence of digital autodidactics show that there was a lack of structural integration of information literacy in the education of digital archeologists.

Keywords: Digital archeology · Information management · Data management · Education

1 Introduction

It is undisputable that information and communication technologies (ICT) have influenced many new fields and forced interdisciplinarity between different fields. One of the examples is the digital humanities domain that has started from two streams - computational linguistics and digitization of heritage. This field has transformed due to both technology and communication and has brought a whole new array of questions and research challenges. "Digital Humanities 2.0 introduces entirely new disciplinary paradigms, convergent fields, hybrid methodologies, and even new publication models that are often not derived from or limited to print culture" [1].

Transformation of this field is also seen through the convergence of various disciplines both on the social science and the humanities specter. One such convergence is seen in the entering of the information literacy field into digital archeology. "The basic principles of information literacy are seen through every step that archaeologist make during the research but there is no help in making their life easier i.e. educating and training them in information literacy" [2]. We could disagree with this as it has become more obvious that there is a need for integration of some elements of information literacy into the educational programs that could help archeologists in coping with the

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digital environment. What is indisputable is that archaeologists are aware of the problems but are unaware of the potential solutions such as integration of the information literacy into their education and training. Their environment has changed, the technology enabled faster and more precise data gathering but the analogue procedures in archival documentation and interpretation have not been transformed to respond the technological advancement. We can say that they are still stuck in the digitization phase and have not moved towards digital archeology. Still, they are gradually becoming aware of the problem and are starting to seek and accept help from other professionals.

There are two aspects of the archaeological field work that have been transformed by the technology advancement. Both are closely related to the issues of how we handle information: the information practice and the archeological documentation. Processes such as data gathering, information management, and production of knowledge have transformed from analogue to a digital environment. A 'digital archaeologist' needs to understand the potential benefits and drawbacks, limitations, and premises of digitalization before they can be applied to the archaeological practice [2]. Still, one has to be aware of the difference between digitization of the analogue data and processing of the digitally born data. The solution is not only to adapt methods, tools, and procedures to the new environment. It is necessity to develop new ones that respond to the specifics of the new environment.

Having in mind these issues the question is: has technology really improved the whole process? The technology has enable faster gathering of the data, and in most cases the data are gathered in a more accurate way, meaning that it is more precise than the data gathered in the past or the analogue data. Still, the questions of how this data are interpreted into meaningful information, how we interact with it, needs to be researched. In the archeology field, the scholarly work has not changed much due to the technological advancement. The results of scholarly research is still being presented in the monographs or journal articles. The interpretation is still the same. Technology, such as digital photos, total stations, drones, 3D digitalization, and various GIS software and applications have improved the accuracy of data gathered but only now we are realizing that it has also brought new challenges in the archeological documentation and the interpretation of findings.

The majority of the research on archeological information practice and knowledge management was mostly conducted by Scandinavian researchers. Through making some advanced arguments it also puts them in the Scandinavian context. Mapping these results, solutions, or emerging issues in the context of Croatian archeology is almost impossible. The majority of the problems in the Croatian context are mainly seen on the basic level or in the area of archeological documentation that has not fully transformed to challenges of the digital environment. One of the reasons for it is the notion that archeology has stopped in the digitization phase or the utilization of technology for data gathering, re-typing data, and scanning drawings or writings of "old" archeologists. The majority of the funds were spent on the acquisition of new and better technology that was developed but the policies, forms, regulations, and interpretations used were still the ones that responded to the analogue archology. This created a divide between the technology and practice. The archeologists were concentrating on how to train themselves in using new technology that was overwhelming and time consuming instead on concentrating on how this technology can transform

archeology to give them the best results and save time. The full integration to digital environment that could be seen thorough connecting their digital data, creating interoperable databases, and developing cross database search options have still not been fully implemented. These are the issues that only now archeologists are seeing as potential solutions but are unaware of the steps needed to be taken in order to get to their potential.

There is a huge division between the small number of so called digital archeologists and the majority of analogue archaeologists'. There is only a small number of digital archeologists where the majority are actually "manual archeologists" self-taught in using digital technology. This implies that developing procedures, policies, and frameworks for digital archaeology, which is supposed to be done by experienced archeologists, is almost impossible due to the lack of understanding of what digital archeology is. Good education and communication is necessary: "it is clear that the pace of change also make the life-long learning a highly relevant notion in the context of archaeology. A more than haphazard planning of continuing education is needed to maintain professionals and academics basic level of competence in the current state of affairs in digital archaeology" [2]. We can agree with this notion as the research has shown that the majority of knowledge archeologists acquire is self-taught. One part of the solution that we see is the integration of information literacy into the education of archeologists and the development of digital archeological literacy programs.

2 Croatian Archaeology at Present

The Croatian archaeological institutions and companies employ around 350 archaeologists (data from 2016). The vast majority are in public institutions (museums, state departments for the protection of heritage, scientific institutes, and universities) – 309, whilst 41 are employed by private companies. Three hundred and twenty six have permanent contracts and 24 have fixed-term contracts. In the year 2013, presently the year of the last issue of Croatian Archaeological Yearbook, there were 349 archaeological investigations (field surveys and excavations).

In the following table we present the number of archaeological fieldwork activities in the period of 10 years since it is mandatory to submit fieldwork reports to this publication (Table 1).

Table 1. Number of fieldwork projects in Croatia per year during the period of 10 years [3–12]

Year	Number of fieldwork projects
2013	349
2012	445
2011	347
2010	390
2009	347
2008	316
2007	277
2006	250
2005	228
2004	129

This is the complete number of all archaeological fieldwork in Croatia including projects funded by the Ministry of Culture, scientific projects, and rescue archaeology following the infrastructure and building activities. These numbers reveal that, on average, there is one fieldwork project by one employed archaeologist in Croatia. Even though there are several projects under leadership of a single person, and several archaeologists often on each excavation, these data clearly shows that conducting field work is more or less individual work. The problem that emerges in this context is the creation of various data and reports being submitted while there is no reusage of the data or collaboration between the projects. Thus, this data only confirms that Croatian archeology is in the digitization phase as data gathered from the fieldwork is submitted in the digital form but there is no usage of these data beyond the projects from which they were gathered. Results of our interviews confirm this conclusion: usually there is one person in charge on the site and all decisions and data management are his/hers prerogative and responsibility. As a result, there are number of different approaches and methodologies regarding data acquisition and management especially use of different digital solutions including varying formats, programs, and so forth.

Archaeological fieldwork in general in Croatia, over the past 10 years faced major transformation in two aspects:

(1) In the first phase we witnessed a shift from small-scale state funded projects towards big infrastructural work due to the increase of private investors [13] or large international projects. We are currently in the second phase, where work continues on state-funded projects and infrastructural work on much smaller scale.
(2) Development of digital technologies and their application in data collection and storage.

In discussing the need to integrate information literacy in the curriculum of digital archeologists, it is important to point out that archeology study programs are positioned at the two Croatian universities: University in Zagreb and University in Zadar. Both universities offer BA, MA, and Ph.D. programs in Archaeology. Each year each university enrolls 40 BA students and around 30 MA students. The number of Ph.D. students vary from 5−15. When analyzing their study programs one can notice that

they are still oriented towards analogue archeology with almost no integration of digital archeology concepts. The only course covering the issues of digital archeology is one dealing with digital documentation for fieldwork data.

3 Methodology

The aim of this research was to investigate whether information literacy should be integrated into archeology study programs. The first step was to research whether there are actually digital archaeologists in Croatia, how has technology advanced archeological documentation, and the information practices of digital archaeologists. The next step is to create awareness for fully utilizing the potential of digital archeology advancements in the field through considering information literacy as a pillar of the study programs.

For this paper, we used thematic semi-structured interviews with ten participants, that we analysed using close reading [14]. Interviews were recorded, transcribed, and coded. For coding we used MAXQDA software. Interviews lasted from 40 to 90 min, with 60 min on average. All participants were active archaeologists, self-employed, or working in public institutions. The all had experience in fieldwork and post excavation data management. Six participants obtained an MA degree in archaeology in the last five years, while four participants had 15–20 years of experience as professional archaeologists. We chose participants that all had more experience, interest, and knowledge in the application of digital technologies as compared to their colleagues. This is why we regard these data, even though based on small number of participants, as valid sample.

We asked participants seven questions relevant to digital information use, of which three directly connected to their experience with digital practices in archaeology. In this paper we will present answer to these three questions:

1. Define archaeological digital documentation.
2. How did you learn to use digital technologies and their application to archaeological documentation?
3. Identify the shortcomings of application of digital technologies in archaeology.

We based our analysis on statements declared by multiple participants.

4 Results

Analysis showed that all participant had the same opinion and experience in while we could make certain “groups” gathered around some issues. We identified four concepts around which all of our participants grouped. In this paper we will present just these four concepts even though there was material for much more detailed and complex analysis that will be included in our future research.

4.1 We Collect Digitally, but We Do not Do Digital Archaeology

Only one participant declared interest in developing an understanding of the archaeological computation and development of methods (participant 1), while all others perceived digital technology simply as a tool to help them in their work and/or a set of equipment and programs through which they collect and process data.

This research showed that there are differences in perception of the digital technologies used in archaeology between young and more experienced professionals. Young professionals rarely expressed doubt in the benefits of digital technologies at first; after more questions they started to express some sort of doubt. More experienced archaeologists stressed the negative effects of the new gadgets, software, and large amounts of data they created.

The biggest perceived disadvantage in the application of digital technologies was the subjective false belief among the archaeologists was that the data gathered "digitally" was more valid and "reliable". Some even seemed to have confidence in the validity of data simply because of the usage of technology or their use of an "advanced" method.

Participants' opinions are best summarized through statements by participants 4 and 7:

- We collect data digitally, but we do not know how to use this data "archaeologically" (participant 4).
- Biggest flaw is perception that technology can solve archaeological problems instead of archaeologists (participant 7).

4.2 Disintegrated Data Storages

The archaeologists point out that the largest issue they are facing in their work is a lack of data management systems. Due to the technology use there are larger amounts of data sets now being created, much larger than in the past when they gathered analogue data. This made them feel frustrated as it showed their lack of training as well as their inexperience in handling and managing different types and amounts of data. Participant declared the need for an efficient system of data integration and management (participants 2, 4, 5, 7, 8, 9). The possibility of working with data off-site was seen as an advantage by one participant, while others (participants 1, 2, 4, 6, 7, 8, 9, 10) pointed out the danger of "data stashing", in other words, collecting large amounts of data but never adequately processing or analyzing it. When asked why the data had not been processed, participants stated that they lacked time, money, and competencies (1, 2, 4, 7, 8, 9, 10).

4.3 Cheap and Quick Information

The biggest advantage in "new technologies" is precision in data gathering. Various methods enable more accurate data, particularly when talking about spatial data. Collecting data is more precise and accurate, but selection of data for documenting is still exclusively based on decisions made by the principal investigator. This means there is still a lot of subjectivity and hierarchy in gathering and interpreting information. It is intended for "now" and "this location" while there is no need for interoperability.

Thus, much quicker procedures save time and money on the field which is supported by the statement that all participants made: "we do not waste time and money on slow and inaccurate methods".

4.4 Digital Autodidacts

Large scale rescue excavations demanded more efficient methodology of data gathering, which, conveniently, new technologies offered. At the same time, budgets for such excavations made possible the purchase of the advanced equipment/technology that is otherwise hardly if not impossible to obtain. However, formal education or even training did not follow this new dynamic and the discipline started to transform itself by using external expertise or even learning through observation and advice from colleagues. Geodetic surveyors, usually associated with construction work were often used by the archeologists as unofficial trainers or instructors on the basic use of total station and AutoCad.

The archaeologists were using Youtube tutorials as a source of knowledge for AutCAD and GIS, (participants 1, 3, 4, 5, 6, 8). We did not pursue the question on how they evaluated the Youtube sources or any other social networks resources. Several participants asked their peers or experienced colleagues for help (participant 4, 6, 10). Only one participant looked for help and advice from published professional and scientific articles and foreign academics regarding use of digital methods.

At the same time, archaeologists were learning how to use new technologies and deciding how to apply these technologies to archaeological work. Archaeologists themselves were deciding whether to use, what to use, when to use it, to what extent to use new available technologies. New circumstances require new knowledge from the archaeologist – not just what and how to use it, but how it would affect quality of data and relevance of interpretation. We feel that this part should be investigated further in the next phase of this research as it is closely related with the information literacy field. Still, the archeologists focus was on data processing and they were not aware of the potential problem and issues related to their autodidact's behavior.

5 Discussion

Everybody expected that digital technologies will somehow improve the "pursuit of the past" [15, 16]. In some countries we can observe the rapid development of computational methods and techniques that are transforming knowledge production and archaeology as a discipline itself. In others countries, such as is the case in Croatia, archaeologists use digital technologies for traditional archaeological practices without feeling the need to adapt to the new digital environment.

This might not be only a case in Croatia as the research shows that archaeologist divide themselves to "those who want to do archaeology digitally", and those who want to do digital archaeology. [17] According to some, they are all digital archaeologists already [18], or, on the contrary, digital archaeologist do not exist [19]. In term of information literacy of Croatian archeologists, we can return to some "old" concepts such as "stages of disciplinary loss of innocence" [20] as defined 45 years ago. Our

results show that the concept is still not outdated. Regardless of the availability and use of digital technologies, this pilot-research draws us to conclusion that archaeology in Croatia is at the level of developing self-consciousness, with this dominant discourse:

"This process is also marked by the emergence of competitive individualism and the authority, since the individual's living depends on the reputation he achieves as a focus in the media or by innovation and intensive work in a specialist field. The politics and sociology of the disciplinary environment increasingly develop this 'authoritarian' state in which each expert has a specialist territory such that criticisms of territorial observations are treated as attacks upon personalities" [20]. At the same time, we can observe emergence of critical self-consciousness [20] through responses of some participants (2, 7, 9, 10). They state that in Croatian archaeology there is still the dominant tradition that the main researcher is fully responsible for the interpretation and has right and obligation to do it by himself. Participant 7 calls it the "German 19th century tradition" and continues: "Archaeological research is individual story and it is hard to share that story. Nobody taught us how to share information and work. It is hard to make consensus with yourself, much less with other colleagues. We are not trained to work together. Volume of the excavation changed, but this story remained the same."

This leads us to question. How has the education system followed these new demands? Information and communication technology (ICT) is regarded as contesting traditional relationships between teachers and students and offering ways of putting educational theory into practice [17]. "*The needs of teaching emerge as one of the main disciplinary propellants into the space of expanding consciousness – student and amateur provide the fuel, research sparks ignition and the disciplinary elders monitor and direct in a series of contradictory instructions*" [20].

In Croatia this rapid development of size of archaeological methods and use was not adequately followed by educational institutions. In 2010 the first and still the only course on use of software for digital data processing (AutoCAD and recently AGI-SOFT) were introduced to the archeology study program. No other advancements were made and no other courses on data or information management or similar were introduced. It is our opinion that a structured system of information management would improve the work of professional archaeologists a great deal, leaving more time to deal with core questions and problems. Also introducing various elements of information literacy into the educational programs of the archeologists would definitely improve their preparedness for orientation and work in the field of digital archeology.

Why can we still not talk about development of archeological literacy in Croatia? Let us just look at one concept from the ACRL framework: Authority is constructed and contextual is still not something archaeologists in Croatia are facing as a problem that needs tackling. Authority is still traditionally seen as it was in the analogue environment. The discipline's authorities are almost never challenged but, instead, are followed. The authority is evaluated in the number of excavations that an archeologist has had. There is almost no questioning of the project coordinator. There are still small steps being made in looking differently in authority during the learning process. This is seen through archeologists "untraditional" sources such as Youtube or specialists from other disciplines but their views are currently to focused on data management and technology usage that this still needs to be explored in the future research.

On the other hand there is no real notion of the concept that "Information has a value" due to the limited funds. The majority of the funds are directed towards excavations, in other words, equipment and technology and not documentation or interpretation. The copyright issues are therefore often neglected in acquiring the information from articles or monographs. On the other hand, traditional awareness of citation and plagiarism are deeply rooted in the scholarly practice.

Therefore, these issues are emerging in the field but only sporadically. We can say that rudimentary concepts of information literacy need to enter the field of archeology and become recognized by archeologists as one of the solutions for problems they are facing.

Some awareness has been reached internationally as "Digital literacy and critical digital media object creation cannot be the realm of only a few heritage professionals, but should be cultivated and rewarded as we create new publication standards throughout archaeology" [18].

Therefore the critical level has been reached and collaboration between information science and archeology needs to be evoked. As it is not about the digital technology but the notion of how to cope with information and how to interpret large sets of data into meaningful knowledge.

6 Conclusion

When looking from an information literacy perspective, the major problems that archeologists are facing are ones related to the data literacy and information management. Addressing these problems could bring more insight and advance the processes of data management-archeological interpretation-knowledge management.

Prior to our study we wanted to see how this field had adapted to the changes of the digital environment. The major problem that we faced is that the field is still very traditional and has not adapted to the digital age in fullest so advances in information literacy that are responding to the challenges of digital environment are not fully applicable. The technology is implemented but with no deeper knowledge and understanding of its advances and obstacles.

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Information Literacy Research and Information Literacy in Theoretical Context

A Phenomenological Imperative for Information Literacy

John M. Budd[1(✉)] and Anna Suorsa[2]

[1] University of Missouri, Missouri, USA
buddj@missouri.edu
[2] University of Oulu, Oulu, Finland
anna.suorsa@oulu.fi

Abstract. When the American Library Association developed and approved the *Framework for Information Literacy in Higher Education*, librarians at many institutions began to attempt implementation. The *Framework* marked a conceptual and practical break from the past of information literacy standards, so substantial re-tooling become necessary. The present paper applies phenomenology to some specific concepts of the *Framework* to assist with interpreting ideas and implementing those ideas into practice. The phenomenological analysis actually forms a critique (not criticism) of three of the concepts in particular and uses the work of Edmund Husserl and Maurice Merleau-Ponty as foundations to facilitate information literacy work.

Keywords: Phenomenology · Truth · Rationality · Husserl · Edmund · Merleau-Ponty · Michel

1 Background on the Framework

The *Framework for Information Literacy in Higher Education* expresses a new way of envisioning what information literacy is and what it aims to accomplish. The definition states, "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" [1, p. 2]. A particular means of achieving results is presented. It is readily admitted that a set of skills must be a component of information literacy instruction, but it is also proposed that a way of thinking about information, informing, an individual's relation to information, and to the sources of information (speakers) is needed. The *Framework* [1] is comprised of a set of components:

The six concepts that anchor the frames are presented alphabetically:

- Authority is Constructed and Contextual
- Information Creation as a Process
- Information has Value
- Research as Inquiry
- Scholarship as Conversation
- Searching as Strategic Exploration [1, p. 2]

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Some specific components will be concentrated on in this paper: Authority, Information Creation, and Scholarship as Conversation. These elements, in particular, lend themselves to examine according to phenomenological means and outcomes.

The focused elements should be elaborated upon here so that they are clearly defined and can be further analyzed. For example, the authority tenet states, "Information resources reflect their creators' expertise and credibility, and are evaluated based on the information need and the context in which the information will be used. Authority is constructed in that various communities may recognize different types of authority. It is contextual in that the information need may help to determine the level of authority required" [1, p. 4]. The assumption that communities define authority independently of one another is something that cries for examination; that examination will be presented below. Information creation is expressed thusly: "Information in any format is produced to convey a message and is shared via a selected delivery method. The iterative processes of researching, creating, revising, and disseminating information vary, and the resulting product reflects these differences" [1, p. 5]. Variance of creation also is fodder for analysis. The next concept states, "Communities of scholars, researchers, or professionals engage in sustained discourse with new insights and discoveries occurring over time as a result of varied perspectives and interpretations" [1, p. 8]. This element suggests a dialogic structure of communication where individuals account both for the presence and the existence of others. The inclusion is integral to phenomenological inquiry.

2 Background on Phenomenology

What is required here in this proposal is a rationale for incorporating phenomenology into information literacy. According to Sokolowski [2, p. 2], "Phenomenology is the study of human experience and of the ways things present themselves to us in and through such experiences". Another statement is even broader: "[Phenomenology] claims first and foremost, to be a *radical* way of doing philosophy, a *practice* rather than a system" [3, p. 4]; emphasis in original). Particulars will clarify how phenomenology relates closely to information literacy instruction. There are some essential elements of phenomenology that illustrate the connection: intentionality, ontology, and, especially, the phenomenological attitude, which students should be instructed to adopt in order to be able to evaluate and use information. With phenomenology, the students could be able to examine and understand their own relation to the world and information of that world. The phenomenological attitude is not so simple; among other things, it necessitates apprehending the natural world in a particular manner: "The manner in which we accept the things in the world, and the world itself, is one of *belief*. As we experience other people… we experience them as being there, as true, as real" [2, p. 45]. The experience of the "true" refers to experience of people and what is presented *as it is*. The nature of experience, for Husserl, is of a particular kind—not "simple," but rich in its relation to consciousness. He [4, pp. 233–34] writes,

> But experience is not an opening through which a world, existing prior to all experience, shines into a room of consciousness; it is not a mere taking of something alien to consciousness into consciousness. Experience is the performance in which for me, the experiencer, experienced being "is there", and there is *as what* it is, with the whole content and the mode of being that experience itself, by the performance going on in its intentionality, attributes to it (emphasis in original).

Why phenomenology, and what can it promise? Phenomenological inquiry can offer insight into the human elements of the *Framework*, especially the three concepts described above. Husserl [5, pp. 8–9] notes, "this new philosophy seeks nothing less than to encompass, in the unity of a theoretical system, all meaningful questions in a rigorous scientific manner." Husserl [5] and Merleau-Ponty [6] also call upon reason as the means by which we are able to apprehend what *is*. What all this means for instruction is that students are trained to employ reason to see things as they are. Students thus trained are able to assess truth as what is. The assessment is key in applying phenomenology in order to become conscious *of* what is said or written. The presentation will make clear that the essentials of phenomenology give students the wherewithal to evaluate information as it is given, and to perceive what is true, including envisioning "what it is like" to adopt an opposing stance on a topic.

There is, of course, a more extensive history of phenomenology, but, for the purposes of examining a practice for information literacy (based especially on the *Framework*), the thought of Edmund Husserl and Maurice Merleau-Ponty will be the focus of attention here, because they offer a consistent explication of the relations of human beings to the world and explicate, how information on that world is created in the process of experiencing and observing the world. That said, it should be mentioned that contemporary phenomenology reaches into some disciplines other than philosophy to recommend analyses of the essences of the school of thought. Some of these contemporary ideas can have pertinence for information literacy. For example, a cognitive approach engages, among other things, "thought states" and emotions as also essential to core phenomenological concepts (see, [7]). Some later works demonstrate that phenomenology is a living, not reified, philosophy that has application to many states and actions experienced by people now.

3 Husserl

Even early in his career Husserl had some definite ideas about what constitutes thought and truth in logic and formal inquiry. In the *Logical Investigations*, Husserl [8, pp.14–15] wrote, "The realm of truth is objectively articulated into fields; researches must orient themselves to these objective unities and must assemble themselves into sciences". There are many kinds and foci of sciences, but the quest for truth binds them together. This is an extremely important notion, and one that Husserl held to throughout his life. As we will see, this stance has importance also for the examination of information literacy. The quest for truth entails a search for knowledge as well: "The… motives for phenomenological analysis have an obvious and essential connection with those which spring from basic questions of epistemology" [8, p. 253]. Although there is not space here to delve deeply into Husserl's transition to

transcendental phenomenology, it must be said that, in that stage of the development of his thought, he remained committed to search for what Moran [9, p. 175] calls the how of knowledge. That commitment to knowledge is accompanied by an equally strong commitment to what constitutes communal life, and the objectivity that attends to it.

As noted above, Husserl distinguishes between two distinct attitudes, and these attitudes extend to almost every difference between the phenomenological and its opposite. He makes this clear when he [8, pp. 283–84] writes, "Where not the phenomenological, but the naïvely objective interest dominates, where we live in intentional acts without reflecting upon them, all talk of course becomes plain sailing and clear and devoid of circumlocution". Phenomenology must include a reflexive character if there is to be a philosophical attitude (as opposed to the natural attitude). He [10, p. 33] emphasizes, "Only in reflection do we '*direct*' ourselves to the perceiving itself and to its perceptual directedness" (emphasis in original). The natural attitude embodies the raw perception of what is presented to the observer; a tree is just a tree, a house is just a house, and a document is taken purely at face value (that is, it is perceived unreflectively). According to Husserl [11, p. 195], though, perception requires judgment—something beyond perception alone. He [8, p. 324] says, "Where the sciences unfold systematic theories, when they no longer merely communicate the progress of personal research and proof, but set forth objectively unified, ripe fruit of known truth, there is absolutely no talk of judgements, ideas and other mental acts." Importantly, there is a stark distinction between the "personal" research of individuals and the collective inquiry that forms a science. He [11, p. 5] clearly describes what he means by objectivity within the context of cognition in a later writing: "Objectively valid results…–the phrase, after all, signifies nothing but results that have been refined by mutual criticism and that now withstand every criticism". As we will see, this distinction comes to the fore when the *Framework*'s concepts are analyzed.

What occurs when aforementioned distinction is realized is that, as Moran [9, p. 7] says, "The life of knowing is to be approached as a life of meaning and intending; it is always in its very essence object-directed". Husserl himself describes what this intending means: "Each *cogito*, each conscious process, we may also say, '*means*' *something or other* and bears in itself, in this manner peculiar to the *meant*, its particular *cogitatum*." (p. 33; emphasis in original). A thinking being is fully cognizant of what is being thought about. In informational terms, this means that the perceiver does not narrowly become aware of one document (writ large). The thinking being becomes aware, becomes intentionally cognizant, of *documentation*, of the body of speech or writing pertinent to a topic at hand. Husserl made his career saying that this kind of intentionality is necessary, if not entirely sufficient, for the phenomenological attitude (and the transcendence of the natural attitude).

For the present purposes of introduction to Husserl's thought, two additional conceptions will be mentioned. One—and this is something he returned to in many of his works—is evidence. As Husserl [12, p. 6] says, "we, the beginning philosophers, make it a rule to judge only by evidence. Also the evidence itself must be subjected to critical verification, and that on the basis, of course, of further available evidence". In another of his works, Husserl [11, p. 29] reminds all thinking beings of a certain quality of what is perceived: "Objects are always present for us, pregiven in simple certainty, before we engage in any act of cognition. At its beginning, every cognitive activity

presupposes these objects". In other words, everyone apprehends an object—and this includes a documentary object—with the natural attitude. Each of us perceives the thing as it first appears to us, before we can even think about, and evaluate or judge it. It is only after that natural initial perception that the phenomenological attitude, including reflection and evaluation, can be applied. Husserl distinguishes, in part, the natural from the phenomenological attitude by noting the distinction between naïve natural science and reflexive epistemology. The first merely accepts objects as they initially appear and are perceived; the second entails the *cogito* as related to the *cogitatum*. Husserl [13, p. 19] describes the difference clearly: "Only epistemological reflection yields the distinction between positive science and philosophy".

4 Maurice Merleau-Ponty

Drawing on Merleau-Ponty's phenomenology is central when striving to examine the act of perception and its relation to how we understand the world and other people – this process is crucial also in relation to information literacy. Merleau-Ponty's phenomenology starts from the acknowledgement of the body as a premise for our understanding of the world, and is occupied especially with the limits and constraints of the perception tied in the body [6, p. vii]. Important for our point of view when striving to explicate the premises for information literacy is the ultimate attitude to the world in the phenomenology of Merleau-Ponty, which questions the origins of our knowledge, and on the other hand, stopping to wonder about the phenomena encountered. For Merleau-Ponty [6, p. vii], the world as such is always already present before it is being perceived, wondered about and possibly questioned, and in the act of wondering there is a possibility to describe the world and the human being living in it differently, starting from the body and the experience. In his phenomenology, the body and its experience is of a primary nature, and there is no other way of being in touch with the world than through a bodily experience. This body is of flesh and blood, and unique as such [6, p. 17]. Thus, everything I know and understand has been created by going through my body, getting its meaning from the experiences I have lived through before in my life [6, pp. 94–97]. As Merleau-Ponty [6, p. 94] states: "The body is the vehicle of being in the world and having body is, for a living creature, to be intervolved in a definite environment, to identify oneself with certain projects and be continually committed to them." Hence, as a body, a human being has no sharp borderlines, as the world always opens up differently, depending on the body and its senses.

To take the bodily experience as a premise for the examination does not mean that there is no real world or that everything would be purely relational. However, Merleau-Ponty emphasizes that, in any case, knowledge is always grounded in experience, which as such is real for the body in that exact moment, even if the experience formed by the senses could be distorted from the viewpoint of the objective conception of the world [6, p. 95]. Hence, the conception of human consciousness is to be explicated anew, to be able to understand oneself, the other, and in the case of examining information literacy, the information in question. Here, the phenomenology of Husserl, examined above, is central, as he deconstructs the idea of a world and a human being as separate. Merleau-Ponty addresses this with the conception of embodied subjectivity,

simultaneously criticizing on his part both the Cartesian emphasis on the mental and empiricism's emphasis on the physical reality. Instead, he strives to explicate the weaknesses of these kinds of dualisms. He, however, does not deny the existence of something, which could be called mind or soul, but merely explicates, that in any case also the mental processes are inseparably tied to the body and the environment. Understanding this gives us means to understand different views and values people have as they strive to find truth in different situations.

Information literacy could thus start from critically evaluating the process of creating information from the world and asking how to understand the basic idea of a world consisting objects and subjects. Merleau-Ponty does not abandon the concepts of object and subject as such, but takes them to describe the relations in the world in his own way. In principle, subject is something which is capable of experiencing, and an object is something of which one can form an experience [14, p. 32]. Object is defined by its stability – it has a certain shape and size, but as being in the world, it is shaped by the subject, who always perceives it differently, depending on the position and point of view of the subject [14, pp. 201–02]. For Merleau-Ponty perceiving is always intentional and related to the human being's ability to distinct the objects from the background [15, p. x]. Hence, the world with separate objects is questioned and described instead as ever changing and dependent on the intentions of the perceiver. Henceforth, also the subject can be defined: it is something which is capable of experiencing, that is to say a body, defined by its awareness of its own embodiedness. As a subject, a human being experiences a body in two ways: by getting experiences of other bodies, and as being a body, which is also perceived [14, p. 56]. However, one cannot turn away from one's own body, and it never disappears from one's own sight, nor is it ever in front of oneself like other objects. Thus, our own bodies are not objects, and realizing this also affects our relationships to other human beings as bodies. In addition, through this way, we are able to understand human subjectivity as physical in a sense, which questions the possibility of dividing a human being into a mind and a body. [6, pp. 94–97] Thus, Merleau-Ponty [6, pp. 159–60] states: "Consciousness is being-towards-the-thing through the intermediary of the body". Hence, consciousness is understood in terms of intentionality and how the body is directed at the world.

This all leads to the question of the other, which is important when analyzing the concepts of the Framework, as it emphasizes the dialogicality and communality of information literacy. In principle, the understanding of the other as a living, embodied subjectivity comes from the realization of one's own embodied subjectivity. In principle, then, it is possible to look at the other as an object by turning away from the humanity and concentrating on the external features, such as the size and form. However, as soon as the other moves or says a word, its position as an object is impossible, as the perceiver recognizes the body and also experiences it in relation one's own body. [6, pp. 420–21]. For Merleau-Ponty, this kind of a way of perceiving and experiencing the other is developed by living and experiencing this world from the first days of our lives, as opposed to the idea of that understanding being analogical, meaning carrying out comparisons based on knowledge [16, pp. 69–70; 17, p. 151]. This is related to the notion of the ever-changing nature of the human body, affecting the way we also understand phenomena related to information, knowledge and learning.

The embodied subjectivity is thus to be understood in its fullest by examining the relationship to the other. Being conscious of other human being belongs essentially to humanity. My perceptions of the other defines my thoughts of what I am and vice versa: because of my perceptions of my own body and the world, which are always understandable through my own life, I can be sure of my own subjectivity: I am not an object like other things, and awareness of this prevents me from thinking of myself as an objective consciousness, as in Cartesinism. On the other hand, the consciousness of the other cannot be objective, because in that case I would be perceived as an object, which I know is not possible [6, pp. 410–11]. This also has effects on encountering the other and engaging in discussions. As I recognize the other as a living body, the encounter remains open and alive: "I experience my own body as the power of adopting certain forms of behaviour and a certain world, and I am given to myself merely as a certain hold upon the world; now, it is precisely my body which perceives the body of another, and discovers in that other body a miraculous prolongation of my own intentions, a familiar way of dealing with the world. Henceforth, as the parts of my body together compromise a system, so my body and the other's are one whole, two sides of one and the same phenomenon…" [6, p. 412] This, together with the general idea in phenomenology emphasising the unity of being, underlines the nature of the discussions as a concrete event of encountering with movements, gestures and mutual perceptions, which prevents the division of this event to separable elements [6, p. 412].

Thus, the nature of this encounter is intergral: even if the other is recognized as a living body, there is no explicitly explicated relationship between this recognition and ethical action in the discussions understood in terms of Merleau-Ponty's *Phenomenology of Perception* [18, p. 12], even though he discussed many societal and ethical issues in many of his writings [19]. The nature of the encounter is defined always in the moment of the encounter, and here, according Merleau-Ponty, a human being can make choices: "The other transforms me into an object and denies me, I transform him into an object and deny him, it is asserted. In fact the other's gaze transforms me into an object and mine him, only if both of us withdraw into the core of our thinking nature, if we both make ourselves into an inhuman gaze, if each of us feels his actions to be not taken up and understood, but observed as if they were an insect's." [6, p. 420]. Hence, as I perceive the other, I can still deny his or her subjectivity. However, there is the possibility of acknowledging the other as an embodied subjectivity, and if this is mutual, there is a possibility for a new kind of being together and communicating: "To be a consciousness or rather *to be an experience* is to hold inner communication with the world, the body and other people, to be with them instead of being beside them" [6, p. 111].

5 Phenomenology and the *Framework*

It has been mentioned above that many elements of phenomenological thoughts and practice have relevance to the specific aspects of the *Framework* that are targeted above. What follows is an examination of just how phenomenological action can clarify and augment what the *Framework* [1] seeks to accomplish. The first concept in question has to do with authority, and how it might be constructed. This first conception states.

> Experts understand that authority is a type of influence recognized or exerted within a community. Experts view authority with an attitude of informed skepticism, and an openness to new perspectives, additional voices, and changes in schools of thought. Experts understand the need to determine the validity of the information created by different authorities and to acknowledge biases that privilege some sources of authority over others, especially in terms of others' worldviews, gender, sexual orientation, and cultural orientations.

The invocation of "experts" is curious, since there are many experts who state just the opposite when it comes to authority. These other opinions note that the expertise holds authority to be objective, in the same way that phenomenology relies on objectivity as a pathway to truth. One of the things, though, that phenomenology has in common with the *Framework* is a nascent (in the case of information literacy) or explicit (in the case of phenomenology) skepticism of positive science. That said, phenomenology replaces positive science with a broader and more human kind of objectivity: "Any attempt by scientific thinking to give an account of being human transforms humanness into a thing: an entity governed by natural laws, explained by causalities that originate outside itself, fully determinable in terms of empirical universals" [20, p. 260]. Expertise, then, is the relative variable in the above statement. With Husserl's and Merleau-Ponty's concepts students could critically evaluate the objectivity of scientific knowledge and also their own prejudices affecting the process of defining the authorities.

The *Framework* is correct in that there are authorities in a variety of fields and subjects, but authority in a given field can be assessed objectively and reflexively to determine truth. As Sokolowski [20, p. 266] says, "The philosophy must not only point out deficiencies but also explain them, because deficiency in philosophy is mistaking one thing for another—taking perception for intuition, for example." Sokolowski [20, p. 267] adds, "Distortions of philosophy brought about by the force of historical circumstances and the inability of thinkers to master them can have deleterious effects on human life and expectations, especially through education which may have become sophistic". Husserl [5, p. 6] himself wrote, "Merely fact-minded sciences make merely fact-minded people". His words are appropriate to the "Authority" tenet in several ways: (1) there must be a means by which the falsities and shortcomings of claims can be assessed and (possibly) found wanting, (2) those evaluating authority should be cognizant of mistakes and how to correct them, and (3) there should not be any tendency to fall prey to fads and fashions of, say, postmodern affinities for radical constructivism. More can, and should, be spent on this matter, but space precludes it. It could be said that the statements in the *Framework* on authority are mired in then natural attitude and do not make the transcendence into the phenomenological attitude. Husserl [5, p. 329] notes, "When we live in the natural—the nontranscendental—attitude, different thematic directions, and thus different directions of theoretical interest, open themselves to us in accord with the structure of the pregiven world". There is, then, something missing, something not quite fully realized.

The next concept of interest here—information creation as a process—has greater affinity with phenomenology in some important ways. For example, the *Framework* [1, p. 5] states, "The information creation process could result in a range of information formats and modes of delivery, so experts look beyond format when selecting resources to use. The unique capabilities and constraints of each creation process as well as the

specific information need determine how the product is used". This description contains an inherent recognition that there is more than the pregiven world, that *noetic* and *noematic* processes are necessary to reach a full understanding of information and its communication. The above statement also contains a notion of mediation, which is decidedly phenomenological premise. Zahavi [21] explicates how this operates: "only a mediator theory, which emphasizes the *difference* between the noema and the object, can account convincingly for those cases where the experience is intentional" (p. 85). One thing about the *Framework* statement that might be challenged is that it does not require putative experts to look beyond format. This is an educational issue, and relative novices can learn to examine various formats (and modes of delivery) when making judgments about content. For example, a Web site may have inherent authority and truth-bearing content, whereas a print publication may contain bias to the extent that its trustworthiness is questionable.

The last point is especially pertinent to information literacy. The process of information creation—and in particular, communication of the outcome of the process—can be taught and learned. The learning process can also emphasize the limitations of a strict empiricism as well. Such empiricism can include representationalism, which limits perception and apprehension that extend beyond the object as it is. Such extension surpasses skepticism and a naïve realism—a realism that does not recognize what Zahavi [21, p. 97] calls "the fit and link between mind and world". None of this suggests that there is not a realist bent to the thought and practice of the thought of Husserl and Merleau-Ponty. They do admit to the truth of physical objects; their philosophies do comprise a transcendence of the physical to allow for the phenomenological attitude. Thus, the phenomenological concepts examined in this paper give a good ground for understanding this problematic turn of our attention to scholarship as a conversation, we enter the realm of the phenomenology of discourse. A central tenet of phenomenology is what is called the presuppositionless character. That is, no presumptions are made prior to apprehension of the object, including documentary or speech objects. The object is evaluated as it is received and in the context of the evaluation of other objects, as seen in Husserl's and Merleau-Ponty's descriptions in previous chapters. In order to accomplish such an aim there must be communicative action. The next step is the full perception of the object and its attending action. For scholarship to be a fruitful conversation, some conditions should be met, drawing from the phenomenological conceptions examined earlier. First, the discourse must be clear and unambiguous (as opposed to poetry or other creative acts); it must be interpretable and understandable by the hearer/reader. Second, it must be amenable to evaluation and judgment; the hearer/reader must be able to assess the content of the discourse. Third, the discourse should be received within the phenomenological attitude; the natural attitude should be transcended. If these conditions can be met, a genuine conversation can take place. As the *Framework* suggests, interdisciplinary communication presents the greatest challenge to effective communication.

A potential obstacle to the achievement of this concept of the *Framework* is that there are multiple perceivers, and this comprises librarians as well as scholars and students. The different perceivers may be receiving the discursive acts within differing contexts. In terms of phenomenology, each perceiver may incur some difficulty in transcending the initial "given." As Merleau-Ponty [22] points out, the communicators are employing signs. Ideally, the recipients of the signs share tools and backgrounds of

evaluation. When there is a lack of sharing, the discursive acts become problematic. Pivčevič [23, p. 53] points out, "Knowledge, as philosophers are constantly reminding us, consists neither in concepts alone nor in perceptions alone but in a combination of the two". Conversation depends on such a combination; student learning, given such a necessity, makes for a difficult task. Librarians need to be cognizant of this phenomenological imperative as they teach students how to become participants in the conversation.

6 Conclusion

One thing that must be noted at this time is that the phenomenology of Husserl is not exactly identical to that of Merleau-Ponty, although the similarities are considerable. One of the concepts they have in common (although it is admittedly more prevalent in Merleau-Ponty) is that of the essential presence of the "Other," of another subject. That Other is not the same as the Self, but the Other possesses all of the attributes of another Self. This means that the Other is a thinking being who experiences the world within the context of her/his familial ties, spatial locus in the world, education, and all other influences that make for a unique subject. The Self cannot immediately know the Other, but *can* apprehend what constitutes experience of the world (even while not knowing *specific* experiences). Through that Self's cognition, and through the bodily elements of cognition, the Self can *appreciate* what enters the Other's life and world. That awareness is an extremely important component of understanding the kinds of concepts are inherent in the *Framework*.

The three concepts of the *Framework* that are discussed here, in particular, depend on the realization of subjectivity. It is, for example, a means for becoming aware of, and critiquing, the idea of Authority. The Self is able to evaluate and judge what two (or more) Others say about the same topic, especially insofar as the Others' experiences are related within what is said or written. The hearer or reader is then able to assess the discursive actions and determine meaning and approach a grasping of truth. The same applies to "Information Creation" and "Information as Conversation." It is most imperative that librarians, as Selves, apprehend the phenomenological essence that is at the heart of the present discourse. Through that apprehension, librarians can themselves adopt the phenomenological attitude and instill that attitude in students. It should be noted that there may well be differing practices in different countries and cultures. What is presented here is only one response to a phenomenological impetus for the praxis of information literacy.

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Information Literacy and Open Science: Before and After the New ACRL Framework

Carlos Lopes[1(✉)], Maria da Luz Antunes[2], and Tatiana Sanches[3]

[1] ISPA – Instituto Universitário, Lisbon, Portugal
clopes@ispa.pt
[2] Escola Superior de Tecnologia da Saúde de Lisboa, Instituto Politécnico de Lisboa, Lisbon, Portugal
mluz.antunes@estesl.ipl.pt
[3] Instituto de Educação, Universidade de Lisboa, Lisbon, Portugal
tsanches@fpie.ulisboa.pt

Abstract. In 2000, ACRL published the Information Literacy Standards, clarifying and describing specific learning objectives for higher education students. The document recognized the role of librarians who had long been informally developing these practices. But the Standards have evolved and adapted. In 2016, the ACRL adopted the new Framework, which sustains a metamorphosis. Information literacy remains a pattern of integrated competencies that encompass the reflexive discovery of information, the understanding of how information is produced and valued, and the use of information in the ethical and legal creation of new knowledge. Aim of the study: Based on a literature review, this study discusses the challenges and practical implications that the new Framework has in Open Science, its flexibility, the relevance for the privacy and rightful author of scientific data, and the new steps of the academic libraries to be involved as key players for the Open Science contents.

Keywords: Information literacy · Open science · Open access · ACRL framework · Higher education

1 Introduction

In 2000, the Association of College and Research Libraries [1] published a document that standardized and described the specific learning objectives for higher education students in the area of information (i.e. what and where to research, how to define search strategies, how to select and evaluate retrieved information, how to use the information in an ethical and legal way) – *Information literacy competency standards for higher education*. These Standards have established learning objectives to actively implement information literacy (IL) in the academic community. They also recognized the role of information professionals who had long been informally developing these practices. Over the years, many disciplines have been inspired by the Standards to

C. Lopes—The three authors are members of the Applied Psychology Research Center Capabilities & Inclusion (APPsyCI), Lisbon, Portugal.

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formulate their specific objectives in the teaching-learning process, namely in nursing, psychology and health sciences. But the Standards had to evolve and adapt. As the disciplines regularly evaluated and accredited their practices and curricula, the practice of IL also had to be reviewed and re-evaluated in terms of its relevance and application. In January 2016, after two years of elaboration and incorporation of extensive comments from information professionals, ACRL adopted the *Framework for information literacy for higher education* [2].

How does the new Framework articulate with Open Science? How can academic libraries maximize IL skills with the benefits of Open Science? The main purpose of the study discusses the challenges and practical implications that the new Framework has in Open Science, its flexibility, the relevance for the privacy, the copyright of scientific data, and the new steps of the academic libraries to be involved as key players for the Open Science contents.

The new Framework renews the concept of IL as: "… 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" [2, p. 2].

This new document also opens the way for information professionals, teachers and other institutional partners; to reformulate contents, training courses, curricula and credits to be awarded [3]; to link IL to successful student initiatives [4]; to collaborate in the pedagogical research and to involve the students themselves; and to develop and broaden the discussion about the teaching-learning process.

2 From the Standards to the New Framework: The Changing Process

The new Framework supports an expected metamorphosis given the need to align the existing Standards with the current information use and creation process. But the process of adopting the new Framework has been controversial. While some recommend the new document for its flexibility [5], others criticize it and call it elitist [6]. One of the main criticisms was that this was just a new document, rather than a review of the document they were waiting for [7]. Regardless, the shift in Standards from IL has brought renewed energy and a new level of discussion around the training provided by academic information professionals.

For years, the Standards have offered to information professionals a tool to plan, evaluate and communicate the need to integrate IL skills into academic curricula [3]. At five levels, each of which comprised a subset of performance indicators along with the results of the evaluation, the Standards recognized the different levels of competencies in the process of locating, accessing, evaluating, and using the information [1].

What are the major changes of the Framework compared to the Standards of IL? The main difference is a change in behaviour against a more philosophical theory of the threshold concepts. While the Standards outlined specific task-based learning objectives (e.g. "access the needed information effectively and efficiently" and "evaluate information and its sources critically") [1, pp. 2–3], the new Framework presents a set of interconnected frames or main concepts, representing broad ideas that are intended

to be applicable to many academic disciplines [2, 8, 9]: Authority is Constructed and Contextual; Information Creation as a Process; Information has Value; Research as Inquiry; Scholarship as Conversation; Searching as Strategic Exploration.

Each of these frames includes a knowledge practice section used to demonstrate how the domain of the concept leads to its application in new situations and to the creation of more knowledge; it also includes a set of provisions that work the know-how in the learning process.

The knowledge practices in each frame comprise a non-exhaustive list of behaviours that highlight the involvement of an individual with IL competencies in the academic community [9]. The dispositions in the teaching-learning process embody students' preferences and attitudes about how they learn. Each frame is intended to involve information professionals in the exploration of an original concept underlying IL, which will ideally enable students to understand latent concepts in information, beyond the mere mechanics of locating, using, and citing information [7, 8].

On the other hand, the threshold concepts are ideas that can be found in any discipline and that constitute a framework that guarantees their expanded understanding, but also ways of thinking and exercising within the same discipline. Schaub and McClure emphasize the concepts' threshold, "focused on the whys of information instead of the hows" [7, p. 2].

Thus, the focus is on why the reason for the information and not on how to use the information. The approach of the threshold concepts in the teaching-learning process must therefore be centered on the student. The concepts require that information professionals remain aware of the knowledge they give with certainty and never assume that others have the same understanding of an idea [9]. The idea of knowledge, which a student may find strange, confusing, difficult or contrary to a prior understanding, requires information professionals, as trainers, to deepen this difficulty. It requires information professionals to abandon their expertise and meet the student – wherever he/she is. In the same way, they are asked to be interesting information professionals to build a pedagogical approach based on skills [7]. The threshold concepts are a useful way to think about the contents of the courses, to define the relationship between teachers, students and learning outcomes.

The assessment of behaviour in IL has also changed. While the Standards defined a list of twenty-two measurable performance indicators in IL, the new Framework moves away from any set of skills and encourages information professionals to develop their own needs.

The discussion about the Standards of IL is relevant to academic information professionals. For specialized librarians who work with a specific field it is even more important because they are confined to following the discipline's specific accreditation standards and their learning objectives. Generally, they provide training in the framework of evidence-based practice rather than strictly based on IL. Although both can be comparable [10], the truth is that these specialized librarians responsible for training do not consult ACRL's resources regularly for framing their training practices [11] – since December 2016, the ACRL has made available, among other things, a sandbox (http://sandbox.acrl.org/), which is an open access repository that houses materials constructed and shared by librarians and other information professionals to integrate the ideas of the new Framework into the training provided by them. The new Framework can influence

the librarians' training, as its vision points to knowledge-based research concepts (rather than the competencies outlined in the Standards) and addresses the information needs of researchers at a higher level, while its conceptual flexibility allows librarians to approach learning at all levels of academic development [11].

3 Challenges for Open Science

The new Framework suggests a different approach in order to integrate IL training in Open Science, highlighting the importance of acquiring specific skills. The new Framework is also more flexible than the previous Standards. With the diverse approaches of Open Science in training, often blending scientific research with practice-based experiences, this flexibility has significant advantages [11]. Provided and competency-based training has a temporary value for the student, but the threshold concepts of the new Framework ensure, as a final result, a broader and more adaptable understanding of the nature of information and better lifelong learning: "This framework highlights the concept of metaliteracy that suggests a new vision of IL as an overarching set of abilities where students are consumers and creators of information who can take part in collaborative spaces. Metaliteracy demands behavioural, affective, cognitive, and metacognitive engagement with the information ecosystem" [12, p.2].

Some authors have shown in recent studies that the academic community has a positive attitude towards cooperation with information professionals and that they are available to take responsibility for organizing editorial processes to ensure the quality control of scientific publications [4, 13]. From the publishers' point of view, the new model of academic communication will deliver more benefits than the traditional publishing model: free access for readers (e.g. through library sites); the inexpensive platform for the publications (even if libraries have to secure costs) and convenient management (through collaboration with other libraries). And this whole process can be achieved through the creation of institutional data repositories by information professionals in collaboration with academic researchers [14]: "Open Science is the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods" [3, p. 12].

Open Science involves, in essence, two fundamental dimensions: (a) the opening and sharing of research results from publications to research data; (b) the openness in the research methods and tools themselves, making processes open and collaborative from the outset and seeking, where appropriate, the involvement of other actors, in addition to the scientific community, in the collection and analysis of research data, in what is designated Citizen Science. Open Science presents benefits and advantages to science and to society, given the opening of research processes and the speed of dissemination of results in conditions that can be reused not only by the scientific community but also by society as a whole. Open Science is thus transparent and accessible and knowledge is shared and developed through collaborative networks. Open Science is based on principles such as rigor, responsibility, reproducibility, but also inclusion, fairness, equity and sharing in research [3]. Ultimately, it seeks to change the way research is done, who is involved, and how it is valued.

4 Articulation of the New Framework with Open Science

The analysis of training courses developed in an academic context points to a relationship between IL and the concepts associated with Open Science.

Open Science represents the link between the academic and research environment with a broader public, the transparency of research processes and open access to scientific data and publications. Open Science follows the presuppositions of making research and its data accessible to society as a whole; its concept is associated with the definition of science, described as the retrieval, analysis, publication, critique and reuse of data [15]. The concept of Open Science is thus associated with that of IL, adding the philosophy of the trinomial: Search – Organize – Publish [16].

Generally, researchers manage their research and have competencies in information search strategies, evaluation of research results, creation of alerts, management of references and publication of results [17]. Open Science requires new skills in the management of scientific data, open sources and open access publishing. It is in this understanding that Open Science intersects with IL. Open Science is, therefore, the source and result of scientific research, teaching and learning in an academic context, so that higher education institutions fulfill their mission through Open Science. In this context, higher education libraries contribute to the access of Open Science through IL, that is, the promotion of practices that involve knowing how to research, select, evaluate and use information. They are skills that contribute to the improvement of student performance and benefit the work of researchers [16].

The concept of Open Science has already been appropriated by researchers and is particularly used in the promotion of scientific results for a greater, open public access [4]. Other features include participation, collaboration, peer networking and information sharing. Other concepts were also identified in Open Science, such as policies, evaluation of results, access to data and scientific publications. Awareness of researchers' social networks has been noted, including the trend of alternative metrics. The big differences emerged from domain-specific research objects, methodologies, and procedures in data acquisition and management. The culture of each scientific discipline leads to differences in information behaviour, as it is reflected in the formats of publication, communication and use of information [17]. At the same time it gives a sense of responsibility, reliability and reproducibility to science, inhibiting or exposing errors, bad practices or even scientific fraud. Transparency in Open Science also makes it responsive to societal challenges and facilitates innovation and the appropriation of new knowledge for the development of new products and services, that is maximizing the economic and social return of public investment in research and in science [18].

In a social, technological and communal dimension, the concept of Open Science requires a new conceptualization of the concept of IL in research. Below we analying the new conceptual frames:

4.1 Authority Is Constructed and Contextual

Questioning authority has been a mantra for everyone, from Copernicus to neo-punks, and it seems that the idea is about to be codified as a territory belonging to the library. Understanding this concept allows students to critically examine what the evidence is

considered to be. Whether it is a Wikipedia article or a peer-reviewed conference paper, it is important for the student to ask relevant questions about the origin, context, and appropriateness of their current information needs. This frame emphasizes the idea that all sources of information have a purpose and a context, and some are more helpful than others, depending on the information need.

The knowledge practices of this frame include the identification of the authority indicators when associated with the information, the understanding that many areas of knowledge recognize authorities (e.g. official, credited, certified), and the recognition that these contents can be presented in a formal or informal format. Some learning objectives include: students will be able to recognize appropriate information resources by discipline; recognize that an author can be seen as an authority in a specific area and recognize his/her responsibility; distinguish between academic and popular sources; to learn how to distinguish a story from an editorial article; and to express the desire to find better resources to improve quality.

The dispositions on authority refer to the need to keep an open mind, to be aware of the importance of critically evaluating content and to recognize that there are necessarily problems in the face of traditional notions of belonging and authority [2].

In higher education and in Open Science the ability of each student to be an information consumer and potentially an information producer is notorious. Thus, clearly disclosing the source of funding and submitting declarations of conflicts of interest when submitting papers in scientific publications and public presentations is considered good practice. Who funds research? What is not disclosed? Why is it not disclosed?

4.2 Information Creation as a Process

Format is how tangible knowledge is disseminated, so its essential feature comes down to the whole underlying process of creating, producing, and disseminating information rather than how content is disseminated [2]. This is probably the way ACRL recognizes that non-traditional publishing formats are as relevant as traditional ones. It is not important how the content is published because, regardless of the form of information, the expert will always look for the process underlying the creation as well as the final product in order to critically evaluate this information and use it as evidence.

Knowledge practices include: the evaluation between the process of creating information and the specific need for information; the articulation of the traditional processes with the most recent ones of creation and dissemination of the information in a certain discipline; the understanding that, regardless of its format and the method of access, the information can be understood differently; the articulation of the characteristics and purposes of the various formats; and identifying which formats best meet specific information needs [2].

Evaluating the format of a publication as to its credibility and quality is one of the researchers' concerns. Identifying the impact of the process of creating information in relation to the need for information is a question that can be answered in the current Open Science ecosystem because researchers are able to evaluate information with defined criteria, articulate the purposes of various types of information, and distinguish between format and access method.

4.3 Information has Value

This concept directly addresses Open Science, open source, open access, copyright and publisher rights, and intellectual property. If the growth of the information age has taught us anything, it is that information is a product. This frame recognizes that the creation of information and all products derived from information require a commitment of time, original thinking and resources that need to be respected by those who seek to use these products, but also by those who want to create their own work on the basis of the work of others [2].

Knowledge practices and some learning objectives: students should have the notion of plagiarism; cite the source correctly and understand the reason for doing so; distinguish between plagiarism and copyright infringement; identify academic publishing practices; be available to invest their own resources to keep up to date; determine the potential use of a copyrighted image, and explain the value of citation sources.

The pillars of this frame are present in the genesis of Open Science and integrate the concerns of researchers: information can be bought and sold; information can be affected by economic, political and sociological forces; and finally, information that seems to be free may have to be paid when shared on a website, for example. In fact, the information has VALUE… but someone will have to pay for it. In Open Science it is imperative to cite the source and respect the authors' original ideas.

4.4 Research as Inquiry

This frame could be designated as 'The Scientific Method'. At bottom, it is understood that research is interactive and depends on increasingly complex questions whose answers develop new questions or lines of research in any area of knowledge [2]. This frame does not define student learning outcomes or prescribe teaching methods. But it invites its use for the contextualization of IL practices.

Knowledge practices and some learning objectives: students will know who to turn to for a library survey; locate a resource in the catalog; locate appropriate information resources by discipline; formulate research questions based on available data and information gaps; apply research methods appropriate to the need, context and type of consultation; identify key concepts and related terms in order to locate relevant sources.

Dispositions for this frame include: assessment of persistence, adaptability and flexibility, critical thinking practice, and the recognition that learning and discovery are an error-based process [2].

Relevant to Open Science is the inclusion of lifelong learning as a practice of knowledge, which is a competence consistently referred to as a behavioral goal for psychologists, educators, and other social science professionals. Open Science demonstrates that research is an interactive process, which requires a lifelong learning, trying to determine what questions can be answered in science, how can information gaps and available scientific data help in the research process, and the impact of effective and comprehensive communication in informed and self-directed learning, in a process of recognition that learning and discovery are processes based on errors.

4.5 Scholarship as Conversation

This frame confers on the production of academic results the idea that it is a commitment to the community [2], that is, that the academy is permanently involved in new contributions and discoveries, giving the academic environment a space of dialogue where ideas are formulated, debated and argued.

Some examples of knowledge practices for this frame include: identifying the contribution that articles, books, and other academic products bring to the enrichment of contents of knowledge areas; and the contributions of academic and scientific communication [2]. In higher education, it is relevant to understand that it is from what others said and did before that the possibility of new scientific knowledge arises; hence the need for citation and referral as a form of dialogue with peers [19].

Some learning objectives: students should be able to analyze the bibliography, footnotes, and references to locate additional information sources; recognize and describe the purpose of the research; identify the contribution of academic work to science; contribute to academic dialogue as a creator/critic; understand the chain of citations to evaluate the impact of a scientific work; understand and analyze a peer-reviewed academic article and identify and understand all parts of the article.

Open Science can foster a reform of the academic evaluation system, encouraging researchers to change their publishing and dissemination practices, leading to cost reductions and the valuation of academic content to the detriment of quantity and impact factors. In Open Science, this frame is a platform for dialogue. Dispositions include the recognition that academic communication takes place in several levels, the valorization of the content emanating from the user and the understanding that the responsibility of academic creation is associated with the contributions of other channels and other types of participation in science [2].

4.6 Searching as Strategic Exploration

With this frame information professionals finally return to what is most important as trainers in the library: teaching students to identify, locate, retrieve and use information sources. Finding the information requires a combination of research, discovery and some luck – there is not an equal recipe for everyone!

Some knowledge practices include: determining the scope of the question; identifying sources; constructing research strategies; and using citation managers. In turn, the dispositions include: persistence, adaptability and flexibility, recognition of the value of navigation and methods of retrieval of information, understanding that the first attempts in research do not always result and also the recognition that ‘enough is enough’ in information retrieval [2].

Some learning objectives: students should be able to locate metadata in a catalog; identify keywords from a particular topic; implement searches in a database and on the internet and recognize the difference between them; identify keywords and synonyms and build a search strategy with appropriate operations in different interfaces; determine if the information retrieved meets their needs and refine the search, if necessary; reflect on the utility of making mistakes in the research process; divide the search into fundamental concepts and discuss additional steps for each concept.

5 The Framework and Its Practical Implications for Open Science

From a systemic perspective, science can be characterized as an organized, cumulative and structured system of processes, as an open and non-isolated system purposely created to produce knowledge, which depends on scientific information and is prepared for sharing information with the surrounding community. Based on the objective of the present theoretical reflection, and given the contributions of IL, in an academic context, it is possible to identify some challenges to explore in Open Science: (a) IL as a variable dependent on the modus operandi of the scientific process; (b) IL in the academic context as a dimension of the process of scientific information; (c) different channels of circulation and dissemination of knowledge; (d) public participation in science to be considered in the strategies of IL in an academic context; (e) need to understand issues associated with data management and curation.

6 Conclusions

Higher education is complex, demanding and challenging. Students play an important role in creating new knowledge, understanding the contours and dynamic changes of the information ecosystem, as well as in the ethical and legal use of scientific information and data. Information professionals, in turn, are responsible for a new role in the teaching-learning process and contribute to student learning. They are the great enablers of the creation of a new curriculum, oriented to the competences of IL in collaboration with the teachers. As IL programs continue to be developed, implemented, reflected upon and reviewed both in libraries (informal learning) and integrated in academic curricula (formal learning), the Framework is a reference document in which information professionals and teachers find inspiration and support. It is useful for the development of knowledge infrastructures, including systems and services that actively support researchers in their contact with information, communication and collaboration.

The present theoretical reflection showed the importance of recognizing the key areas around Open Science, trying to ensure that IL, as a learning tool, corresponds to its objectives. In this context, academic libraries need to create a more effective involvement in advocacy. It is also essential to encourage researchers and all interested parties in the process of scientific research, and even those who show some skepticism about Open Science, to associate with the movement. The active partnership between researchers, information professionals, librarians, science managers, institutions and agencies is recommended. The need for information professionals to reformulate and invest in their skills, in data management and, why not, in their creativity, is also emphasized.

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Information Literacy of University Freshmen, and Differences in ICT Use, Internet Confidence and Motivation

Danica Dolničar(✉) and Bojana Boh Podgornik

Faculty of Natural Sciences and Engineering,
University of Ljubljana, Ljubljana, Slovenia
{danica.dolnicar,bojana.boh}@ntf.uni-lj.si

Abstract. The study explored the differences in information literacy (IL) and related characteristics of freshmen majoring in chemical education. 126 students were divided into two groups, based on the results of an IL test: the IL stronger and the IL weaker group. Students also took surveys on ICT use, Internet confidence and motivation. Results showed a 20% mean difference in the overall IL score, with the IL weaker group being significantly less successful in over half of the IL test items, and having the biggest knowledge gap in information searching and ethics issues, when compared to the IL stronger group. The biggest cognitive divide occurred on the level of understanding. The groups did not differ much in overall ICT use, but the IL stronger group was significantly more confident when using the Internet. The motivation levels were similar, except for the controlled external motivation, in which the IL weaker group scored higher.

Keywords: Information literacy · Higher education · Freshmen · ICT use · Internet confidence · Motivation

1 Introduction

When students enroll in university, they bring along a set of general competencies, acquired both through prior education and their personal practices. One of those is a digital competence, which incorporates both information literacy (IL) and information and communication technology (ICT) literacy. While the focus in the former is the mastery of information and deeper understanding of its importance, the latter primarily deals with the technical mastery of ICT tools. The ACRL [1] defined IL as an intellectual framework for understanding, finding, evaluating, and using information. The five ACRL standards were translated and adopted for use in higher education in Slovenia [2]. Newer approaches followed, both at the university level by the ACRL [3] and at the secondary school level by the AASL [4], that updated and reorganized the IL concepts and, among others, extended the student's role to that of a creator of information and a collaborator. This is in line with other modern frameworks and initiatives, such as DigComp [5], the European framework for digital competences for citizens.

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DigComp incorporates elements of ICT and IL literacies in its five subject areas. The IL elements are present in the area of information (browsing, searching, filtering and evaluating data, information and digital content), in communication and collaboration (netiquette), content creation (copyright and licenses) and safety (protecting personal data and privacy).

"Digital natives", the generations who grew up using computers and to which today's university freshmen belong, are presumed to automatically possess higher levels of ICT proficiency in using software tools and the Internet. Contrary to that belief, studies [6, 7] show that digital nativeness as such has not been sufficient for using information in a creative and critical way. On the other hand, freshmen's proficiency levels reflect the quantity and quality of prior education. For example, in Slovenia two primary and secondary school curricula deal with ICT and IL, namely *Informatics* and *Library with information knowledge*, but the implementation is not uniform across schools. This can result in highly notable differences in IL and ICT-specific knowledge and skills among students. Our study attempts to address part of this problem.

Not only IL knowledge and skills, but also psychological and pedagogical factors could be a potential source of differences among students' IL levels, such as academic self-concept (knowledge of one's academic ability), general self-efficacy (belief in one's capabilities), motivation (internal and external), and the use of metacognitive learning strategies. In the past, both internal and external academic motivation, but specifically the internal motivation to know, were positively related to IL [8]. While students' low self-efficacy was found to be a hindrance to the development of their lifelong IL competencies [9], high academic self-concept was a positive factor when combined with high intelligence [10]. Metacognitive strategies were found to affect multiple IL dimensions [11].

The objective of our study was to investigate the differences between two groups of university freshmen: one possessing a stronger set of IL skills than the other. We examined the group scores in regard to:

- overall IL level
- content areas of IL, based on the five ACRL standards (A1-5)
- cognitive areas of IL, based on three categories (B1-3), adapted from the Bloom's taxonomy
- particular IL topics (items)
- use of ICT tools
- confidence when using the Internet
- motivation, self-concept, general self-efficacy and metacognitive learning strategy

We aimed to:

- identify the content and cognitive areas of IL, as well as specific IL topics where the weaker group lagged behind the most, and
- determine whether the use of ICT, confidence using the internet, and other psychological factors (motivation, self-concept, general self-efficacy and metacognitive learning strategy) scored lower in the IL weaker group.

2 Materials and Methods

2.1 Measurement Instruments

Information Literacy Test (ILT). A validated 40-item multiple-choice knowledge test [12] was applied. Four options were provided for each item, with one of them being correct. Test items were further grouped into 5 content subscales (information need, search, evaluation, use and ethics) in line with the 5 ACRL IL standards for higher education [1], and separately into 3 cognitive subscales (remembering, understanding, applying and higher), adapted from Bloom's taxonomy of cognitive processes [13]. In the results, all ILT point scores were transformed into percentages. Subscale scores represent percent achieved within a subscale.

ICT Use and Internet Confidence Questionnaire. Two subscales from a four-scale survey used in a previous study [7] were utilized. The frequency of use for 16 types of software was measured with the ICT-S subscale on a 5-point Likert scale with the following frequency options: never, less than once a week, multiple times a week, almost every day, multiple times a day. Student's confidence when using the Internet was tested with the ICT-I subscale, consisting of a series of 10 statements, evaluated on a 5-point Likert scale, with options ranging from strongly agree to strongly disagree.

Self-concept/Self-efficacy/Motivation/Learning Strategy Questionnaire. A70-item questionnaire [14] was applied, which was a synthesis of the Self-description questionnaire III (SDQ, [15]), Generalized self-efficacy scale (GSE, [16]) and the Academic motivation questionnaire [17]. Items comprised statements, evaluated on a 5-point Likert scale based on the agreement level. The questionnaire was subdivided into 7 subscales: self-concept about learning (SC-L, 10 items), self-concept about problem-solving (SC-P, 10 items), self-efficacy (SE, 10 items), internal motivation (IM, 13 items), autonomous external motivation (EM-A, 6 items), controlled external motivation (EM-C, 6 items), and the use of metacognitive learning strategies (LS, 15 items).

2.2 Test Group and Testing

The participants were 126 freshmen majoring in chemical education from years 2014 to 2017, enrolled at the Faculty of Education, University of Ljubljana. All students also had a second education major, either biology, physics or home economics. Students involved in the study had not yet taken any IL-related course in their freshmen curriculum.

The testing was implemented through the online survey system 1 ka (1 ka.si), took place in a computer classroom and was supervised by a teacher, who explained the testing protocol, the study purpose and assured students' anonymity. The time for completing the IL test was not limited.

2.3 Data Analysis

Testing results for the 126 participants were divided into two groups, based on their total ILT scores – a weaker (lower half, in the results denoted as ILT-w) and a stronger (upper half, ILT-s), with 65 and 61 students respectively. The following differences between the IL weaker and stronger group's performance were explored: (1) total ILT score using descriptive statistics and a t-test; (2) ILT subscale scores according to the five ACRL standards and three cognitive levels, using t-tests; (3) individual ILT item scores with chi-square tests; (4) results of ICT use, Internet confidence and motivation questionnaires using t-test and chi-square tests. Effect size provided in the t-tests is Cohen's d. IBM SPSS statistics package (version 24) was used for the data analysis.

3 Results and Discussion

3.1 ILT

Descriptive statistics of the ILT score of the entire sample, and separately of the IL weaker and the stronger group are shown in Table 1.

Table 1. Descriptive statistics of the ILT score (%) of the entire sample (ILT), the IL weaker (ILT-w) and the stronger group (ILT-s)

Measure	ILT	ILT-w	ILT-s
N	126	65	61
Mean	67.10	57.38	77.46
Standard error of the mean	1.12	1.10	0.78
Median	67.50	60.00	77.50
Mode	72.50	65.00	72.50
Standard deviation	12.62	8.83	6.12
Variance	159.34	78.01	37.39
Minimum	27.50	27.50	70.00
Maximum	92.50	67.50	92.50

The mean difference of 20.08% in favour of the IL stronger group was statistically significant ($p < 0.001$, $d = 2.64$).

3.2 ILT Subscales Based on Content Categories

Mean scores on the content-based ILT subscales for the IL weaker and the IL stronger group are depicted in Fig. 1. Both groups recorded the poorest mean performances in ethics issues and the best in information evaluation. The lowest results were achieved by the weaker group with only just under 42% in ethics issues, and nearly 51% in information searching. In those two areas the mean differences between the two groups were the highest (26.44% in search and 23.11% in ethics). Differences were statistically significant ($p < 0.001$) in all five categories with large effect sizes ($1.13 < d < 1.80$), except in information use (A4), where it was moderate ($d = 0.62$).

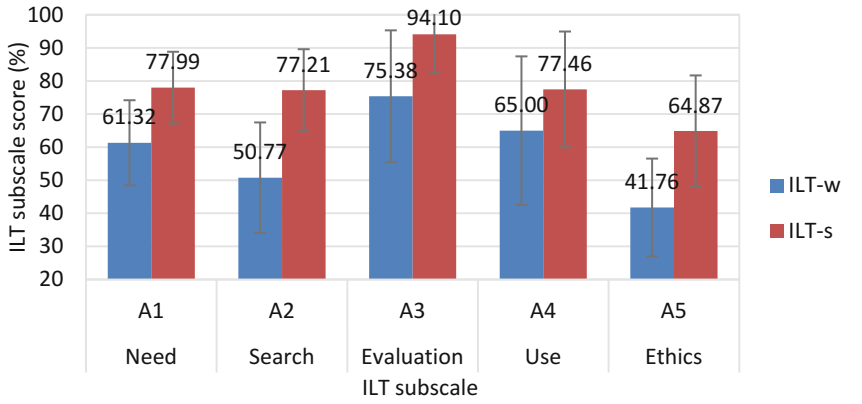

Fig. 1. ILT subscale means (%) according to the five content categories (A1-5), for the IL weaker (ILT-w) and the IL stronger group (ILT-s); error bars: ± SD

3.3 ILT Subscales Based on Cognitive Categories

Comparison of the three cognitive ILT subscale scores (Fig. 2), shows the decrease in mean scores for both student groups, as the cognitive level increases. The weaker group scored below 60% in understanding and below 50% in applying knowledge. Differences between the groups are the highest in those categories (21.65% in understanding and 20.40% in applying). In all three categories the differences were statistically significant ($p < 0.001$) with large effect sizes ($1.46 < d < 1.90$).

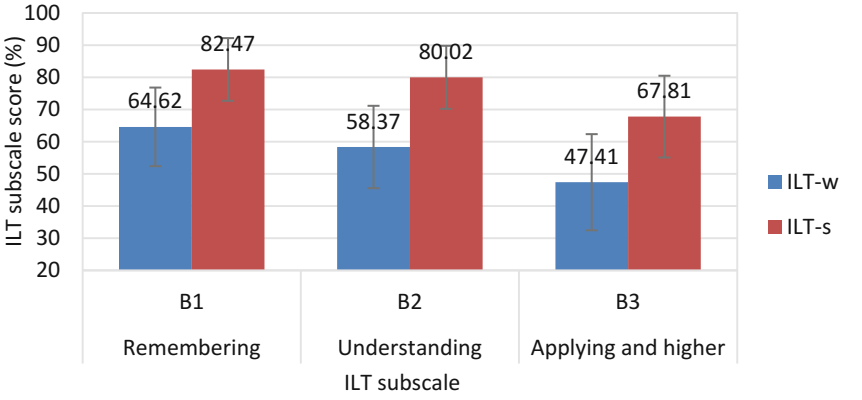

Fig. 2. ILT subscale means (%) according to the tree cognitive categories (B1-3), for the weaker (ILT-w) and the stronger group (ILT-s); error bars: ± SD

3.4 ILT Items

Students from the IL stronger group were at least 20% more correct in half of the test items, and at least 30% in a quarter of the items. Chi-square tests revealed statistically significant differences in 21 out of the total 40 test items. The highest proportion of such results was observed in information searching (80% of the items, subscale A2) and in ethical issues (57.1%, A5). On the cognitive level it was 63.6% of the items in applying knowledge (B3) and 56.3% in understanding (B2).

Top ten items with the largest inter-group differences are presented in Table 2. Half of the items (5) are from the search content area (A2) and further 3 refer to information need identification (A1).

Table 2. ILT items with the largest difference in the correctness level between the IL stronger and the weaker group

Item #	Content category	Cognitive category	Item topic	Diff. in corr. (%)
40	A5	B1	Bibliography order in numbered citations	45.98
25	A3	B2	Most concise part of an article	44.41
23	A2	B2	How to organise electronic publications	36.34
6	A1	B2	Ordering source types by reliability	35.94
24	A2	B1	Bibliography tool in MS word	35.91
19	A2	B3	Search expression in Google Scholar	35.44
3	A1	B1	Where to find terminology in English	31.73
21	A2	B2	What is full text search	31.63
14	A1	B3	Narrowing down a database search	31.42
20	A2	B2	Matching “optional” with a boolean operator	30.06

3.5 ICT Tool Scale

The mean difference in the use of ICT tools between the IL weaker ($M = 2.61$, $SD = 0.37$) and the stronger group ($M = 2.70$, $SD = 0.43$) was found not to be statistically significant ($p = 0.18$). Comparison of mean scores for individual items is shown in Table 3. Both student groups counted search engines, social networks and YouTube amongst the most frequent uses. The overall differences in ICT use between the two groups were small, mostly in favour of the IL stronger group. Interestingly, the IL weaker students used search engines more often, and, as expected, used OPACs less often than the IL stronger group, but the results were not significant enough. Chi-test yielded the only statistically significant differences in the use of office and communication tools.

Table 3. Mean values for the use of ICT tools and the difference between the IL stronger and the weaker group; statistically significant differences are bolded.

Item topic	ILT-w	ILT-s	Diff.
Office tools	2.38	2.70	**0.32**
Games	1.92	2.18	0.26
Search engines	4.51	4.38	−0.13
Social networks	4.43	4.46	0.03
Virtual classrooms	3.66	3.59	−0.07
Programming	1.28	1.31	0.03
Communication tools	3.57	4.05	**0.48**
Maps	2.69	2.67	−0.02
News	2.91	3.02	0.11
HTML editors	1.06	1.16	0.10
OPACs	1.85	2.03	0.19
School assignment/projects	2.14	2.15	0.01
Photo editing	1.74	1.79	0.05
Video/animation editing	1.42	1.44	0.03
YouTube	4.06	4.10	0.04
E-books	2.08	2.25	0.17

3.6 Internet Confidence Scale

The IL weaker (M = 3.33, SD = 0.70) and the IL stronger group (M = 3.65, SD = 0.59) differed significantly ($p < 0.01$, $d = 0.49$) in their overall confidence when using the Internet, albeit the effect size was small. Item means are displayed in Table 4. Both groups felt most confident using search engines, finding information on their own, and using social media. The IL stronger group was significantly more confident than the weaker group when using discussion groups, as well as presenting their opinions and

Table 4. Mean values for confidence when using the Internet and the difference between the IL stronger (ILT-s) and the IL weaker (ILT-w) group; statistically significant differences are bolded.

Item topic	ILT-w	ILT-s	Diff.
Finding information without help	4.12	4.28	0.16
Using discussion groups	2.94	3.49	**0.55**
Presenting own opinion/knowledge	2.83	3.41	**0.58**
Learning new software	3.31	3.80	0.50
Using professional/expert forums	2.85	3.02	0.17
Using social networks	3.85	4.15	0.30
Problem solving	3.08	3.44	0.37
Using search engines	4.22	4.34	0.13
Using OPACs	3.37	3.87	0.50
Using scientific bibliographic databases	2.74	2.72	−0.02

knowledge. Surprisingly, differences in items, related to searching (the biggest IL deficit of the weaker group) were either not significant (using OPACs), small (using general search engines) or non-existent (using scientific bibliographic databases). Freshmen had not experienced scientific databases in their previous studies.

3.7 Motivation and Related Scales

The two groups of students exhibited similar levels of motivation, self-concept, self-efficacy and possession of a learning strategy (Table 5). However, the IL stronger group had a higher self-concept for problem solving, although not statistically significant ($p = 0.06$), and at the same time significantly ($p = 0.02$, $d = 0.41$) lower level of controlled external motivation. The students from the weaker group relied more heavily on motivation from teachers and other external factors.

Table 5. Mean values of motivation, self-concept, self-efficacy and possession of a learning strategy with the difference between the IL stronger (ILT-s) and the weaker (ILT-w) group; statistically significant difference is bolded.

	Self-concept learning	Self-concept problem solving	Self-efficacy	Internal motiv.	Auton. external motiv.	Contr. external motiv.	Learning strategy
ILT-s	3.80	3.52	3.66	3.44	3.92	3.13	3.54
ILT-w	3.70	3.34	3.63	3.35	3.91	3.39	3.56
Diff.	0.11	0.18	0.03	0.09	0.01	**−0.26**	−0.02

4 Conclusions

The study aimed to identify the characteristics by which the freshmen students with a higher level of IL differed from the classmates with a lower level of IL.

Significant differences were detected between the IL stronger and the IL weaker group of freshmen in the following parameters:

- total IL level (respective means 77.46% and 57.38%),
- all five ACRL standards of IL, particularly the topics of information searching (mean difference 26.44%) and in the IL ethical issues (23.11%),
- 21 out of 40 IL test items, with the difference in correctness over 30% in 10 items, related to referencing, understanding the role of abstracts in the structure of scientific articles, evaluating literature sources, using scientific search engines, and preparing effective search queries,
- all three tested cognitive categories of IL, with the largest differences in understanding (21.65%) and applying of IL knowledge (20.40%),
- confidence when using the Internet, especially when using discussion forums, presenting opinions and knowledge,
- use of ICT office and communication tools.

In addition, the IL stronger group had a

- slightly higher self-concept about problem solving, and
- a significantly lower level of controlled external motivation (suggesting that their motivation did not primarily depend on the teacher as with weaker students).

These characteristics can be considered as attributes that distinguish IL stronger and IL weaker students, or as attributes of students who have managed to develop a higher level of IL during the previous education.

No significant differences were detected between the freshmen in the following parameters:

- using scientific bibliographic databases (low in both groups, as freshmen did not use scientific databases in their previous studies),
- confidence using the Internet when using basic search engines (this could be partly due to lower performance students overestimating their IL skills [18]),
- frequency of search engine use,
- overall ICT use (suggesting that the use of ICT *per se* did not contribute to a higher level of IL [7]),
- motivation levels, general self-efficacy, self-concept about learning and possession of learning strategies.

The results of this study may contribute towards a better understanding of factors affecting students' IL, and may be applied by higher education specialists in preparing IL courses, their contents and teaching styles, particularly when helping weaker students to achieve higher levels of IL.

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Information Literacy Self-Efficacy of Medical Students: A Longitudinal Study

Ann De Meulemeester[1,2(✉)], Jan De Maeseneer[3], Sven De Maeyer[4], Renaat Peleman[2], and Heidi Buysse[2]

[1] Library and Information Science, University of Antwerp, Antwerp, Belgium
[2] Knowledge Centre for Health Ghent, Ghent University, Ghent, Belgium
{Ann2.Demeulemeester, Renaat.Peleman, Heidi.Buysse}@UGent.be
[3] Department of General Practice and Primary Health Care, Ghent University, Ghent, Belgium
Jan.Demaeseneer@UGent.be
[4] Department of Training and Education Sciences, University of Antwerp, Antwerp, Belgium
Sven.demaeyer@uantwerpen.be

Abstract. Objectives: Medical curricula are investing more and more in educating students as lifelong reflective learners. The research analyses the development of medical students' information literacy self-efficacy and measures the differences between study years. Methods: Data has been collected within a 6-year curriculum for four continuous academic years. Students evaluated their information literacy self-efficacy on a validated information literacy self-efficacy scale for medicine. In 2016, the research was finalised with a qualitative part. One-way ANOVA with post-hoc tests and unpaired Student's t-test were performed. Outcomes: Results confirm the impact of training and practice on students' information literacy self-efficacy. Furthermore, information literacy self-efficacy increases overall in more recent years. This research proposes the need to integrate information literacy skills in the curriculum at the right time, at different key-moments and adjusted by level.

Keywords: Information literacy self-efficacy · Higher education · Medical curriculum · Longitudinal study · Information literacy scale for medicine

1 Introduction

The information society is changing rapidly, with new emerging technologies continuously influencing the processing of information. Health professional education must adapt. Universities need to focus on delivering learners capable of processing vast amounts of information, extracting and synthesising reliable knowledge necessary for clinical and population-based decision-making. In a 2010 report, "The Lancet Commission Education of Health Professionals for the 21st Century" proposed an important vision: "all health professionals in all countries should be educated to mobilise

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knowledge and to engage in critical reasoning and ethical conduct so that they are competent to participate in patient and population-centred health systems as members of locally responsive and globally connected teams" (p. 6) [2].

X's medical curriculum evolved from a discipline-based to a contextual curriculum, focussing on patients, students, and community using a problem- and evidence-based approach. Students are stimulated to think through and discuss problems so as to develop problem-solving strategies [3]. Competency-based education integrates problem-based learning and critical thinking, which requires the necessary information literacy (IL) skills [4]. Information literacy, a well-established concept [5, 6], lies at the core of the development of lifelong learning (LLL) [7]. From a medical education perspective, physicians are expected to be lifelong learners so that they can adapt to challenges in their professional environment [8]. Hence, undergraduate education needs to prepare students for LLL [2].

Along with IL, self-efficacy (SE) plays an important role in becoming lifelong learners [9, 10]. Bandura [11] defines perceived SE as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances". The level of SE determines the effort an individual will make and how persistent and resilient this person will be. Participation can be an influencing factor; for instance, students with higher anatomical SE can decide to take the lead and dissect for their group. By doing so, they gain experience, have the opportunity to learn and become more confident. This difference in SE and participation can lead to higher assessment scores [12]. Furthermore, students with a high SE are more likely to set academic goals, such as seeking more knowledge and challenges, and will therefore remain more committed [13, 14]. Hence, medical students need information literacy self-efficacy beliefs (ILSE), to have the confidence to find, select and use information efficiently. They need to think critically and appraise the retrieved information within a given context for qualitative decision-making. To the best of our knowledge, there are no medical curriculum-based studies examining ILSE on a longitudinal basis [15]. Longitudinal, large-scale and domain-specific research could be an add-on [16], as it may provide insight into IL-development. This paper focuses on the results of a longitudinal mixed-methods design, evaluating the development of students' ILSE beliefs throughout a complete medical curriculum.

2 Methods

Participants and Setting. This study was conducted at Ghent University's Faculty of Medicine and Health Sciences (Belgium) within a 6-year medical curriculum (mean n/academic year: 1192 students). Data collection started in 2011 and ended in 2016 with a surplus qualitative study. For ethical reasons, data was collected anonymously. Longitudinal tracking of results was only possible on the level of a cohort. Results for this paper focus on the data from 4 specific cohorts starting in the academic year 2011–2012: Cohort Year (CY) 1, CY2, CY3 and CY5 (Fig. 1).

Approval of the Ethical Committee of Ghent University was obtained and students signed an informed consent form. All data collected is anonymised by a trusted third party.

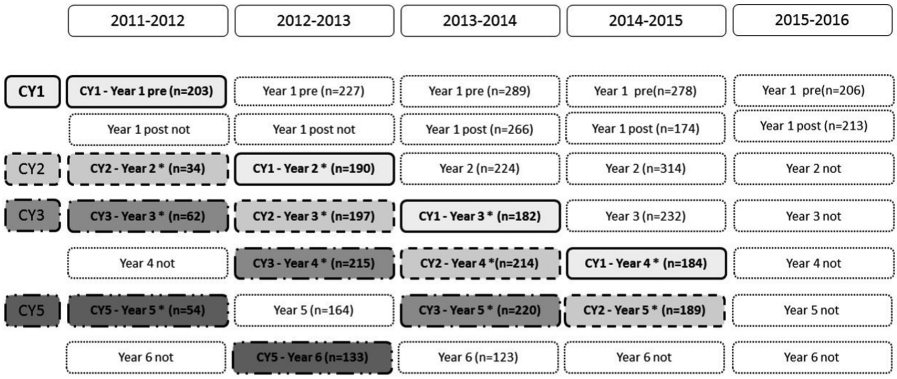

Fig. 1. An overview of the data collected between 2011–2016. CY1: cohort year 1; CY2: cohort year 2; CY3: cohort year 3; CY5: cohort year 5; pre: pre-testing; post: post-testing; not: no data collected; Y2*, Y3*, Y5*: study years analysed for the longitudinal comparison of the different study years

Procedure. Students from Y1–Y5 filled in the validated 38-item information literacy self-efficacy in medicine scale (ILSES-M) (1) at the beginning of the academic year. Students from Y6 were surveyed at the end of the academic year, after their final clinical examination. Validation of the ILSES-M resulted in a 5-factor model with high internal consistency of the subscales (S) identifying a clear set of demarcated IL competencies: S1 'Evaluating and Processing Information' (α: 0.930); S2 'Medical Information Literacy Skills' (α: 0.911); S3 'Searching and Finding Information' (α: 0.858); S4 'Using the Library' (α: 0.872); and S5 'Bibliography' (α: 0.845).

At the end, a qualitative study was conducted. A focus group, with representatives from all study years, was assembled in April 2016. Questions were selected to help clarify some results. The interview was recorded and used for further contextualisation of the quantitative results. Students took the discussion seriously, each discussing from his own perspective and experience (learning path).

Statistical Analysis. All analyses are performed with SPSS Version 24. Descriptive statistics are used to establish frequencies, mean and standard deviation (SD). To look for differences within cohorts of students (Fig. 1: CY1, CY2 and CY3), one-way-ANOVA is performed for comparison of continuous variables with Tamhane post-hoc tests to look for pairwise differences. For the analysis of CY5 (Fig. 1), unpaired Students' t-tests are used. A secondary analysis looked for differences per study year within different academic years. Unpaired students' t-tests or one-way-ANOVA is performed with post-hoc Tamhane where appropriate. Significance level has been set at alpha = 0.05.

3 Results

As shown in Fig. 2a, for "Evaluating and Processing Information", no significant difference was found between the first two study years. For CY2, a significant drop in mean scores is observed between Y2 and Y3, after which the mean scores significantly increase in Y4 to a level comparable to that in Y2. For CY1, also between Y3 and Y4 mean S1-scores increase significantly. For CY3, the significant increase in mean S1-scores is only seen between Y4 and Y5.

For 'Searching and Finding Information' (Fig. 2a, there is no significant difference in mean scores between the first two study years. However, a significant drop between Y2 and Y3 can be observed. For CY2 and CY3, between Y3 and Y4, there is again a significant increase in mean S3-scores. For CY1, mean S3-scores are significantly higher compared to Y2; for CY2 they reach the same Y2-level. For CY3, the high mean S3-scores show a significant drop in Y4, after which there is a significant increase in Y5. The mean S3-scores in Y5 are however borderline missed lower compared to the Y3-scores. For CY5, between Y5 and Y6, only a significant drop in mean S3-scores is observed).

In a medical curriculum, 'Medical Information Literacy Skills' are important. As shown in Fig. 2b, those skills increase significantly between Y1 and Y2. Between Y2 and Y3, for CY1 mean S2-scores remain stable, while for CY2, these skills decrease significantly. However, between Y3 and Y4 and between Y4 and Y5, mean S2-scores increase significantly, then stabilise after Y5. The same is true for total mean scale scores.

Between the first two study years no significant difference can be found for 'Using the library'(Fig. 2c). For CY1 and CY2 however, a significant drop in mean S4-scores is seen between Y2 and Y3, after which in Y4 those scores again increase significantly towards a level comparable to that of Y2. For CY3, the rather high mean S4-scores decrease significantly between Y3 and Y4. After Y4, no significant changes in mean S4-scores occur.

Looking at the subscale 'Bibliography' (Fig. 2c), for CY1 and CY2 no significant changes in mean S5-scores occur until Y3. Between Y3 and Y4, however, those skills increase significantly. Between Y4 and Y5 another significant increase in mean S5-scores occurs. After Y5, those skills remain stable.

No results are presented for Y1 and Y6, as only one cohort was researched, making comparison impossible (Fig. 3. For Y2, only significant differences for S1, S2 and total mean scores could be found, whereby students from academic year 2011–2012 gained better scores than those of 2012–2013. For Y3 students, overall significant differences could be found except for S1. Post-hoc analysis showed only significant differences for S2 and S4 (both: students of 2011–2012 scored worse than students from the other academic years), and S3 (students of 2011–2012 scored better than students from the other academic years). For Y4 overall significant differences were found for all subscales. For all subscales, students from 2014–2015 score better than those from the other academic years. Students from 2012–2013 and 2013–2014 gain comparable scores for all subscales except for S1 where students from 2013–2014 scored better than those from 2012–2013. For Y5 almost no significant results appear. For S4, students from 2014–2015 get better scores than those from the other academic years.

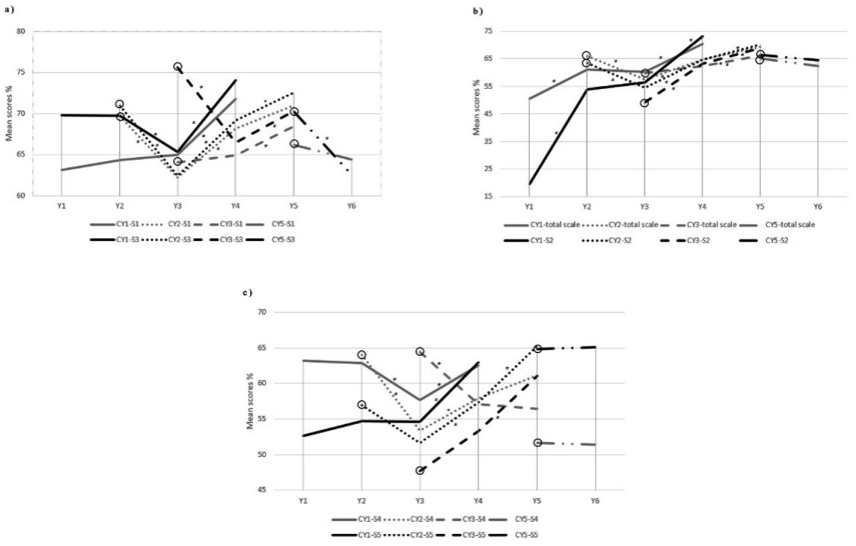

Fig. 2. Mean scores (%) for ILSES-M (a) subscales 1 and 3; (b) total scale and subscale 2; (c) subscales 4 and 5; for cohort year (CY) 1, 2, 3 and 5. CY1: cohort year 1; CY2: cohort year 2; CY3: cohort year 3; CY5: cohort year 5; S1: 'Evaluating and Processing Information'; S2: 'Medical Information Literacy Skills'; S3: 'Searching and Finding Information'; S4: 'Using the Library', S5: 'Bibliography'; *significant at 0.05-levem (between 2 subsequent years); ° borderline missed significance (between 2 subsequent years); O Incomplete cohort.

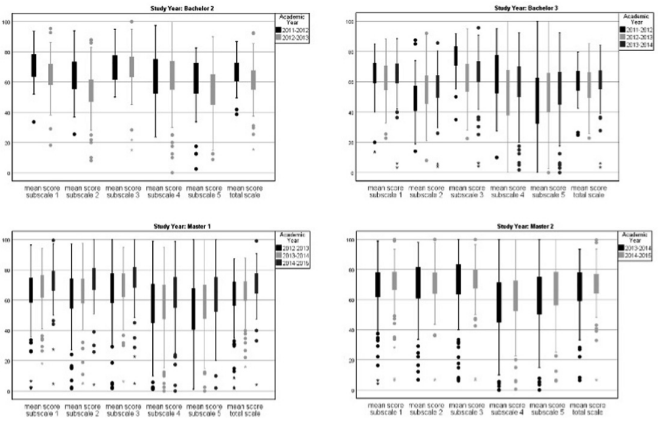

Fig. 3. Longitudinal comparison of the different subscales through the different study years. S1: 'Evaluating and Processing Information'; S2: 'Medical Information Literacy Skills'; S3: 'Searching and Finding Information'; S4: 'Using the Library', S5: 'Bibliography'

Within the focus group discussions, students confirmed that they are highly convinced that spending extra time practising their IL skills is useful and that these skills are beneficial for more experience-based education as they feel a real impact of practical training. They also reported that, when they started their course, they thought they could search and find information, because they could conduct a Google search. Later when working on their Master thesis or searching in a clinical environment, they experienced many more difficulties in searching and evaluating the reliability of the information. Students realised the difficulties and therefore, their confidence will not increase much. During the research some curriculum changes were made; in the academic year 2015–2016 the bibliographic instruction was moved from a Y4 to a Y1-course. Students reported this was a really necessary and positive change, as it had been much too late in the curriculum. The group also discussed the differences in quality of support they receive for preparing their Master thesis or doing their clinical internship. They argue that equal support needs to be integrated at appropriate moments in the curriculum. They were not clear about whether this should be integrated in a course, online training, or individual support.

4 Discussion

The longitudinal analysis of 4 different cohorts enables us to evaluate the development of ILSE of students during their university education. Furthermore it provides us with the opportunity to compare the evolution of study years between different academic years (Fig. 1). Since the data is collected from the moment students arrive at university until the end of the six year curriculum, the results reflect the development of ILSE within a complete curriculum. Furthermore, medical students are selected through a standardised entrance exam resulting in homogenous groups.

During the first year of their medical course, students do not evolve in any of the ILSES-M subscales. At that time integrated courses on IL were mostly focused on encyclopaedic training and only a few hours of classroom database searching. This type of passive rote-learning probably had little impact on students' ILSE. Activating students in a continuous process of processing information is necessary to obtain and retain ILSE [17]. In response to these results, course changes were made in Y1 and since 2014–2015 students have to contribute more actively, by writing a (search) paper and since 2015–2016 peer-reviewing papers by two fellow students has been added. As confirmed by the year representatives, students support this type of experience-based education because it has an impact on the development of their IL skills and SE. Curriculum innovators should be aware that integrating more experience-based education positively affects the learning path. Another example is the expected development of ILSE in relation to S2, with an increase from Y3 on, where we can hypothesise that it results from a continuous focus on integrating medical IL skills within the course.

In general the mean scores for S1 and S3 are higher than the other subscales. These subscales contain more general questions, possibly leading to a more individual interpretation. The expected IL skills evolve throughout the student's academic life, from a basic to a more advanced and discipline-specific search. This was confirmed by

the qualitative study, where students indeed reported that their ILSE is influenced by the complexity of searching and finding qualitative information. Students from Y1 may therefore have a high SE as they really feel capable of performing a search, whereas Y4 students recognise the complexity and will therefore have lower ILSE. Similarly, research by Clark and Catts [18] indicated that Y4 medical students rated themselves lower than Y1 students due to more complex searching.

Students in Y2 need to prepare independently a biomedical-oriented assignment with an active process of searching and finding information; difficulties arise and the ILSE declines. The results for S3 in Y6 indicate a second decrease in mean scores. Students in the focus group confirm encountering search problems during their internship. They need to transfer their academic skills into a work environment where time and opportunities to perform a broad search are limited and where the necessary reassuring feedback is lacking. At that stage students reflect that they become less confident when searching for answers. Research revealed that medical students tend to underestimate themselves [19]. In the qualitative study, students are confronted with the fact that SE mean scores are on average not higher than 80%. The group reported that they are not "professors" and that only a "professor" could be 100% self-confident. Yet, it can be hypothesised from the consistent results and the focus group that the surveyed medical students responded honestly, according to how they viewed their own capabilities, taking into account that this can be different for a student from Y1 or Y5.

Skills application is important for retaining SE; the decrease in mean scores for two cohorts in the transition from Y2 to Y3 for S4 illustrate this. In Y1, it is assumed that students still use and search for books in the library catalogue. From Y2 on, this is no longer required and students lose their ILSE for using library services. In the transition to Y4, preparing their Master thesis, students may need more clinical textbooks and start using the library again. Mean scores increase at the start of Y4. The mean scores for S4 are generally not very high, which seems consistent with the digitisation of medical information. Students are taught from Y1 to search mainly for peer-reviewed articles in scientific databases. When and how a skill is taught has a major impact on student learning and consequently also on students' SE. The results for S5 are as expected, Master's students reflected that the integration of teaching bibliographic skills came much too late.

Even if the research enables some clear recommendations to be formulated, some weak points need clarifying. A longitudinal analysis on a student rather than cohort level may provide a more detailed evolution of ILSE. However, for ethical reasons, this was not possible. Also, the authors believe that the analysis of cohorts of students provided valuable information, as these students are quite a homogeneous group.

One limitation could also be not assessing the IL skills. Yet, studies have proved that SE can be associated with academic performance [20]. It is important to indicate that at the beginning of the research not all groups of students were fully represented, which may explain some real outliers in the results. Nonetheless, the strength of this research is the fact that no other longitudinal analysis of ILSE among medical students has been done on this scale. Students from a complete medical curriculum participated in consecutive years. Finalising the research with a qualitative study proved to be an added value for contextualising the results.

5 Conclusion

In conclusion, recommendations for further curriculum innovation can be formulated. The development of ILSE is clearly connected to some important factors and will always be influenced by the context and moment when the SE is evaluated. From both quantitative and qualitative results it could be hypothesised that continuous integrated education with practice and the necessary feedback from peers are needed to develop and retain medical students' ILSE. Although further in-depth research is needed, other researchers [21] had similar results and concluded that literature searching and critical appraisal skills taught in the undergraduate years are not retained after graduation unless they are practised. Different researchers suggested teaching IL skills at the beginning or at appropriate times throughout the curriculum [22–25]. This research proposes the need to integrate IL skills at different moments of the curriculum, at the right time and adjusted by level, in such a way that these skills can be converted into real practice. The recommendation would be to start in Y1 with an integrated practical course, covering different basic aspects of the medical research process (S1 to S5). Subsequently, the IL skills need to be explored year on year. To challenge the students to keep learning and to make them more self-assured in their learning, it would clearly be beneficial to integrate IL skills in different disciplines. Information literacy skills are basic LLL skills, and should be integrated in the same way as communication skills [3] in a "learning line", as a continuum, and activated by personal experiences. The results of this research indicate a positive evolution, as the ILSE of medical students is increasing gradually over time. But, to succeed, some educational changes are still needed, namely more experience-based education. From the Master years onwards, students must become circular thinkers, by connecting theoretical background with clinical practice much more and not just focus on evidence-based searching. A learning community should be created, where teachers and students argue on an equal basis – using (evidence-based) literature – why they (should) take a certain decision, or action.

With this research and educational changes, Ghent University has invested a lot of time in reforming the content of integrated IL courses in the medical curriculum to optimise students' ILSE skills and beliefs. More practice has already been integrated. Most of the research results reflect the expectations: on the one hand the positive impact of effective integrated IL teaching, on the other, the areas that still need to be tackled.

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Information Literacy in Portuguese School Libraries: A Longitudinal Study of Master Degree Dissertations

Ana Novo[1(✉)] and Glória Bastos[2]

[1] CIDEHUS-UÉ, Universidade Aberta, Lisbon, Portugal
anovo@uab.pt
[2] CEMRI, LEAD, Universidade Aberta, Lisbon, Portugal
gloria.bastos@uab.pt

Abstract. Since the beginning of the 21st century, a rapid growth in access to information and communication technologies has been observed in Portugal, as well as in other European countries. School libraries (SL) and teacher librarians (TL) play a fundamental role as they have been increasingly considered by school communities as an essential resource for developing information literacy (IL) competences. The methodology for this study was a meta-analysis of the results of a body of master dissertations, completed between 2007 and 2017, at Universidade Aberta, Portugal. A first group of the analysed dissertations indicated that in general, TL misunderstood the concept of IL, were still not aware of its importance and most of their work was still related to traditional library activities. In more recent years we have identified some important improvements in Portuguese SL and in research studies and evidence of that progress is shown.

Keywords: Teacher librarians · School libraries · Information literacy · Universidade Aberta · Portugal

1 Introduction

During these first two decades of the 21st century, a rapid growth in access to information and communication technologies has been observed in Portugal, as well as in other European countries. The Portuguese Technological Plan for Education [1] has played an important role in the educational context, fostering schools and teachers to open classrooms to new technologies and to prepare pupils for the challenges of the knowledge society. In fact, it is necessary that pupils have an active intervention in the learning process, and teachers must help them to improve the reflected and active construction of personal knowledge. This is a primary condition for the challenges of contemporary society, and schools need to focus on enabling students with transferable

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skills, which in turn will allow them to play a full role in the information society. This situation also requires the promotion of different ways of working within schools: collaborative work among teachers and the integration of transversal competencies, like information literacy (IL), stimulating the cohesion within the educational program and/or between the different subjects.

Today we have connection to broadband Internet in every school in the country and schools opened up to virtual environments. But at the same time some investigations show that knowledge about available services, technological skills and information literacy competences are still not developed well enough.

In this context school libraries (SL) play a fundamental role as they have been increasingly considered by school communities as an essential resource (internal and external schools' assessment reports confirm this idea), as well as teacher librarians (TL) who, in Portugal, saw their role institutionalized in 2009 [2].

2 Background

Information Literacy is understood as a major tool to live in our society and in the complex world of information. The recent publication from CILIP [3] points out that "Information literacy is the ability to think critically and make balanced judgments about any information we find and use. It empowers us as citizens to develop informed views and to engage fully with society". The concept has gained new colours in recent years and is connected with important aspects of our lives: citizenship, health, the workplace, and of course, education.

Educators need to understand the role of information literacy in teaching and learning, especially in a digital world. This is where information literacy models come in as tools to support information as a knowledge flow, developing information fluency and the capacity for critical thinking and cognitive engagement with old and new media. The abundance and accessibility of information requires knowledge of the information structures and information seeking strategies that impact efficient information discovery.

In this context, school libraries can play a very important role. Numerous studies and longitudinal research have found the programme of the SL and the work of the teacher librarian/school librarian to have an impact on student achievement [4]. There is also largely unanimity in the literature about the role of the school librarian in the context of information literacy teaching. TL is an important resource for students and teachers, namely taking into account the relevance of collaborative work in this particular area. But this is a path that needs to be followed with persistence and that requests a permanent updating of the teacher librarian. For instance, it is important that TL have an understanding of different frameworks and IL models to find those best for a specific context.

3 School Libraries and IL Practices

3.1 Methodology

The adopted methodology for this study was a meta-analysis of the results of a body of master dissertations in the context of a master course in Information Management and School Libraries, at Universidade Aberta, Portugal. Meta-analysis. A comprehensive analysis of these different studies, allows us to understand and determine, for example, "what potentiates or weakens a relationship", "as results are cumulated over different contexts and conditions" [5, p. 554]. Although meta-analysis can be problematic because the studies that we are comparing deal with different contexts, we find an important advantage in this method because "combining results of studies can help us to target the specific set of circumstances under which an intervention can be most effective" [5, p. 555].

This is a longitudinal study, as it analyses dissertations completed between 2007 and 2017. It is also a follow up of a previous study [6]. In this master course all students are TL who want to acquire specific formation in the field to increase their knowledge and competencies. From the very beginning of the master course, in 2005, one of its research objectives was to improve knowledge of the concepts and practices of TL concerning IL in school libraries. In this sense, one of the "umbrella" projects for the master dissertations is IL.

The Repositorio Aberto [7], the institutional repository of Universidade Aberta, was used to identify which dissertations had the word 'literacy' either in the title or in the keywords' list. In a group of 62 master dissertations, we found eight that used the keyword and two that also focus on IL, although 'literacy' was not in the title nor on the keywords' list. In the end, ten dissertations were retrieved and thoroughly analyzed. Their main characteristics are shown in Table 1.

3.2 Results and Discussion

The following table summarizes the main aspects of characterization of the dissertations integrated in this meta-analysis.

Table 1. Main characteristics of dissertations under analysis

Study/topics	Study design/ methodologies	Universe	TL profile (variables)
Carvalho, 2007/IL Practices in SL	Quantitative	20 schools (North Portugal)	TL – 8 h–14 h per week
			TL instruction
Freire, 2007/IL practices and collaboration	Action research	1 TL/school (Centre Portugal)	TL – full time
		TL/T (mother tongue department)	TL instruction

(*continued*)

Table 1. (*continued*)

Study/topics	Study design/ methodologies	Universe	TL profile (variables)
Tomé, 2008/IL Practices in SL	Quantitative	26 Schools (Centre Portugal)	TL – full time
	Questionnaire		Integration in SLN
			TL instruction
Mendinhos, 2009/IL practices in SL	Quantitative – questionnaire	9 schools (Lisbon area)	TL – full time
		9 TL (quantitative)	Integration in SLN
	Qualitative – interviews	3 TL (qualitative)	TL instruction
Santos, 2010/IL practices and collaboration	Qualitative	3 TL/schools (Centre Portugal)	TL – full time
	Interviews/ observation		
Silva, 2010/IL practices and collaboration	Action research	1 TL/school (Lisbon area)	TL – full time
Dias, 2011/IL practices in SL	Action research	21 students (secondary school) (Centre Portugal)	TL – full time
Sampaio, 2012/IL practices in SL	Action research	4 classes – 5th year (Lisbon area)	TL – full time
Brito, 2014/Visual literacy in SL	Case study - qualitative	1 class – 9th year (Lisbon area)	TL – full time
Paixão, 2017/IL and social networks	Quantitative	296 students – Secondary school (Centre Portugal)	TL – full time with one class
	Online questionnaire		

Through analysis of the study's results, one can draw several comments and interpretations. The first remark – with a relevant position all along the timeline covered by the studies til 2010/11 – in general, Teacher Librarians (TL) were not yet aware of the importance of Information Literacy (IL), "The inconsistency that we see at the work done with students within user training and information literacy, questions the very essence of school libraries, as an environment that's rich in information is not used or explored" [8, p. 197] or as Tomé [9, p. 170] refers,

> It is pertinent to point out that to define and implement a program of information literacy in a school, the governing body and the whole educational community should recognize the importance of literacy for the future of each student. The program should be considered an educational priority and adopted by the largest possible number of elements of the educational community and not just being written intentions on referential and guiding educative action school documents.

These earlier studies show that most part of TL's work was related to traditional library activities:

- Organization of information;
- Introducing the library to learners (at the beginning of the school year): guided visits to the library, how to use the library, library skills.

The following most important activities listed by TL were:

- supporting students during their work in the SL – for instance, technological support;
- and with lower representation: supporting teachers in curriculum - to find and to give information according to teacher's needs.

In what concerns specifically Information Literacy, the findings were not very positive. In the next paragraphs we will present these aspects with the addition of some comments:

(a) There was a misunderstanding concerning the concept of IL – there was a mix-up with reading promotion and with library skills (how to use the library). With Taylor [10, p. 6], we must distinguish library skills from IL: "Information literacy is not library instruction or library skills. Library skills focus on helping students understand how to use specific resources […] while information literacy skills do include accessing information, they go far beyond that, to using and thinking about information";

(b) IL models were unknown for most part of Teachers Librarians;

(c) Students competences are not developed well enough, in the context of the work of the SL or in collaborative work with teachers – mainly, we see that the intervention of TL in the field occurs once a year (almost always at the beginning of the scholar year) to instruct pupils about information skills but there is no further work with teachers and there is no skills training in context, that is, with an integration with curriculum contents. Teacher training for the development of IL competences is residual though we know that most teachers are not aware of the importance of this issue. As Mendinhos [11, p. 155] refers,

> The conclusions of this study show that there is a considerable distance between the international standards and the practices of the analyzed libraries. Thus, it becomes evident that there is a great need for teacher training, particularly focusing on school library teams and that the establishment of national standards of information literacy is highly necessary, if we want to meet the directives of IFLA and UNESCO.

(d) There is little collaborative work between TL and other teachers. We recognize that thinking together about activities and conducting activities together are crucial factors for success in this field, as several international studies have already identified. So, it seems that we still have two parallel worlds – SL and classrooms – that work separately most or part of the time.

Information literacy accentuates the need for careful retrieval and selection of information available and places prime emphasis on recognizing message quality, authenticity and credibility. IL education emphasizes critical thinking, meta-cognitive, and procedural knowledge used to locate information in specific domains, fields, and contexts [12]. So, for this to happen in all its fullness we need the intervention of an information specialist, that is, the Teacher Librarian and the content specialist, that is, the curricular teacher, in particular in higher grade levels.

The analysis of the dissertations' findings also led us to other important factors that have a significant influence in TL's work:

(1) To achieve a deeper understanding of some results we have to take in consideration the professional situation of teacher librarians. In Portugal, until 2008 TL was a part-time function – the TL was also responsible for some regular classes. As the coordinator of the School Library, he/she spent 8 to 14 h per week working in the SL, according to the number of students in that particular school. The implementation of the National Reading Plan [13] and the government concern with the success of the Technological Plan for Education [1] led to the creation of the position of TL at the school structure. In 2007/2008 the Portuguese Ministry of Education began to create conditions for having a fulltime TL in school libraries, and this situation resulted in a significant increase in the activities of SL, as well as the possibility of deepening their action. Teacher Librarians saw their role institutionalized in July 2009, by the Portaria nº 756/2009 [2]. So, the situation described above requires us to distinguish two phases: TL's work before and after 2009.
(2) Another important factor is Teacher Librarian instruction in this specific field. More than the number of years as TL, all studies have identified instruction as one of the main factors that positively influences the work developed by TL. Specialized training and training in various areas (information literacy, library management and evaluation, reading promotion, evidence based practice) have a positive impact in TL performance.

The alliance between these two factors, which began to occur mainly after 2007/2008, gives us important clues to understand some good practices identified in this second period of time, even if some problems that we have already pointed out, still remain.

In more recent studies we can recognize:

i. An effort to implement an IL model to be applied by all teachers – TL report that there are several resistances to this issue but also a great lack of knowledge regarding this field, so the intervention and support of the TL towards other school teachers is very important, namely as a teacher-trainer. Like Dias [14, p. 83] says,

> At a meeting with the other teachers, we emphasised the importance of the collaborative planning of the student research work and we made the presentation of various models of information research for analysis and involvement of the teachers in the choice of the most consensual model. We only presented the models that seemed to us more easily understood because they were tools unknown by the majority, if not the whole of the teachers present at the meeting and also because the time available was limited.

ii. An effort to involve the whole school in IL competences development. 'Project area' had been a privileged domain of work: all students had this subject and teachers were more available to collaborate with TL and to use various resources in teaching and learning (most teachers only use textbooks). Portuguese language teachers are also interested in promoting active practices including IL (because most TL began as Portuguese language teachers it is easier to establish collaborative relationships with the Portuguese language department).

iii. An effort to connect IL with curriculum subjects and not only as a separated and theoretical exercise done by students in the library with the TL. The publication of a referential, *Learning with the School Library* [15, Aprender com a Biblioteca Escolar] has also improved the collaboration with the TL.

The existence of a fulltime TL is a very important factor not just because these TL have more time to work in the library with students and teachers, but because generally they have more instruction in the field, and we find a direct correlation between more instruction in different topics and more consistent practices. Integration in the School Libraries Network (www.rbe.pt) is also another positive factor and has a real impact on Teacher Librarians' conceptions and practices. This SLN factor brings us to consider the importance and impact of such a structure on TL's work and on the way schools look to the SL, with a positive effect on students' results (shown in PISA studies).

In 2008, SLN launched a self-evaluation model for School Libraries. This model is an important instrument to foster schools and SL practices concerning Information Literacy. This model had a pilot phase and at this moment is applied in every school. The model was presented at the 38th IASL Conference [16] and has been accompanied and evaluated [17]. It covers four domains that represent "essential areas to the accomplishment of school libraries mission and its teaching and learning objectives" [18] within the school. Some of the features are characteristic of the Portuguese reality, but they are all directed towards critical teaching and learning dimensions of SL.

A brief note on the master dissertations conducted after 2010/11, where we have some references about the role played by the self-evaluation model in what concerns, for instance, the increase of collaboration between teachers and TL. As Sampaio [19, p. 117] refers,

> We can think that in these four years of our SL's integration in the SLN, students already look to the SL as a place to find support for the research and the realization of work. Some teachers have also requested some assistance from the SL but it is still insufficient … the collaborative work is still scarce, but there is a will on the part of some teachers and we will see if in the future there is the possibility to achieve a set of structured actions for a more effective development of information literacy competences.

But other aspects can be found, for instance: improvement of TL leadership and more confidence in the work they develop as Paixão [20, p. 24] says,

> The effectiveness of the SL will depend on the personal skills of the TL, which has to be creative, with great imagination, innovative, with strategic vision, able to define strategic policies/plans, which has management, technical and pedagogical skills and mainly leadership skills. […] Leadership, because he/she has to lead, manage and coordinate a team, which cannot be just a sum of individuals with no common goals, who have to operationalize the activities envisaged for SL and can condition the implementation and success of policy/strategic plans defined by the TL. As a teacher, TL is also a learning expert and, as such, must promote collaborative work at curriculum level, with teachers, and direct work with students, in the development of literacy skills of various types.

Nevertheless, some constraints still remain: (1) Resistance to diversification of teaching and learning resources - most portions of the work is based on textbooks; and (2) Teacher isolation in the classroom – one teacher, one textbook, 30 students doing all the same work at the same time.

4 Main Conclusions

The results obtained show some characteristics of the route being taken in Portuguese SL concerning IL's competences development. A first group of the analyzed dissertations indicated that in general, TL misunderstood the concept of IL, were still not aware of its importance, and most of their work was still related to traditional library activities such as organizing information and introducing the library to students through guided visits. In more recent years we have identified some important improvements in Portuguese SL, and in research studies evidence of that progress is shown. These results were then compared with important and recent developments in the context of Portuguese schools. For example, the legislation institutionalizing TL as a fulltime job, recognizes and explicitly mentions the significance of their work and its integration into the pedagogical activities of the school. The self-evaluation model, launched in 2009 by the Portuguese School Libraries Network is also a new element that brings more visibility to the work of the SL and to the advantages of linkage between TL and other teachers, specifically in what concerns the development of student's competences in Information Literacy.

Nevertheless, in some schools, IL practices are still underdeveloped and classroom teachers and TL still live, in a considerable number of schools, in parallel worlds. This means that TL training is a permanent work, but also that teachers in general must have a deeper understanding of the importance of developing IL competences. More recent developments, motivated by economic constraints, like the obligation of TL to be responsible again for a class, with less time to support students and work with other teachers, represents a step backward to the pedagogical improvements of the last decade, evidenced by the results of PISA 2009, 2012 and 2015 [21–23]. For instance, the crucial role of SL in supporting the work promoted by the National Reading Plan in schools is stressed by several studies [24, 25]. It is important that the pathway that is being build, particularly since 2009, but not yet sufficiently consolidated, is not put in danger.

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Impact of Purposefully Designed Learning Activities in the Case of Information Literacy Self-Efficacy

Ann De Meulemeester[1,2(✉)], Renaat Peleman[2], and Heidi Buysse[2]

[1] Library and Information Science, University of Antwerp, Antwerp, Belgium
[2] Knowledge Centre for Health Ghent, Ghent University, Ghent, Belgium
{Ann2.Demeulemeester,Renaat.Peleman,
Heidi.Buysse}@UGent.be

Abstract. Objectives: Developing information literacy skills of medical students is one of the basic skills to become lifelong learners. Method: The study focuses on the development of a first year integrated information literacy course for medical students during three consecutive years. Students filled in a validated information literacy self-efficacy scale for medicine at the beginning and at the end of the course. Results: Integrating a search-report has a significant positive effect. For 'Medical information literacy skills', a positive difference is found for the academic year in which a peer review was introduced. Integrating personal experience has an undeniable impact and should be stimulated in the educational design in higher education. Performing a peer review impacts information literacy self-efficacy related to the specific medical information literacy skills and should be further integrated in the course. Teachers need to evaluate the impact of course development continuously, as not all adaptations always have the expected impact.

Keywords: Information literacy self-efficacy · Medical education · Higher education · Pre- and post-implementation · Information literacy scale for medicine

1 Introduction

To train medical students in the process of defining a research question, searching, finding and evaluating information for high-quality decision-making, curriculum designers invest lots of efforts in integrating information literacy (IL) courses. Furthermore there is no guarantee to find reliable information for a specifically defined health question. Self-efficacy (SE) in acquiring information becomes a key factor for perceived decision quality [1]. Medical educators should evaluate whether students have the necessary basic IL and ICT skills at the start of their academic career, and, if not, curricula integrating these skills should be developed [2].

According to Bruce [3], the integration of IL in a curriculum requires some critical components. Firstly, provision of the resources (budget, staff, access to sources, …) to facilitate the learning of IL skills is necessary. Furthermore, the curriculum has to offer the opportunity to integrate the learning, either early in a course or when appropriate.

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Finally, the IL courses need to be embedded as an engagement in learning activities, which requires continuous interaction with the information environment. Furthermore, the curriculum culture has to be based on open, reflective documentation practice. Three critical elements of learning are important for students to become information literate: experience, reflection on experience, and application of experience within new contexts. Only when a course is not limited to merely teaching IL skills, but also includes the development of learning experiences, can an information literacy programme be successful. Teachers providing their students with multiple task assignments such as instruction, practice and review, will contribute to their opportunity to experience success [4]. Faculty and teachers therefore have to evaluate their teaching methods and to analyse the impact of integrated interventions.

Appropriate training is a way of minimising the adverse effects of information overload [5]. Within all academic contexts, educators need to train students to overcome the mass of information and guide them towards becoming self-directed and lifelong learners. Nowadays (a lot of) research documents the impact of training on the development of IL skills and information literacy self-efficacy (ILSE) [5–7]. Furthermore, practice and experience play a key role in attaining SE, as this generates confidence in using those skills [6, 8]. Integrating IL should therefore be combined with practical exercises in which students experience their abilities, gradually become more skilled and ultimately more self-confident [6, 7, 9, 10]. Attention should be given to guiding students towards positive experiences [11]. Research has demonstrated that it is not only the development of skills, but also the encouragement, which make students more self-confident about finding reliable information [12].

A purposefully designed intervention influences not only the quality of searching, but also the ability of students to perform their searching autonomously and to engage in independent learning activities. Training can orient students to the use of the most applicable information sources; furthermore, after the intervention, students will use a greater range of databases and will not limit themselves to querying Google [13].

In health sciences, student peer teaching and learning have proven to be an effective educational method in the clinical environment [14]. Furthermore, peer assessment can be used as a learning tool: feedback can help medical students to learn and to adjust their professional behaviour [15]. We can assume that integrating peer review in an integrated IL course will help medical students to further develop their ILSE.

Ideally, students need to get appropriate feedback from their teacher, so when lower ILSE occurs, they can be encouraged or guided in the further development of their IL skills and thus ILSE [6, 11]. Post-test SE and skills appear to improve when feedback is given as opposed to no feedback at all. Feedback concerning performance should also be given in the first half of the course to enhance the efforts students make to succeed [4].

This study focuses on the impact of an IL integrated and embedded course that was developed and adapted during three consecutive academic years. Faculty, curriculum developers, teaching and library staff invest time and resources to construct a good basis for the development of students' IL skills. To determine a good teaching approach and purposefully designed content, course evaluation is needed.

2 Methods

Participants and Setting. Participants in the study are first-year medical students of the Faculty of Medicine and Health Sciences of Ghent University (Belgium) during the academic years 2013–2014, 2014–2015 and 2015–2016 (Table 1). This cohort of students is a homogenous group as they have all passed an entrance exam organised by the regional government, a prerequisite for starting medical school. One of the key goals of the medical curriculum of Ghent University is to train students in such a way that they become lifelong learners. Students learn to be flexible in handling the medical information flow and to apply their theoretical knowledge to patient care, in the framework of the health care system [16]. Educational strategies, based on experiencing and exercising, are integrated in the information literacy course in the first year, within a "learning trajectory" of problem-solving. This study describes the impact of two different interventions, one in the academic year 2014–2015 and another one in the following academic year 2015–2016. It analyses whether integrating practice and experience into the IL course has an impact on students' ILSE.

Table 1. Participants

Academic year	Gender	Pre-intervention participants n°	Post-intervention participants n (%*)
2013–2014	Male	125	106 (84.8%)
	Female	160	145 (90.6%)
2014–2015	Male	87	47 (54.0%)
	Female	169	108 (63.9%)
2015–2016	Male	64	52 (81.2%)
	Female	134	113 (84.3%)
Total number of participants		739	571 (77.2%)

°All participants are unique and have only participated once. *Percentage of participants in relation to the pre-intervention.

Learning Intervention. In the first semester of the first year, a theoretical and a practical class given by an expert teacher in medical IL topics, illustrate the aims: students need to be able to search and handle information, information sources and medical documentation, and have to learn how to read critically [16].

Following guidelines for better integration of IL within a curriculum [3], the course had to be adapted (Table 2) in order to integrate experience, reflection on experience, and application of experience.

In the academic year 2013–2014 the IL course focused on the following competences: defining a health-related question, knowing how the publication cycle is organised, searching in databases (PubMed: free text, gaining insight into automatic term mapping, Medical Subject Headings–MeSH–MaJR, NoExp; MyNCBI), and citation-related searching. In the practical session, students had the opportunity to

practise those skills. Unfortunately, they all had to work out the same example, which did not stimulate their personal learning, whereas working on different topics would make them more reflective.

From the subsequent academic year 2014–2015 onwards, different course adaptations have been implemented to respond to the prerequisite of more experience-based education: the course has evolved to an actual setting where theory and practice have been integrated in a 4-h theoretical-practical integrated session (Table 2) [17].

Table 2. Information literacy course development over time (2013–2016)

Topics	2013–2014	2014–2015	2015–2016
Define research question	o	x	x
PubMed	o	x	x
Citation search	o	x	x
Impact factor	o	x	x
MyNCBI	o	x	x
Google scholar		x	x
Web of science		x	x
Task to submit a search-report		x	x
Interaction between databases			x
EndNote			x
Peer review			x

o: Theoretical and practical classroom session; x: Aspects taught in theoretical and practical classroom session with personal assignment.

Because in the academic year 2013–1014, group-practice within the course was not enough to experience learning, all students were asked to write a personal 'search-report' in which they described their search strategy starting from a broad (individually chosen) health-related question. Database searching was extended with Google Scholar and Web of Science. Submitting the 'search-report' was part of the exam and thus evaluated. By means of this 'search-report', students had to demonstrate that they have incorporated the different goals, such as being able to narrow down the original health-related question based on their search strategy and perform a structured search strategy in different databases.

In the academic year 2015–2016, some more elements were added to the teaching and practice of IL skills: explicit exploration of the interaction between databases; management of citations with bibliographic software (EndNote) and citing in Word via EndNote. To reflect on experiences, the 'search-report' was expanded with a peer review, whereby each student received (randomly) two papers from peers. The teacher and the two peers individually scored the 'search-report', without consulting each other. At the start of the course, students received detailed written and oral instructions as well as all pre-defined items for peer review, with a maximum score per item. Clarifying the task and expectations of the teacher are important factors for the smooth

running of the course. After the peer review, students received personal feedback on their 'search-report', as well as on the peer review they performed themselves.

Procedure. Students filled in a validated 38-item information literacy self-efficacy in medicine scale (ILSES-M) at the start of the academic year just before the learning intervention (Pre-intervention) and after the learning intervention (Post-intervention). Post-testing was done before the final course examination. Students had to respond to questions related to five subscales (S) which identify some clear IL skills: S1 'Evaluating and Processing Information'; S2 'Medical Information Literacy Skills'; S3 'Searching and Finding Information'; S4 'Using the Library' and S5 'Bibliography'. Data was collected for three consecutive academic years: 2013–2014, 2014–2015, 2015–2016.

Unfortunately, it was not feasible to use a control group for this research, because for ethical reasons all students needed to follow the same integrated course with the same learning and course objectives. On the other hand, other researchers, using a control group noted the beneficial effect of IL training with a higher quality of searching [18].

Approval of the Ethical Committee of Ghent University was obtained and students signed an informed consent form. All data collected was anonymised by a trusted third party.

Statistical Analysis. Descriptive statistics were used to establish frequencies, means and standard deviations for pre-intervention as well as post-intervention ILSE scores per academic year for male and female students. The pre-intervention score was expected to influence the post-intervention score. In addition, 'academic year' and 'gender' were variables that may have influenced the post-intervention ILSE-score, so a one-way ANCOVA was conducted to determine a statistically significant difference between academic year and gender on the ILSES-M (sub)scale scores after the classes (post-intervention scores) controlling for the pre-test ILSES-M (sub)scale scores. Partial Eta Squared has been calculated for each subscale and total scale, to evaluate the effect of "academic year" and "gender" on the results.

3 Results

The estimated mean scores of the post-intervention for the more general subscales, S1 and S3, were the highest in all three academic years. Subscale 2 had the lowest score for academic years 2013–2014 and 2014–2015 and increased in 2015–2016, while the ILSE for S4 was lower. For subscale 5, ILSE after post-intervention remained one of the skills with a lower ILSE score in all academic years.

For all subscales and the total scale, a statistically significant effect was found for "academic year" on the post-intervention score after controlling for the respective pre-intervention scores (Table 3). Post-hoc testing showed only a significant difference between academic year 2013–2014 and the academic years 2014–2015 and 2015–2016, with no significant differences between 2014–2015 and 2015–2016.

Table 3. Effects of academic year and gender on post-score after controlling for the respective pre-scores for (sub)scale.

	Academic year (p-values)	Partial Eta Squared academic year	Gender (p-values)	Partial Eta Squared gender
Evaluating and processing information	<0.001	0.850	0.850	<0.001
Medical information literacy skills	<0.001	0.094	0.864	<0.001
Searching and finding information	<0.001	0.116	0.453	0.001
Using the library	<0.001	0.091	0.007	0.013
Bibliography	<0.001	0.149	0.010	0.012
Total scale	<0.001	0.131	0.845	<0.001

A statistically significant effect appeared between 2014–2015 and 2015–2016, only for the "Medical Information Literacy skills" (the main emphasis in the IL course) (Fig. 1).

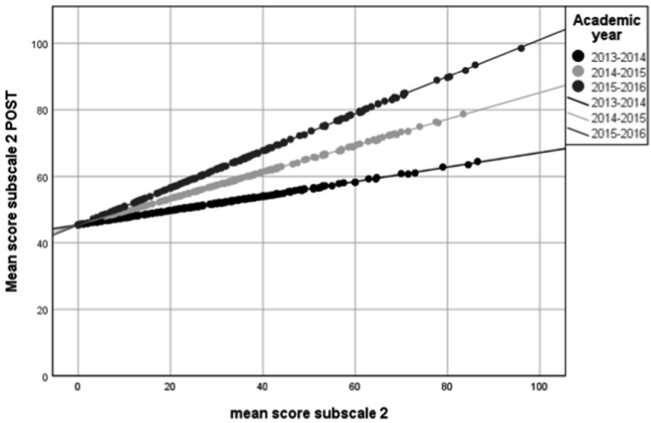

Fig. 1. Subscale 2, "Medical Information Literacy skills" - mean score post-intervention effects of academic year

For S1, S2, S3 and the mean score of the total scale, no gender differences were noted. For S4 and S5, male students tend to have higher ILSE beliefs. Partial Eta Squared analyses for all subscales reflected that "academic year" had a more profound impact on the results than "gender". For S4, 'academic year' explained the results nine times more.

4 Lessons Learned

The results showed that offering an integrated IL-course increased the ILSE-score for all three different cohorts of students. Even though a statistically significant effect of gender on S4 and S5 post-scores has been found, Partial Eta Squared analyses showed the limited impact of "gender".

Other research found no significant differences between male and female students regarding SE in getting information [6, 9, 19–22]. Bazrafkan, Hayat [9] reported no statistically significant difference between males and females but noted some variances in the mean of subgroups of IL, where female students reported only higher mean scores in their ability to understand legal and financial cases related to the use of information. Male students had higher mean scores for all other researched aspects of IL-related skills.

The implementation in 2014–2015 of the exercise 'writing a search-report' clearly influenced the ILSE for all subscales. The impact of individual practice and thus experience seemed clear. When students define and refine their search question, search in different databases, use and cite the information appropriately, this has an overall positive impact on their ILSE. In a free comment field of their 'search-report', students reported that they feel positive about practising this and that they do not mind the additional effort to write their 'search-report' because they feel that practice stimulates their development. Other research reported comparable results, e.g. that occupational therapy students prefer active learning to traditional learning [23].

However, the results of the cohort of 2015–2016 showed no direct impact of the peer review on the post-ILSE for S1, S3, S4 and S5; as we noted, there was no significant difference within the academic years 2014–2015 and 2015–2016. Students' ILSE is only influenced by peer review when it comes to their medical information literacy skills. Could this be the result of adding the interaction between different databases within the searching method, or does the peer review only triggered the ILSE for medical information literacy skills? We have no explanation for this result. The peer review was added to the course as a supplementary learning tool. Future research should therefore evaluate why students do not feel any impact on other IL skills and if performing the peer review lead to an improvement in other skills. Analysing another student's work may activate other mechanisms. In the free comment field of the 'search-report', students reported that doing a peer review is very instructive: they learn from others by finding out if they did it well, and if the latter was not the case, by explaining how they should do it correctly next time. After the peer review, students were able to ask for personal feedback. This is an important add-on because, at this stage, students do not feel sufficiently confident about their skills. The timing of the feedback can play an important role. If students succeed early, this could be a sign of superior learning ability [4]. But, more importantly, this can give the student the opportunity to develop positive experiences within his learning method, which again can have an impact on students' SE [11]. In addition, students prefer the personal contact with their teacher when struggling with questions. Even though communication technology facilitates contact with teachers, students still prefer asking questions in person [23]. Perhaps they feel more reassured when this person is someone they know. Students can be guided and given the

appropriate help in their learning path, but we need to take care that students become independent in developing their skills, so the risk of "over-pampering" should be avoided. Students need, for example, to have adequate searching practice, to experience their learning accomplishments to develop their SE; negative feelings such as confusion and frustration will influence their ILSE [7].

It can be hypothesised that, because students already feel quite confident for S1 and S3, a lesser impact is noted in the post-intervention ILSE score. Adding the peer review did not generate any expectations of an increase in the ILSE in the case of library and bibliography skills, because ILSE is needed for both when writing a 'search-report'. The ILSE for library skills decreased in 2015–2016, which can be linked to the fact that in the first year, students are taught to search for peer reviewed articles by means of database searching and that catalogue searching is omitted from the course. The impact of the digitisation of the biomedical collection is another factor that may have influenced the uncertainty of catalogue searching. The lower ILSE for S5, related to bibliography, is possibly connected to the fact that originally, instruction about the bibliographic management tool was only integrated in the first Master's course, when students were already working on their Master thesis. Since 2015–2016 this has gradually been integrated in the first year course. Within our results no real impact has been seen as a result of this change; however, from 2016–2017 a more advanced use of the bibliographic tool was required by the teacher.

Integrating IL development in specific assignments allows students to develop IL skills within a context or discipline relevant to them [24]. The results of subscale 2 showed this impact. Expert teachers should therefore continuously evaluate and develop their course and use different methods to stimulate students' learning, creating a good basis for students to become independent lifelong learners.

Due to the impact of the results of these former interventions, the teacher steered the course, with further development of the integrated IL training.

5 Conclusion

The positive changes in ILSE support the development of an integrated IL course. Adding personal practice and experience are real advantages to enhance ILSE. The study, however, triggered several new questions that should be dealt with in future research. Not all of the interventions have the expected impact. Teachers have to set their objectives clearly and have to evaluate, after the intervention, whether they have been effectively met, or if adjustments are necessary.

Peer reviewing could help strengthen the basic general competences in health education and should therefore receive appropriate attention [25]. However, a major challenge is to find the right balance, because the evaluation of the 'search-report' and the peer review are time-consuming activities, especially for the teacher.

Course development must be a continuous process. Educational strategies based on experience should be further stimulated and integrated within the context of the disciplines. Purposefully designed activities requiring students to use their IL skills within

the medical discipline have an impact on students' ILSE. Medical Faculties and IL experts can, by these means, play a crucial role in encouraging students to become independent, lifelong learners.

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Information Seeking and Information Behaviour

Information Behavior of Humanities Students in Bulgaria, Italy and Sweden: Planning a Game-Based Learning Approach for Avoiding Fake Content

Marina Encheva[1(✉)], Plamena Zlatkova[1], Anna Maria Tammaro[2], and Mats Brenner[3]

[1] Library Studies Department,
University of Library Studies and Information Technologies, Sofia, Bulgaria
{m.encheva, p.zlatkova}@unibit.bg
[2] Department of Information Engineering, University of Parma, Parma, Italy
annamaria.tammaro@unipr.it
[3] Library/Learning Centre, University of Gävle, Gävle, Sweden
Mats.Brenner@hig.se

Abstract. The paper deals with the Erasmus+ project NAVIGATE - Information Literacy: A Game-based Learning Approach for Avoiding Fake Content, coordinated by the University of Library Studies and Information Technologies in Bulgaria. The focus of the project is on Bachelor's students in Humanities who either do not have the skills to distinguish fake content or do not have the desire, due to lack of time and interest, to conduct more in-depth information search. By applying a game-based approach to information literacy training in three European countries innovation can be brought into this field. The results of an empirical sociological survey conducted in the partners' institutions in Bulgaria, Italy and Sweden on students' understanding of the concepts of information and mobile literacy and the criteria used by the learners for the assessment of information are presented. Emphasis is also placed on the role of the library as a partner in the learning.

Keywords: Information literacy · Mobile literacy · Fake content · Game-based learning · Comparative survey · Higher education · Bulgaria · Italy · Sweden · Erasmus+

1 Introduction

Information literacy (IL) is the first of the five key components of digital competences defined by DIGCOMP, the European Digital Competence Framework [1]. European citizens must be able to manage information and knowledge through a conscious use of such skills. According to the new definition of information literacy officially launched on April 6 2018, by the CILIP Information Literacy Group "information literacy is the ability to think critically and make balanced judgements about any information we find and use" [2]. The widespread phenomenon of fake news/content shows that we are still

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far from achieving these objectives. The information skills are now digital skills. The information consumer has become an "online" information consumer and uses sources other than traditional bibliographic sources, such as websites and social media. Aided by mobile devices, new learning platforms and other technology, students often overestimate their informational skills and try to complete their tasks using unvalidated resources. Developing educational elements to increase information literacy is critical to whether we can make the most of the new technologies or we will suffer from the inability to manage the processes we have started. If new generations do not have markers to navigate within Staged Reality, then they will be lost both literally and idiomatically [3]. In terms of using information for learning, the previous experience of the students provides the scaffolding that allows them to increase their existing knowledge. At the University of Trobe a questionnaire was sent to students to understand their previous knowledge [4]. Stanford's study (2016) of social media and websites used by students for their tasks added stimulus to the discussion, highlighting that university students have very weak assessment skills [5].

NAVIGATE (https://www.navigateproject.eu/) is an Erasmus+ project that intends to apply an innovative approach based on digital gaming to increase competences on information literacy (IL), starting from higher education students in Humanities. It involves four partner organizations (three universities and one NGO) from Bulgaria, Sweden and Italy – University of Library Studies and Information Technologies, University of Gävle, University of Parma, and Fondazione Politecnico di Milano. The project started in September 2017, and lasts for three years. A first activity aimed at monitoring students' awareness on information literacy showed a gap between reality and perceptions. The goal of the project is to use a games-based approach to improve the student learning to avoid fake content and to create opportunities for an active involvement of students. The objectives are also to extend training opportunities focused on the issues of information literacy for avoiding fake content, since game-based training expands the learning potential of digital environments [6]. Game-based learning is based on strong learning principes [7, 8]: it gives information "on demand" starting from people's purpose/tasks, allows people to be creators and not only consumers, and confronts players with problems that allow generalisations about reality, which is highly motivating.

The first concept of "fake" is that of manipulation of information, a fraud, the intentional spread of misinformation using social media or traditional media. Another concept of "fake" news is misinformation, inaccurate information, uncertified information. In the NAVIGATE Project we translate "fake" news as "false news", emphasizing the meaning of inaccurate and invalidated information. The fake news offer a particular case to evaluate not just an information format and a strategy of fakeness but the content of media literacy in a digital environment. There is no easy way to demarcate between "fake" and "non-fake" across all cases and this opens interesting research opportunities on learning [9]. The NAVIGATE Project focuses on literacy and educational initiatives for avoiding fake content, together with game-based technology to evaluate fact checking of information.

2 Methodology

NAVIGATE started with a comparative survey on the IL perceptions and skills of undergraduate students in Humanities from the partner institutions in Bulgaria, Italy and Sweden in order to better understand and study the particular needs of the target group in relation to IL. The results from the survey in the second phase of the project will be analysed to develop a Competency Tree Chart (a Strategy for IL Training).

The questionnaire was created with the participation of all partner institutions in the NAVIGATE project and distributed among students from the three universities involved in the partnership: University of Library Studies and Information Technologies (ULSIT), Sofia, Bulgaria; University of Parma, Italy and the University of Gävle, Sweden. The survey is inspired and is a simplification of the questionnaire used by the comparative study on the mobile and information literacy perceptions and skills of Humanities students done in 2017 by the University of Library Studies and Information Technologies (ULSIT), Bulgaria and Anadolu University, Turkey [10].

The main goal of the survey was to make a comparative analysis of the similarity in the learning behaviour in the era of digital technologies and their impact on students' managing of information flows and on the students' assessment of libraries in their digital everyday life. The survey had the following objectives: to understand the student's notions of information and mobile literacy; to assess the role of technologies in the learning process and the intensity of their use; to evaluate the student's concept of fake content and their criteria for assessment of the information sources; their level of digital competence. In the three countries the information literacy sessions are offered in different way – in Bulgaria they are integrated in the curriculum as part of mandatory or elective courses while in Italy and Sweden they are usually a part of sessions organized by the university libraries.

With regard to the methodology of respondent selection, subjects of the research were students in Humanities from three universities (in Bulgaria, Italy and Sweden), full-time, Bachelor's programs. They were selected in compliance with the educational degree, specialty, and year of study. The sample that meets the criteria listed must include in total 163 students (from each course of study in all Humanities specialties of the three universities). Their selection was done by the method of those who had responded (every fourth until the needed number had been reached). In this method the information is collected on the principle of voluntary participation in the survey. The total number of the respondents in the three universities was 423. Concerning the methodology of gathering and registration of sociological data (research tools) a quantitative survey by standardized questionnaire and online questionnaire with closed, semi-open and open questions was applied together with the Europass Digital competence self-assessment form [11]. The data was collected from December 2017 to January 2018. The information processing was done through programs of statistical data processing. Open questions were processed and analysed by the following means: manually in the traditional way; via the web tool the LIX counters Readability Index (LIX); via classification of the students' written statements within the Framework SCONUL Seven Pillars of Information Literacy [12].

3 Results from the Survey

3.1 How Students in the Library and Information and Humanities Faculties in the Three Universities Understand the Combination of the Notions Information Literacy and Mobile Literacy

The question of understanding the notion of "information literacy" was answered by the majority of the students surveyed at the three universities. However, their perceptions differ significantly as this applies most to Sweden. Students from ULSIT have formulated a total of 150 views. The highest percentage (25.3%) of these are related to the prevailing opinion in the public space, namely: [it] is the ability to work with information and communication technologies entirely in a technical aspect including: "to be good with computers", "working with different computer programs and applications", "skillful handling of technology and office PC programs", "to be up-to-date with technology". For 18.7% of the respondents, information literacy is associated with access to information, particularly: "fast", "easy", "how", "where". Another aspect of the information, namely its use, is related to the opinions of 14.7% of the respondents - it must be "effective" and "understandable". The ability to work with a variety of information sources and resources (knowledge of different documents, understanding and reading online information, etc.) is the basis of the understanding of 14% of the respondents. The notion that information literacy is a "set of skills that are needed to detect, analyze, remember and use information" and reflects another important aspect of the term is shared by 8.7% of the participants. For another 7.3%, it is related to awareness of the need for information. There are, of course, general responses: "a set of skills", "knowledge in different areas", "being literate in the information environment" and so on given by 10% of the respondents. For two students, the term is not associated with "anything". Those who did not respond account for 18%.

There are no significant differences in the views of Italian students, where the majority of respondents (33%) indicate the technical capacity to use the devices and tools, together with Internet and the Web as information literacy. Part of the answers (19%) are even provocative: the respondents say they do not know or answer in a way which reveals arrogance ("I am an expert but I have never heard of literacy") or confusion with the concept of information and communication technologies, or with the concept of teaching. Only 10% define information literacy as a competence including two or more SCONUL skills in the seven pillars. However not all phases in the research process are considered. The stages of identification of needs, research planning and awareness of what is already known are underestimated: only 4% of respondents are aware of the need to start identifying needs; 11% respondents plan the research process.

The research activity is considered as gathering of information: 16% of respondents define the indicated literacy as an activity related to the gathering of information, only sometimes combined with the evaluation of information. To evaluate information and its sources critically is considered in the definition of information literacy only by 6% of respondents. After collecting and evaluating the data, the activities connected with the use of information are considered by only a few respondents: 5% recognize the need for management, 13% of respondents equate information literacy essentially as a capacity to inform others, both as communication and as sharing information.

Students' description and understanding of the term "information literacy" in Bulgaria and Italy is presented in Fig. 1, which related to the SCONUL pillars look like this:

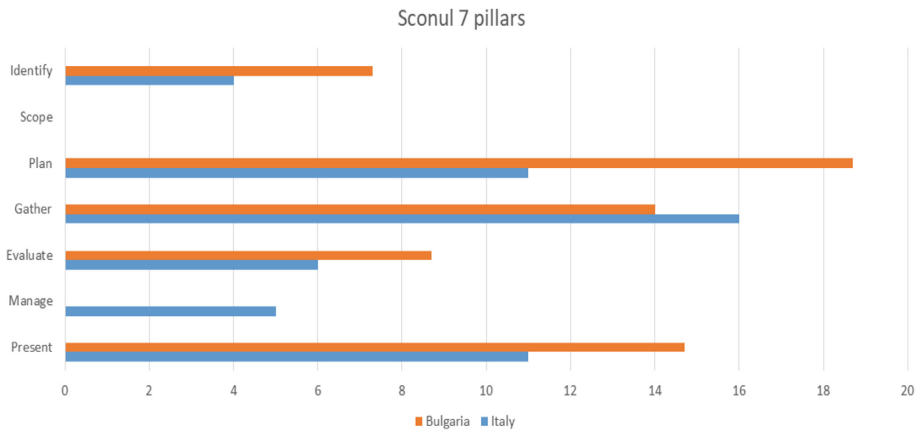

Fig. 1. Statements of the Bulgarian and Italian students regarding "information literacy" – analysis via SCONUL seven pillars of information literacy framework

Ninety-seven Swedish respondents answered the question related to the understanding of the notion of information literacy, which when analysed via SCONUL Seven Pillars of Information Literacy Framework in Fig. 2, look like this:

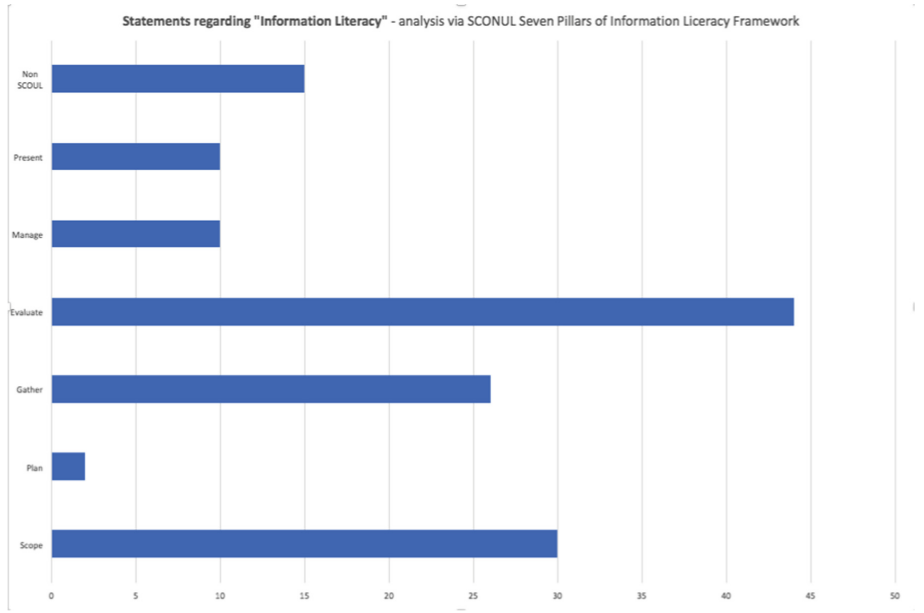

Fig. 2. Statements of the Swedish students regarding "information literacy" – analysis via SCONUL seven pillars of information literacy framework

Fifteen students did not understand the questions. Very few (three students) understood the question as "Can construct strategies for location information and data" referring to the SCONUL's pillar "PLAN". The text readability index is 49, which means that it is classified as an intermediate, normal newspaper text. When reading the statements it appears that these are not students in an academic environment – it looks more like a school level. Some students write very briefly and do not relate their study or work with the processes around information retrieval for research. Most commonly, the statements can be interpreted as competences connected with the pillars: IDENTIFY, EVALUATE, SCOPE and GATHER. The lens/pillar "PLAN" is missing from the respondents' statements – very few of them can be associated or connote this lens. It is understood as the following: searching techniques, differences between search tools (limitations/advantages), advanced search, Boolean operators, the need to revise keywords, controlled vocabularies and taxonomies in searching. The students seem to lack this skills and area of knowledge, for example neither metadata nor open data are mentioned.

Mobile literacy provides a comprehensive introduction to literacy pedagogy within today's new media environment. It focuses not only on text literacy (reading and writing), but also on other modes of communication, including oral, visual, audio, gestural and spatial literacies. The information literacy skills base has been broadening in the mobile environment: the focus of teaching and learning in higher education today is more on critical thinking and problem solving. This growth has occurred in response to the exponential increase in both the number of information channels that can be accessed, and the amount of information that flows through them.

The mobile technologies that have developed and become widespread in recent years have placed the concept of mobile literacy onto the agenda. Although the debate around which devices are mobile or not is evaluated differently in different contexts, according to ADL (Advanced Distributed Learning) mobile learning or "mLearning" is the use of handheld computing devices to provide access to learning content and information resources [13]. It is important to note that most of the survey participants in Bulgaria and Italy have a mobile device, which they prefer to use over their laptop and desktop PC. Also if the use of mobile devices is widespread, it is not used for learning. Laptops are preferred for studying and mobile device use for learning is limited to the search for information and reading.

Concerning the difference between information and mobile literacy, the students' responses in Bulgaria and Italy are analysed below. In Bulgaria 64.9% of the participants in the survey answered, and the opinions could be presented in the following way: 40% think it is related to mobile skills, for example: "using smart equipment and devices", "working freely and anywhere with mobile devices", "getting literate in mobile technologies, not in computers". For 13.8% of the respondents the difference lies in the approach whereby we find and pass on information "from one person to many" (PRESENT); 10% think that it is relates to computer and Internet skills (GATHER), and 2.5% refer to the work of the devices themselves and the technical equipment (MANAGE). 13.8% of the respondents answered frankly that they did not know, 11.3% use cliché phrases, according to another 7.5% "the difference between the two terms is not big" and 1.2% think that they are "fundamentally different".

The responses of the Italian students directly correspond to the various elements included in the term "mobile literacy". Most of the respondents (36%) focus on the

search process (GATHER) and define mobile literacy as the capability to use the devices and the Internet: the capability to use tools thus defines mobile literacy, which is considered equivalent to digital literacy. The technological interface is seen both as an element that facilitates, and as an element that hinders: some respondents evidence the simplicity of using or the difficulty: 2% and 0.1% respectively. The main feature that many recognize with regard to the mobile literacy is the quickness (4.4%), and the immediacy of answers (2%).

It is interesting to note that defining the evaluation of the results (EVALUATE) obtained using mobile devices, there are opposing opinions. Regarding the quality of the information that is obtained, some of the respondents appreciate quantity of information (2%) and some instead claim the limitation of resources (0.1%); some consider all the information using mobile tools false (3%) and some think that the information on the Internet is of better quality (2%). Some answers (7%) are regarding the use and management of information (MANAGE and PRESENT) and mobile literacy is defined as: capability of presenting information using mobile devices (2%), inform the other (2%) and be informed by others (0.1%). Others note the flexibility needed in research (0.1%) and the dependence on the context in which one is located (0.1%). This aspect is important to be taken into account for the following next phases of the NAVIGATE project. More than on skills, mobile literacy should be seen in different contexts, such as that of learning and teaching. In the concept of mobile literacy, the preparatory activities of the research process disappear: how to identify needs, plan and understand what is already known. The planned activities are reduced to the SCONUL pillars GATHER, EVALUATE and PRESENT. Some of the answers say: "One is the medium, the other the knowledge", "With the mobile device, thanks to the Internet you can have all the information you want", "Information competence with mobile devices is the ability to understand if information is truthful or not". These different opinions reveal a positive approach to technology or, on the contrary, a negative approach to information and communication technologies, but not justified by training in information literacy that makes students independent lifelong learners. Of these 22 (24%) cannot define this competence. The statements of the Bulgarian and the Italian students are presented in comparison in Fig. 3.

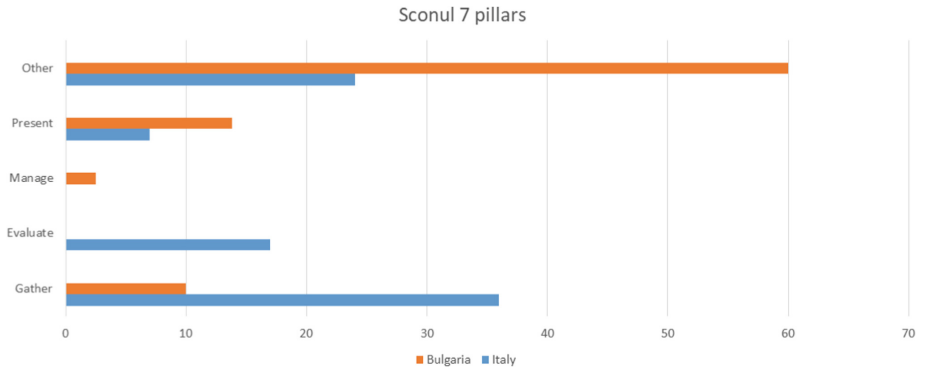

Fig. 3. Statements of the Bulgarian and the Italian students regarding "mobile literacy" – analysis via SCONUL seven pillars of information literacy framework

It is interesting to note that the question about the difference between information and mobile literacy or the relevance of the concept of mobile literacy was not understood by the Swedish respondents. Such a problem did not appear in Italy, as well as two years earlier in Turkey [10]. This may be due to cultural differences as well as to economic and technological differences.

3.2 The Library (in the University and Out) in the Everyday Life of the Contemporary Students

A set of questions in the questionnaire is related to the skills needed to use university and other types of libraries in the students' everyday lives, and to work with their resources, part of the totality of the concepts "information literacy" and "mobile literacy". The intensity of visits and use, the ways to create skills to work with the resources of the university library, the ways to form a reference and bibliographic culture, the most frequently used services are considered here. Regarding the intensity of use of library services as a whole, it can be argued that there are significant differences in the three countries, the explanations for which need to be further sought.

The survey outlined a negative picture for Bulgaria and Italy presented in Fig. 4:

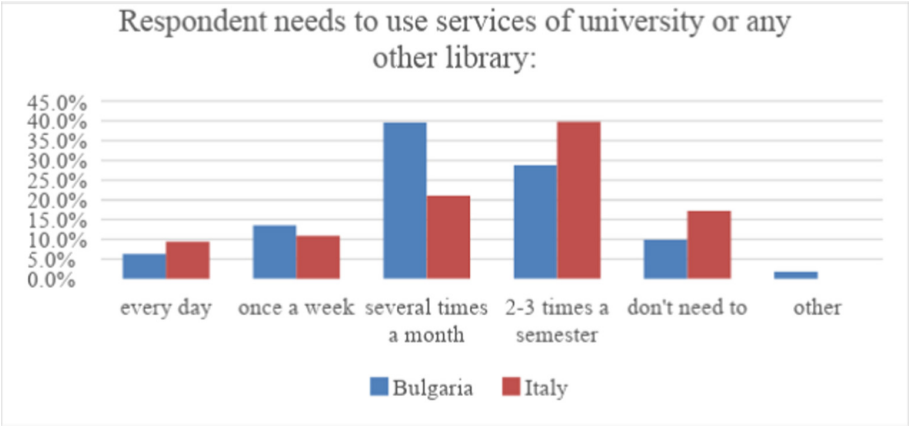

Fig. 4. Respondent needs to use services of university or any other library (Bulgaria and Italy)

In Bulgaria, a possible explanation can be found in two directions: firstly, the unpopularity of the library institution with the necessary capacity (material, technical, etc.) to support the learning process. Its unattractiveness is due both to the outdated library fund and to the lack of sufficient modern technology. The reason for this is the under-funding of Bulgarian libraries and the lack of a clear vision of their role in the educational process as a whole.

University libraries in Parma try to attract students and contribute to their success with various services: visits and use of the space, building students' skills for working with the university library resources, forming a reference-library culture, and most often with interlibrary loan and other lending services. In conclusion, we can state that

all students have an electronic device and are connected, but do not use the technology for learning. The learning style is still traditional even if the textbook is downloaded on a PC. Many like to study at home but some prefer the library. However, the library is not used as a place for its services, including databases and digital resources. If libraries want to have a role for learning using mobile services, they should start to be in the workflow of students, for example offering services on mobile devices.

With regard to the results for Sweden it is confirmed that in the Scandinavian countries, compared to some other European countries, there is a significantly different attitude towards the libraries and the services they offer. This is clear from the answers of the Swedish students. For 34% of them, a visit to the library (university or other) is a daily ritual, 24% visit it once a week, and 17% do this a few times a month. The role of the library (university and others) in the everyday life of contemporary students (intensity of the visits and use, their ways of building skills for working with the university library resources, forming reference-library culture, most often used services) is presented here by over 90% of the responses. Students' answers are divided in three main categories – every day, once per week and several days a month regarding the question "In your studies, how often do you use your university library or other library services including Internet services?". Students tend to seldom have direct asynchronous e-mail contact with the library staff. One of three visit the library on a daily basis, one of four every week and others more rarely. They order books, search for electronic resources. More students tend to search in the library catalogue more often than in journals or conference publications. The search in research databases leans more towards the statement "Sometimes" and less towards "Very often/Often" and "Rarely". About 10–15% of the students indicate they do not search in either in research databases, journals, or conference publications.

3.3 Criteria for Evaluating the Credibility of Internet Resources

For analysis of the results in the three countries the Guide for Evaluating Resources developed by the Berkeley Library at the University of California (http://guides.lib.berkeley.edu/evaluating-resources) and Easybib (http://www.easybib.com) are used. The results are presented in comparison in Fig. 5.

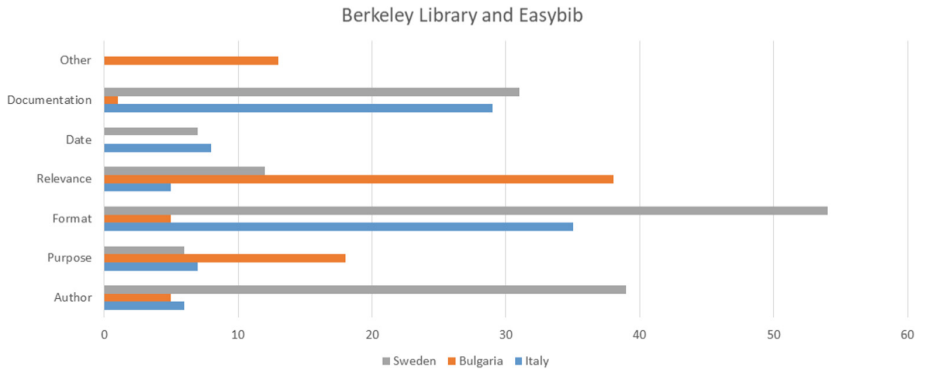

Fig. 5. Criteria for evaluating the credibility of Internet resources (Bulgaria, Italy and Sweden)

As regards the criteria used by the Bulgarian students to assess the search results on the Internet, the results can be summarized as follows: the quality of the information is a determining factor for 44% of the respondents, stating that it should be "credible", "relevant", "useful", "specialized", or "up-to-date". For 20.7% of the surveyed students, the source of information, which is "secure", "reliable" from a "verified source", is important. Popularity, in terms of "site visits", "number of positive comments", "number of views", is a determining factor for 7% of the participants. For an equal number of those questioned (5.7%) the access (quick, easy finding of information, etc.) and the author, ("known" or "checked") are important. The volume of the material is important for 2.3% of the respondents, and 1.1% say the full description. Other views are shared by 5.7% of the respondents, and one participant says that "I search for information in books because there it is 100% true". Search criteria are not applied by 3.4%, explaining that "I use what is useful on the subject". They believe that criteria for assessing the results do not exist and therefore 2.3% of the total do not apply them, and according to another 1.1% "those criteria are not so many" but do not specify any more. Opinions were not shared by 50% of the Bulgarian students surveyed.

Many of the Italian respondents (31%) compare various sources of documentation and apply a selection of preferred sites (37%). Others check information relevance for the need of information (5%). Surprisingly, very few consider author reliability (6%), and the purpose of information (7%), as relevant. The presence of a date is considered relevant for 9% of the respondents. Other considerations include comments in forums, and ephemeral features like color and layout (5%). It seems that the ability to evaluate the resources is really insufficient and not adequate for assessing the quality, accuracy, relevance, credibility, format and accessibility of digital material.

The most frequent among the criteria used by the Swedish students to assess the search results on the Internet were the Publication and format followed by author and writer (Authority), and the Documentation – if the text has credible references and sources. The Relevance, Purpose and the Date of publication were less frequently cited as among the criteria applied by the respondents. The text's readability index is 39, which means that it is classified as easy to read, as used in fiction and popular newspapers. Two students express the word "Impartiality" as a criterion. This is interesting that academic student interprets and recognizes information, knowledge or the publisher as impartial. What exactly the students understands in this definition or concept is something to be investigated further. The question or term "Bias" is perhaps what is meant. It is possible they are referring to the places of the publication or author affiliation. The text's readability index was pretty low and could indicate that the students have not internalized the terms, definitions and concept - ways to talk about, discuss or to do survey plans or scientific studies. They "lack words" in the field of academic research such as critical information retrieval, information processing and data processing.

4 Conclusion

Aided by mobile devices, new learning platforms and other technologies, the survey evidenced that students often overestimate their informational skills and try to complete their tasks using unvalidated resources. A Competency Tree Chart (a Strategy for IL Training) will be developed based on the results from the survey and the Europass digital competences self-evaluation of the students. The strategy comprising various dimensions that represent the core IL skills obligatory for students in the digital age (finding information, evaluating information, using information effectively) and support of the acquisition of such skills synthesized as a syllabus definition. At the next stage of the project implementation, the strategy for IL training (the competency tree) will be approbated at conceptual level in compliance with the game-based learning principles. One of the most effective ways to ensure that students become skilled in handling all information is to include information skills in the curriculum, centered on the library, but also put into practice in the classes and combined with the different subjects.

For this purpose the learning pathways and routes of the games to be followed by the students and by the tutors will be defined; the working modules with specific game tasks for synchronous and asynchronous learning will be planned; and the game-based learning activities will be elaborated. As a result of these activities a Game-based Model for IL Training of Bachelor's students in Humanities will be developed [14].

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Biographical Space, Digital Death and Information Literacy Skills: Current Issues

Paula Ochôa[1] and Leonor Gaspar Pinto[2(✉)]

[1] CHAM and DH, FCSH, Universidade NOVA de Lisboa, Lisbon, Portugal
poc.paula@gmail.com
[2] CHAM, FCSH, Universidade NOVA de Lisboa, Lisbon, Portugal
lgpinto@sapo.pt

Abstract. The concept of biographical space integrates the confluence of several contemporary autobiographical discursive genres related to personal experiences and to the public exposure of intimacy. This includes the most traditional - letters, diaries, memoirs and (auto) biographies – but also media and digital media, with a variety of uses and interactive practices. Mediated memories, diaries and lifelogs are instruments of self-formation, vehicles of connection, future memory and identity, allowing the creation of new subjectivities and multiple identities in the various situations of life, gaining a digital identity that will persist even after death. The purpose of this paper is to explore the discussion around biographical space and digital death in information literacy skills using the evidence of an ongoing study on Portuguese librarians' memorial practices (2017-2018). A conceptual framework that interrelates information literacy skills with current biographical and digital death practices is presented.

Keywords: Information literacy · Biographical space · Digital death

1 Introduction

The participatory construction of autobiographies, private, personal and collective memories, bereavement and remembrance – a collective memorial landscape [1] – and its potential conflict over these constructions are a growing information related context that necessitates curation [2] and information literacy skills. Such an approach focuses on how everyday forms of communication repurpose particular modes of personal information management and self-representation in interaction with digital legacies and afterlife planning.

This is a transdisciplinary research area involving death studies (thanatology) with biographical studies, media studies, cultural studies, sociology and psychology of religion, anthropology, philosophy, theology, medicine, internet studies, computer science, information science. While these considerations may seem entirely theoretical, we suggest that they will require further empirical examination and theorisation on information literacy studies in the near future. This paper aims at providing a contribution to information literacy studies in the current transformation of informational

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behaviour in the information society. The contributions of this paper are twofold: we discuss the present cross-disciplinary issues in biographical practices and digital death in order to analyse the complex and permanent relation with information literacy skills in daily life. They correspond to different but coexistent levels of analysis and, for these reasons, they are an area which has high potential for innovation concerning materiality, information behaviour, digital artefacts and research themes.

The research material used for this article is the result of an ongoing study in Portuguese librarians' memorial practices (2017-2018), a co-creative and participatory research conducted within CHAM - Centre for the Humanities (Universidade NOVA de Lisboa, Faculdade de Ciências Sociais e Humanas and University of Azores) and volunteer members of the Portuguese Observatory of Information Documentation Profession. In the following sections, we will examine empirical research material and we will introduce a framework that interrelates information literacy skills with current biographical and digital death discussion, outlining some of the most important practices.

2 Librarians' Memorial Practices Study (Portugal, 2017–2018)

Capurro and Hjørland [3] consider that the information-documentation sector needs a strong awareness of its historical roots to embrace an historical continuity of development. Inspired by these authors, several Portuguese researchers advocate for a Dictionary of the Profession based on the memories, narratives, oral history and biographical data of professionals [4].

Librarianship as a field of professional practice in Portugal reached maturity in the last half of 20th century. However, recognition for the profession is scarce, despite specialised roles in several areas of society [5]. Moreover, the history of the profession is limited and biographical narratives do not exist. So, memorial practices are particularly critical to the collective memory of these professionals.

In the Fall 2017, a research team from CHAM – Centre of Humanities and the Observatory of Information Documentation Profession conducted an exploratory study about these (lost and unknown) practices, concentrating in identifying interrelations and dependencies on four issues:

- professional memory and career memory trajectories – integrating transitions, cycles of competencies and techno-biographies;
- motivations to remember – sharing information in social networks, memory transmission to the next generation, the desire of immortality and not to be forgotten;
- use of biographical formats and information skills needed– diaries, digital memories, blogs, autobiographies;
- use of obituaries – in periodicals, social networks.

The results of this study highlighted several situations that affect the history of the profession (the risk of forgetting, the risk of losing information), but also the growing importance of information skills including self-evaluation in private information

behaviour where different contexts interact. Subsequently, in February 2018, this research shifted focus to a digital skills approach linked to memorial practices. This approach was based on the evidence that technological, temporal, social, and geospatial contexts affect librarians' information behaviours and, when taken together with the need to remember between offline and online environments, they may be problematic to young and old generations[1]. Understanding these differences and contexts are crucial when carrying out research about information behaviour. In this phase, we used the Digital Competence Framework for Citizens - DigComp 2.1 model [6] as a reference to discuss information literacy levels in the digital transition in Portugal.

Together with the research team, a group of six librarians talked about what strategies they use to deal with the challenges and what they believe will be the future. This reflective and co-created experience was bound up with consideration of the general inexistence of memorial practices in the light of their knowledge about trends and their beliefs. Librarians see themselves as moving into new environments, navigating this complex mix of interacting contexts of communication, information and technology. Their visions have broadened our understanding of these critical situations, namely the discussion of correlate current issues suggested by an extensive review of the literature.

3 Current Issues, Discussion and Implications

Each current discussion about biographical space, digital death, digital afterlife services[2] and information literacy skills appears to reveal new theories, contradictions, emergent questions and participatory dialogues between academic experts, policy-makers and industry, focused on people of all ages and their informational behaviour throughout their life course. Clearly, these vast discussions (at least, in a practical, conceptual, cultural and ethical sense) are likely to become important future research issues. In order to better understand their importance, we undertake a brief excursion

[1] Burnett, Merchant and Parry [7] consider that the vision based on age criteria can result in a linear reading of literacy work, so we were cautious in our preliminary results.

[2] Posthumous messaging services, Digital estate planning services, and Online memorials and obituaries. These services reintroduced mourning into social life and transformed the traditional specificity of death status and location [8] with impact on the memorializing process [9, 10] (e.g. 'presencing', the 'visual turns' of selfies at funerals, photo-sharing, re-presencing the funeral via Instagram or the discursive field of multiple hashtags and images highlighting the "death" of inanimate objects, such as mobile phones and laptops, web communities of grief and remembrance, identity work in profiles on social networking sites) and on the new forms of adaptation to digital immortality [11] and in the possibility of an 'infinite' communication with the dead (techno-spiritual relationships). According to Bourdeloie and Julier-Costes [12], the logic of connecting/disconnecting with eternity is now taken to the extreme, exploring the metaphysics and the ethical and philosophical problems associated with death and post-mortem survival, complementing with new terms: digital religion, posthumous social presence, telecopresence, social necrophilia, necromedia, permadeath, and thanosensitive design [13]. This can also support questions concerning what future publics will consume the dead and how they will do so [14].

into five areas that are crucial to expand information literacy approaches: (1) Ethical and moral perspectives; (2) Reflective Practice in Information Literacy Development; (3) Individual Information Management for Future Use; (4) Enlargement of the Biographical Space; and (5) Health literacy.

(1) Ethical and Moral Perspectives. The approach to the infosphere (a new information environment constituted by the totality of informational agents and objects, services, relations, processes, as well as the space within which they interact [15]) involves digital ontology, digital hermeneutics, automated personalization processes and the dynamics of digital data movements as part of people's everyday life, integrated into their bodily existence, both in spatio-temporal and in social experiences [16]. Bollmer [17] suggests the existence of a tension in our lives between an anticipated decoupling between the hybridization of body, digital data and the digital selves. The hybridization of the body and therefore the necessity to explore key relevant dependencies can be useful for making sense of death, afterlife, and immortality: (after) death [14].

A reflection about digital death must integrate four types of analysis: the Living, defined by the condition of mortality, which influences how people perceive themselves and how they choose to live their lives; the Dying, individuals who received a clear prognosis or are in circumstances that indicate an imminent death; the Bereaved, defined as the social network of people connected to someone who died; and the Dead, those who use the technology to take care of the dead's issues and to continue to remember [18].

As suggested by Brubaker [19], we can see the dead as a case of extreme users who, in the specificity of their technological needs, offer new types of implications for other people. One of these situations is related to types of attachment to digital objects [20]: Engagement; Ability of the materials to preserve personal histories or other memories; Augmentation by reuse beyond its original intended use; and Perceived durability, based on regarding an object longevity. The first step might be to decide to what extent, and under what circumstances, memory of the deceased is to be driven and shaped by the commercial interests of industry or by individuals, regulating practices of remembering deceased online [21].

In this discussion we must consider new interaction paradigms and metaphors, but also barriers and conflicting interests between social actors engaged in practices and management of digital data production, circulation and use. This group includes those ontological friction practices [15] and people affected by data friction [22, 23], partial privacy or contextual privacy [24].

(2) Reflective Practice in Information Literacy Development. In the library and information profession[3] [25–27], professionals' attitudes, beliefs, competences and practices are determinant factors in the realization of change in the implementation of

[3] Skills in information literacy education have been systematised by Bawden and Robinson [28]: Understand the information environment; Use digital tools effectively; Recognise information needs; Know relevant information resources; Find and access information; Critically evaluate information and information sources; Critically evaluate online interactions and online tools manage information; Share digital content ethically; Become an independent and a lifelong learner; Learn to learn; Develop metacognition; Understand ethical issues of information; Present and communicate information; Create information products; Synthesize information and create new knowledge.

lifelong learning competences[4] related to digital literacy and to digital divides and e-Inclusion [29]. Librarians must give also attention to alternative narratives of a 'new digital literacies' paradigm that treat language and literacy as social practices rather than technical skills, considering different literacies associated with different domains of life and historically situated [30].

In Europe since 2013, digital competency is a reference in public policies in education, training and labour that involves active participation of various stakeholders. The main competency areas of DigComp 2.1 are: Information literacy and data; Communication and collaboration; Digital content; Security; and Problems resolution.

This reflexivity is also relevant in digital environment development where individual immersive and interactive experiences reveal and confirm a direct connection between information behaviour - the study of how people need, seek, give, use, communicate information and its impact in a variety of contexts and immersive behaviour [31], like everyday life moments - and communication related activities. According to Robson and Robinson [32, p. 1047], "Information users and providers are affected by their environmental contexts including their living, working and cultural environments. They are also affected by their personal contexts such as knowledge, experience and psychological factors. These contextual factors inform their needs, wants, goals and perceptions, which in turn may motivate them to seek or communicate information or inhibit them from doing so." Semantic Web technology will allow contextualised linked data gathered by lifelogging practices, as well as the use of past information behaviour as a source of individual interests. Portability of data across applications is also important concerning data and personal profiles or identities across sites. As stated by Capurro [33], there is a need to base the development of information literacy on a rigorous examination of the nature of information and its role in, and effect on, the lives of people.

(3) Individual Information Management for Future Use. A competency approach to several types of individual information management for future use, namely Personal Information Management (PIM) [34, 35], will be particularly relevant. It involves the practice and study of the activities someone performs in order to acquire, create, store, organize, maintain, retrieve, use, and distribute the information needed to complete tasks and fulfils various roles and responsibilities. Jones [34] presents six information senses within a life cycle and a Personal Unifying Taxonomy (PUT): Information controlled and owned by me; Information about me that others may have or want; Information directed toward me; Information sent (or posted, or provided) by me; Information already experienced by me; Information potentially relevant to me.

[4] Several frameworks have been developed in Europe under the initiative of international organizations: 21st Century Skills and Competences for New Millennium Learners (Organization for Economic Co-operation and Development) with the goal of providing policy-makers, researchers, and educators with orientations for the design of educational policies and practices that address the requirements of learners in the knowledge society; Key Competences for Lifelong Learning, a European reference framework (Council and European Parliament, 2006), aimed at identifying and defining the key competences that are necessary in the knowledge society; ICT Competency Framework for Teachers (UNESCO, 2008), which intends to identify a common set of qualifications needed for the integration of ICT in teaching and learning.

Another important concept has been developed by Marova [36, p. 97]: "the Thanatosensitive Information Management (TIM) is a humanistically-grounded approach to a person's physical and digital belongings, supported in research and design, that recognizes and actively engages with the facts of mortality, dying and death, with regards to interpersonal relationships, where belongings refer to a set of everything that can be associated, attached, close or related to an individual's existence in different stages of their lives that can be both anticipated, or performed after one's death". The personal information commonly left behind in the digital world extends to Files stored on devices, Social networking accounts, Accounts involving financial transactions, Email accounts, etc.; and are affected by several factors, namely Legal framework, Privacy and security, Personal identification online, and Authorship and ownership [37].

All these practices imply informational curation for current and future use and new ethical questions arise: What happens when personal information changes hands unintentionally? What happens when knowledge that was meant for the consumption of a single individual is now available to a wider audience? How does the availability of huge archives, including trivialities and special moments, affect user's choice of whether or not to share their worldly belongings, and how much of it? What part, if any, can be legislated to cover situations where the deceased person's intentions are not explicitly known after death? [38].

(4) Enlargement of the Biographical Space. In an enlarged biographical space, technologies originate new forms of self-expression and new kinds of selves. Fragmented and fluid digital identity characterise the daily online self-narration. The expansiveness of online autobiography and memoir changing [39] (like the case of the formation of transnational mediated memories or the global memory field [40]) are performed by exposing, selecting, editing, revising, and revaluing, individual and collective memories. New memory dynamics can be framed into several categories: Transmediality (memory as an assemblage of discursive formations across different media); Velocity (events are witnessed, archived, remembered, and communicated simultaneously; Extensity (global); Modality (memories are forged and captured as data); Valency (multiple bonds to other memory assemblages); and Viscosity (memory as liquid modernity, fluid and changeable) [40]. The common fear of information loss is characterized by the existence of a fundamental tension between remembering and forgetting, keeping and losing, saving and deleting information [39–41]. In this discussion, we must consider three aspects in order to understand the continuum of self-experience, identity and subjectivity: Life writing as humanist and as post-humanist lives in collaborative auto/biographical narratives; New forms of reconfiguring several interdependencies (human- animal interaction; human-machine interaction) [42]; and the Expansion of the life course in a narrative perspective on aging where facing our mortality and life ends as in a story [43]. The age is also an important aspect when we study processes of biographical digital curation that may be of interest in the broader field of narrative research – "what does it mean intentionally to tell stories across generations and for future generations after death?" [43, p. 254].

(5) Health literacy. Information Society developments create the need for a conceptual enlargement in the health literacy area, a complex and multidimensional social construct with different definitions and still being discussed [44], but one of the most promising approaches to advancing public health [45]. Considering that health literacy theory, practice and measurement must identify its broad range of information literacy skills and the relation between those skills and the health status, it is inevitable that it must include what people do with the skills that they possess online and offline, using self-report as an evaluation method. Nowadays, people make decisions about the end of life (vital testaments, euthanasia, organ donations) and it looks natural also to decide about what to do with their health data after life. Other challenges relate to the volume of personal health data, generated either as part of healthcare service, or by individuals when using personal digital devices to monitor health or lifestyle parameters. There is a shortage of guidance concerning transparency, privacy and security in the use and management of health data and to meet citizens and patients' expectations on privacy, security issues and digital health literacy of populations [46].

4 Conclusions

Inspired by UNESCO's Media and Information Literacy concept, the group consider Information Literacy as a composite concept that encapsulates several related literacies that co-exist in the digital context and encompasses "a set of competencies that empowers citizens to access, retrieve, understand, evaluate and use, create, as well as share information and media content in all formats, using various tools, in a critical, ethical and effective way, in order to participate and engage in personal, professional and societal activities" [47, p. 17]. Two of the researchers registered all the issues in discussion and selected themes prevalent to co-create a framework (Fig. 1) that expresses a possible direction to interrelate information literacy skills with current biographical and digital death practices. This model refers to fifteen factors grouped under three headings:

- Remembering conditions - Intentional sharing of information, Types of information to manage, Personal information management, Biographical practices in an immersive environment;
- Ethical and technical problems - Posthumous sharing or unintended sharing, Sharing without consent, Desire of immortality, No access to private information, Limited time versus Perpetual, Limited Audience versus Public;
- Individual practices - Digital memories, Digital storytelling Thanatosensitive design, e-Obituaries, Digital death data and Legacies.

These factors are affected by new social constructs and information behaviour. The last component of the model refers specifically to a proposal to DigComp 2.1 within dimension 2 - Communication and Collaboration that must include a new skill – Legacy information management. Therefore, the development of information literacy skills must be adjusted to these emergent practices, addressing both research and relevant intervention in the current discussion.

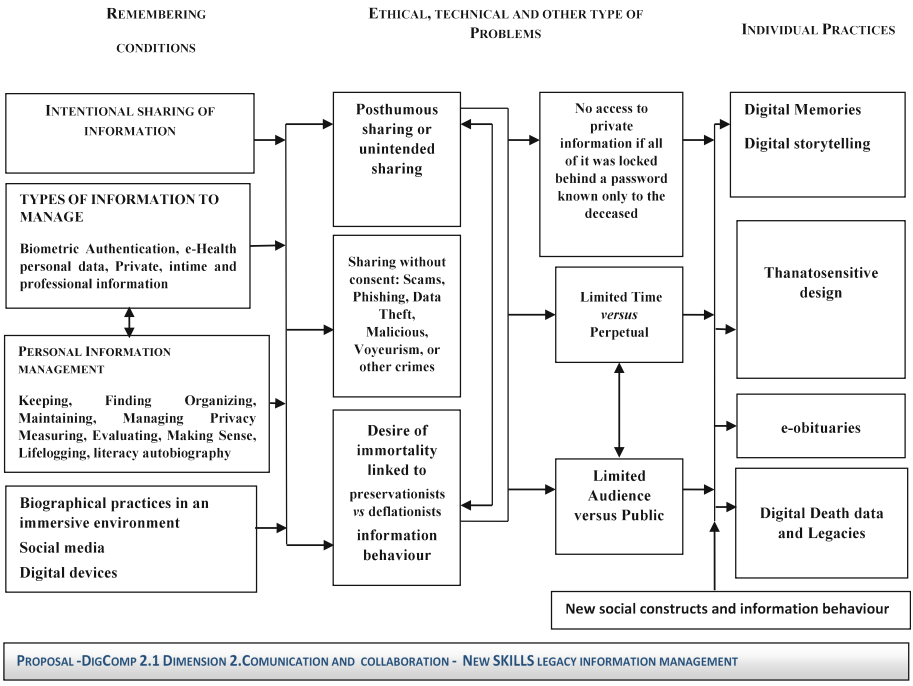

Fig. 1. Biographical space, digital death practices and information literacy skills: interrelations and dependencies

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Information Seeking Behavior of Primary School Teachers in Estonia: An Exploratory Study

Sirje Virkus(✉) and Marit Mathiesen

Tallinn University, Tallinn, Estonia
sirje.virkus@tlu.ee, maritmathiesen@hotmail.com

Abstract. The aim of the study was to explore Estonian primary school teachers' information seeking behaviour, the sources and tools they use to find and evaluate information, the challenges they face and their usage of libraries. A questionnaire was used to collect the data. Fiftyfour primary school teachers in Estonia participated in this study. The study contributes to the understanding of information behavior of primary school teachers and identifies the main problems and challenges they face.

Keywords: Information seeking · Information retrieval · Information seeking behavior · Information behavior · Primary school teachers · Information literacy · Digital literacy

1 Introduction

Several authors have viewed the process of becoming information literate as a lifelong endeavour that should be started at primary school and form a part of formal training in all phases and all subject areas during the whole education process [1–3]. Moreover, "children do not just learn about their world through formal education, there are the wider influences of home, including parents and siblings, and the community and society" [4, p. 332, 5].

The facilitation of the development of information literacy (IL) is receiving greater attention in schools as the role of teachers has changed from being the "provider of knowledge" to a "faciliator of knowledge" [6]. According to Kuhlthau [7, p. 163] "the primary objective of information seeking and use in the school context is to enhance student learning and to develop information literacy". In order to help students in the process of becoming information literate teachers themselves must be information literate [8, 9].

While there is a significant body of research on the information seeking behaviour (ISB) of different occupations, the studies on teachers' ISB and teachers' IL instructional practices are scarce [3, 8, 10, 11]. At the same time several authors express concern that students and teachers are not sufficiently information literate [12–27]. Therefore, to close the research gap, the present study focuses on Estonian primary school teachers' ISB and IL.

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2 Literature Review

2.1 Definition of the Concepts

Julien and Williamson [28] note that in information science there is an obvious and close relationship between information seeking (IS) and IL. There are both differences and overlaps between these domains; while IS is a foundational concept for information science scholars, IL has been a concern primarily of practitioners. They found that the relationship between these concepts has not been fully explored and largely ignored in the research literature; only some researchers have blended these concepts [7, 29].

IS is a multifaceted phenomenon and there is no consensus among researchers about the definition of IS, information searching and browsing. A number of other related terms have also been used such as information retrieval, encountering, scanning, monitoring or acquisition [30]. Case and Given [10, p. 6] define IS as "a conscious effort to acquire information in response to a need or gap in your knowledge". Ingwersen and Järvelin [31, p. 21] see IS as a "human information behaviour dealing with searching or seeking information by means of information sources and (interactive) information retrieval systems". Wilson [32, p. 49] defines ISB as "the purposive seeking for information as a consequence of a need to satisfy some goal". Wilson [33] provides a nested model to clarify the differences between information behaviour (IB), ISB, and information-searching behaviour. The definition of ISB of Wilson [32, p. 49] is followed in this study.

There is also confusion and a lack of clarity about IL terms since 1990s [3, 34–36]. In this study the definition of Johnston and Webber [37, p. 336] seems the most appropriate: "Information literacy is the adoption of appropriate information behaviour to obtain, through whatever channel or medium, information well fitted to information needs, together with critical awareness of the importance of wise and ethical use of information in society".

2.2 Estonian Educational Context

The education system in Estonia consists of pre-school, basic, secondary, vocational and higher education (HE). Pre-school education is delivered to children between the ages of 18 months to seven years in dedicated educational institutions. Basic education is the mandatory educational minimum which can be acquired either partially in primary schools (grades 1 to 6), basic schools (grades 1 to 9) or upper secondary schools [38].

The Estonian school system is high-performing and has accomplished significant achievements in the past years. Coverage rates in pre-primary education are high and participation in schooling is almost universal [39, p. 3]. PISA 2015 showed that Estonia's basic school students rank among the best in the world while being at the absolute top in Europe [40]. Significant initiatives to improve the quality of the education system include adjustments to the mechanisms of school financing, the establishment of the Estonian Lifelong Learning Strategy 2020, the 2011 curricular reform in general education, the 2013 new standard for vocational education and the introduction of a new competency-based career system for teachers [39, p. 3]. In this context, there is a desire to explore how skills of teachers might influence the student learning outcomes.

2.3 Research on Teachers' Information Seeking Behaviour

While students are one of the most widely studied participants in IB studies, teachers have received less attention in research compared to other target groups such as engineers, physicians, health care providers, managers, journalists, and lawyers [10]. There is also limited research on teachers' perspective on IL. The focus of this paper is on primary teachers but as only few authors have addressed primary teachers' ISB and IL [2, 41–48], relevant studies involving secondary and tertiary teachers are also discussed.

Several authors have expressed concern that teachers are not information literate themselves and therefore they will not be able to facilitate the development of IL of their students. Moore [42] found that around half of teachers from New Zealand primary schools were unfamiliar with various stages of the process of finding and using information. Henri [8] found that practicing teachers and trainee teacher-librarians in Australia had difficulty distinguishing between relevant and irrelevant information. Flockton et al. [21] stated that the concept and importance of IL is not properly understood and practiced by educators. Several researchers [22, 23] found that teachers were not confident information users. They used relatively few information resources, rarely spoke of using libraries of any sort, and found it difficult to locate information, overwhelmed by the sheer volume of information [23]. It was also found that teachers had a limited or little understanding of IL [25], they did not have the requisite skills needed to browse the library's collections [20, 27] and they felt unprepared for the responsibility of facilitating the development of pupils' IS [49].

The teachers' perception of their students' IL has been explored at postgraduate [50], secondary [12, 51] and primary education [52]. Kousar [50] reported that teachers were very positive about their postgraduatre students' IL skills. In the UK, secondary schools teachers believed that the most difficult task for students were information analysis, evaluation in terms of accuracy and reliability, and that students had a tendency to search for the right answer [12]. Gordon [51] reported that teachers found information searching and analyzing the most difficult parts in the information process for grade 10 students in Germany. Purcell et al. [53] reported that 42% of teachers thought that students know more about digital technologies than their teachers and 40% thought that teachers' and students' level were almost equal. A survey of primary school teachers' found that teachers were very optimistic about pupils' IL [52].

Studies have found that teachers use various information channels and sources for teaching purposes [12, 23, 54]. These include: colleagues, books, personal knowledge and experience, in-service events, newspapers and reports available in the schools [23, 55]. On the contrary, a study by Laverty and Reed [22] found that teachers used relatively few information sources. Several studies found that print was the preferred format for teachers [12, 27, 55, 56]. However, Herring [57] found that teachers preferred using electronic sources over printed sources. Diekema and Olsen [45] found that teachers use both physical and electronic sources. Several studies also revealed that teachers preferred using their own personal collections rather than the library materials [27, 56, 59]. Although Mokhtar and Majid [60] found that in general teachers did not use school libraries effectively in Singapore schools, several studies confirm that libraries are preferred sources for information for teachers [56].

The main barriers for IS were a heavy workload, limited or lack of time, frequent changes of curricula, and focus on extramural activities [4, 23]. In the developing world, inadequate hardware and software, library resources and physical facilities were also barriers [56, 58]. Tahir, Mahmood and Shafique [61] identified 17 possible problems teachers face in acquiring information such as: the required material is not available, information is scattered in too many sources, information sources are expensive or located far away, lack of time, IL training and knowledge in using the library, language barriers and inadequately trained library staff.

Several studies confirm that students did not receive enough support to develop their IL. Most primary school teachers in Moore's study [42] left students alone with their IS activities and believed that they could find information themselves. Merchant and Hepworth [12] indicate that although most of the secondary school teachers in their study were information literate themselves, their IL competencies were not transferred to their students. Several studies found that students would like to have more assistance from teachers in all phases of the IS process and instructional methods used by teachers do not support students becoming information literate [12, 53]. The literature review leads to the following conclusion: studies dealing with teachers' ISB and IL in general and primary teachers in particular are scarce.

3 Methodology

This study is a part of a larger investigation that explored Estonian primary school teachers' ISB and perspective on IL. The main aim of the study was to explore the sources and tools they use to find and evaluate information, the challenges they face and their usage of libraries. There is a lack of research on Estonian primary school teachers' ISB and IL. It is important to know more about ISB of primary school teachers in order to improve teaching and the development of pupils' IL. A literature search was carried out to identify previous studies and to provide background to this research.

This study combined both quantitative and qualitative research methodologies: a questionnaire survey and semi-structured interviews. Semi-structured interviews were conducted with fourteen primary school teachers. However, this paper only reports the results of the questionnaire survey, the results of the qualitative study will be reported elsewhere. The questionnaire study replicated a previous survey conducted with Greek primary school teachers and followed the research design explained in the previous paper [9].

The questionnaire consisted of open, closed-ended and Likert scale type 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.

Convenience sampling was used to carry out the survey among Estonian primary school teachers. It was aimed to get 60 completed questionnaires in order to compare the results with the study results conducted in Greece in which 59 questionnaires were collected. However, 54 completed questionnaires were collected in March 2018. The respondents came from 22 schools mainly from North and West Estonia.

The survey provided both quantitative and qualitative data. The data to the closed type questions was firstly categorised and coded and entered into an Excel spreadsheet for initial analysis. Excel was also used for open type of questions and comments because there was no character limit for variables. The responses from the questionnaires have been presented and summarised by using descriptive statistics.

4 Results

Characteristics of Respondents. Fifty-four teachers responded to the questionnaire, 45 women and nine men. The majority of respondents belonged to the age group 25–35 (19), followed by the age group 46–55 (14), age group 36–45 (8), up to 24 years old (7) and over the age of 56 (6). 39 teachers had a master's degree, 14 a bachelor's degree, and one had a diploma certificate. Twenty-five of the survey respondents were teachers whose professional experience was more than 15 years; 20 had work experience less than six years, six teachers had from 6 to 10 years, and three teachers from 11 to 15 years.

The Use of Computers and the Role of Libraries. The respondents of the survey were asked to rate their computer skills. None of the teachers rated their skills as a novice. Two teachers stated that they have moderate knowledge and skills to use computers, 22 stated that they have good knowledge and skills and 25 stated that they have very good knowledge and skills of using computers while five reported that they are experts in computer use.

Teachers visited libraries to get help from librarians or borrow library resources in order to prepare teaching materials 1–2 times a week (three respondents), 2–3 times a month (five respondents), 1–2 times in the semester (22 respondents), 1–2 times a year (17 respondents). Five respondents never visited the library.

Forty-five of the respondents had used online library catalogs while nine had not. Thirty-seven of the teachers have learned to use, search, retrieve and evaluate electronic information independently, 18 have received help and guidance from their colleagues, 30 have learned during their studies, while 25 have received guidance from seminars and training courses.

Twenty-two teachers believed that the Internet search engine was a reliable tool for finding information and they always found the needed information, two replied that they did not know about other tools, 18 responded that this was just a habit, and 44 of the teachers said that it was a convenient search environment for them.

Use and Evaluation of Sources. The second part of the questionnaire contained questions about the use and evaluation of information sources. Data analysis showed that there are several tools that teachers use to find information. Figure 1 shows how teachers themselves evaluate the frequency of their use of various tools for finding information. Five respondents said that they never use online library catalogs, 19 used them small extent, 20 some extent, six moderate extent, and four large extent.

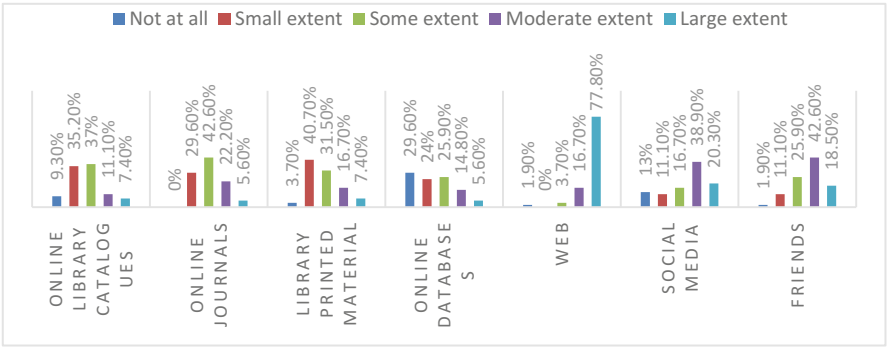

Fig. 1. Use of sources: how often you use these information sources to find material

Data analysis showed that all teachers used online journals. Sixteen teachers never used online databases, 13 used them small extent, 14 some extent, eight moderately, and three large extent. One teacher never used the Web, two used it some extent, nine moderate extent, and 42 large extent. Seven teachers did not use social media, six used it to a small extent, nine some extent, 21 moderate extent, and 11 extensively. One teacher did not use the help of friends and acquaintances for finding information, six used them somewhat, 14 to some extent, 23 moderate extent and ten extensively (Fig. 1).

The teachers were provided with ten source evaluation criteria. None of the respondents considered author reliability to be unimportant, three of them noted that this is somewhat important, 15 stated quite important, 16 very important and 19 extremely important.

One teacher considered bibliographical references unimportant, eight considered this somewhat important, 22 quite important, 11 very important and five extremely important. One of the teachers considered information objectivity unimportant, ten quite important, 25 very important and 18 extremely important. Information clarity and organization was assessed in the following ways: one teacher considered information clarity and organization unimportant; two considered it important to some extent; 14 thought they are quite important; 15 considered them very important and 22 found them extremely important. The importance of the domain name was assessed in the following ways: five teachers considered domain name unimportant; 12 considered it important to some extent; 18 thought it quite important; 12 considered it very important and six found it extremely important. The teachers considered the publishing date in the following ways: unimportant – (1); somewhat important – (4); quite important – (25); very important – (18); and extremely important – (6) (Fig. 2).

The following five characteristics that teachers rated less valuable were the owner of the website, location of the host organization, the contact information and use of advertisements.

Thus, the most important criteria for teachers when they evaluate Web sources are: information objectivity, the clarity of information and organization structure of the source, the author reliability, the publishing date and the reputation of the organization.

The most common way to find information on the web was to search by using keywords, which was stated by 51 respondents. The other major strategies were browsing by subject (45), using a phrase search (29), truncation (6), and Boolean operators (2).

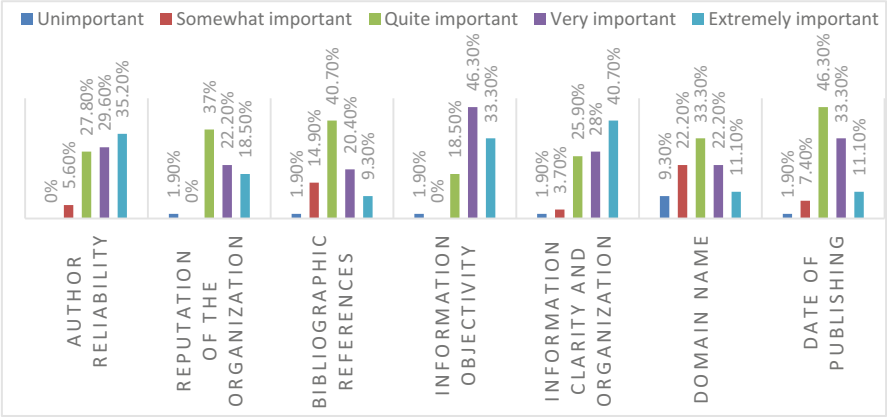

Fig. 2. Source evaluation: what are the most important source evaluation criteria

The teachers were asked to imagine the situation in which they do not get the relevant information when searching for information and indicate which strategies they will use in that case: including, use other keywords, advanced search options, other ways, ask from someone or quit research (see Fig. 3). One teacher never used other keywords when performing the search, one decided to do this seldom, three did it sometimes, 29 very often and 19 always. One teacher never used advanced search options, three teachers used it seldom, 13 sometimes, 26 often and ten always. Five teachers do not choose the second database or search engine when the search fails, 12 choose it seldom, 16 sometimes, 16 very often and three always. In case the information search fails nine teachers never abandon search, 23 teachers seldom give up, 19 do it sometimes and one always. One teacher never asks help from others, four do it seldom, 28 ask help sometimes, 15 often and five teachers ask help always. Teachers reported that most often they ask help and guidance from their colleagues, followed by friends and family members (see Fig. 3).

Teachers experienced various problems in IS. Nine teachers never had problems with the Internet connection, 26 experienced this seldom, and 19 sometimes. Two teachers never had a time-consuming search, ten experienced it seldom, 37 sometimes, three very often and one always. Finding relevant sources was never difficult for three teachers, ten teachers experienced difficulties seldom, 27 sometimes, 11 very often and one teacher always. Twenty-four teachers never felt that they do not know relevant search strategies, 25 teachers had felt the lack of relevant search strategies seldom, four teachers sometimes. No teachers felt it very often or always (Fig. 4).

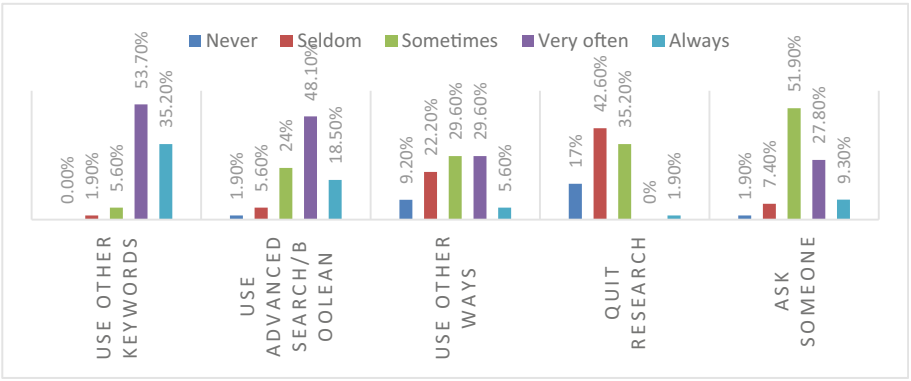

Fig. 3. Information seeking strategies in case of no results

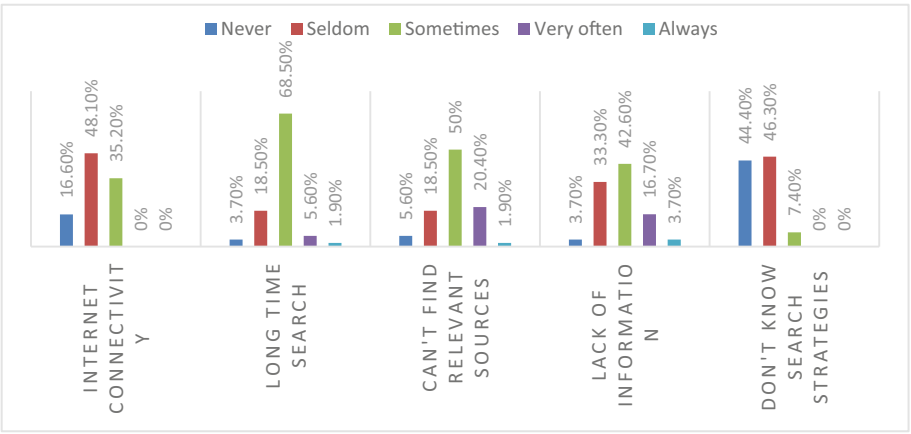

Fig. 4. Difficulties during the information seeking process

The Use of Information Literacy (IL) Programs. Estonian primary school teachers are not familiar with websites that provide information and guidance on IL. They most often used the APA system as a bibliographic reference system, which was noted by 28 teachers, nine used the Harvard and five MLA systems. 12 teachers did not answer this question and were not able to name any other reference system they had used.

5 Conclusions

Most studies on ISB of teachers and the teachers' perspective on IL have been done in colleges and universities. In Estonia no study was found on ISB of primary school teachers. Therefore, to close this research gap, this study explored primary school teachers' ISB, the sources and tools they use for seeking and retrieving information and their usage of libraries.

The results of the research revealed that the teachers of Estonian primary schools perceived themselves as skillful users of computers. The majority of teachers reported that they are good, very good or experts in computer use. Most of the teachers said that they visited library with varying regularity. However, the number of teachers who reported that they visited library more than one or two times in the semester was still relatively small. The majority of teachers reported that they have used online library catalogues and most of them have learned to use, search, retrieve and evaluate electronic information by themselves. One third of the survey participants reported that they had also received help and guidance from their colleagues and during their studies. The majority of teachers reported that they used Internet search engines to find information, because it had become a habit and it was a convenient search environment for them. Teachers reported that they used various tools to find information. However, the most preferred were the Web, social media and friends. The most important critaria for teachers when they evaluated sources from the Web were: information objectivity, the clarity of information and organization structure of the source, the author reliability, the publishing date and the reputation of the organization. The owner of the website, location of the organization that hosts the source, the contact information and use of advertisements on the page were rated as less valuable by teachers. The most common way to find information on the web as reported by teachers was to search by using keywords, browsing by the subject, using a phrase search, truncation and Boolean operators. Teachers reported that they experienced a variety of problems in finding information, but they all occured sometimes. Lack of information and relevant sources were mentioned most often, but these were reported only by small part of the respondents. However, Estonian primary school teachers were not familiar with websites that provide information and guidance on IL. It shows that teachers had no proper knowledge of the concept of IL. Estonian primary school teachers used most often APA, Harvard and MLA systems as bibliographic reference systems. However, several teachers were not able to mention any bibliographic reference system. The study revealed that Estonian primary school teachers have relatively good IL skills, however, there are still many aspects that need improvement: for example, the awareness of the concept of IL in general, the use of various library resources, the knowledge and skills of bibliographic reference systems, and the value of various IL guides and web sites. It is obvious that closer collaboration with school librarians and IL training for primary school teachers is needed.

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Epistemic vs Non-epistemic Criteria to Assess Wikipedia Articles: Evolution of Young People Perceptions

Gilles Sahut[1(✉)] and Josiane Mothe[2]

[1] ESPE, Université de Toulouse, LERASS, Toulouse, France
gsahut@univ-tlse2.fr
[2] ESPE, Université de Toulouse, IRIT, UMR5505 CNRS, Toulouse, France
Josiane.Mothe@irit.fr

Abstract. This paper tackles the problem of information credibility assessment by users, focusing on Wikipedia articles. We consider both epistemic and non-epistemic criteria. We conducted a study using a questionnaire where 841 French young people aged from 11 to 25 years participated and we analysed the results considering the level of education as a variable. We found that the higher the level of education is, the more young people mention epistemic credibility criteria and the less they indicate non-epistemic criteria. We draw some recommendation for information literacy.

Keywords: Wikipedia · Credibility judgment · Education level · Student · Teaching information literacy

1 Introduction

Studying the judgments of information credibility became crucial because of the recent information landscape transformation. Indeed, the individuals are confronted with information of uneven quality not only on the Web but also on specific sources such as Wikipedia. With regard to teaching information literacy, the study of young people's perception of credibility is of particular importance. Many studies have shown that Wikipedia is an information source that the majority of the young people use frequently, although they do not consider it as the most reliable source and in spite of the its predominantly negative academic reputation (for a recent synthesis, see [1]). However, many questions remain unsettled on the credibility criteria young people adopt when considering articles from the collaborative encyclopaedia, as well as the influence of the age and level of education on the perception of the credibility.

In this paper, we focus on analysing credibility of Wikipedia articles considering a large range of education levels in France, from Collège (middle school), that is to say where pupils are 11–12 years old, to Master where the majority of students are aged 22–25 years. Our study focuses on (1) the main criteria the young people mention to assess credibility of Wikipedia articles, and (2) the variation of the mentioned criteria over the education levels.

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2 Credibility Judgement Young People Mention

2.1 Epistemic vs Non-epistemic Criteria

There are various definitions of the term "credibility" [2]. We proposed to define credibility as a characteristic granted to information depending on its truth-value [3]. Past studies show that there are a large number of criteria used to judge the credibility of information [4]. In this present work, we distinguish two types of credibility criteria: epistemic criteria and non-epistemic criteria. Epistemic criteria have a direct bearing on the truth value of the information. They concern trustworthiness and expertise of the source as well as trustworthiness and expertise of the content [2, 4]. The conclusions of empirical studies on the use of epistemic criteria by young people are not converging. For example, some studies show that young people take into account epistemic criteria as they consider the authority of the source when they search and select information [5, 6]. On the other hand, it has been shown that young people have difficulty understanding epistemic criteria [7] or applying them when seeking information [8].

Research also shows that users refer to non-epistemic criteria to determine the credibility of the information. These criteria relate in particular to the form of the document. In the case of the web, the appearance of the site (e.g. visual design, typography, presence of images, colours) and its structure (organization of the information, ease of navigation) frequently influence users' judgments of credibility [9]. The importance of web site aesthetics on credibility has been noted as an important criterion for high school students [10] and for undergraduate students [11]. The influence of the amount of information on the perception of credibility has also been demonstrated. In a study considering young people aged 4 to 18, abundant information was frequently considered as synonymous to "good information" [12].

2.2 Influence of Age on the Judgments of Credibility

Perceptions and criteria regarding information credibility are not identical among young people. There are many psychological, cognitive, social and contextual variables that can explain these differences [13]. The age and level of education are two of them.

The role of the age is recognised on a theoretical point of view [14] but there is little empirical research on the topic. A study concerning young people 11–18-years old, shows that the older individuals are more conscious of the credibility problem when using on-line information. They use more credibility criteria and are less inclined to believe hoaxes than the younger children [15]. Other authors noted differences between 1st and 3rd-year undergraduate students when considering the factors that influence their credibility judgment of on-line health information [16]. The 3rd-year students referred to more criteria and were much clearer about their evaluation processes. Variations between the information behaviour of Bachelor's and Master's degree students were also observed. Liu and Huang observed that Bachelor's degree students use primarily the author's name, reputation, institutional affiliation, and web site reputation to evaluate information credibility [17]. On the other hand, Master's degree students are more concerned with the accuracy and quality of information, while they are less concerned with the source-related features.

According to these studies, it seems that the young people pay more attention to the problems of credibility and refer more to epistemic criteria as they grow up. However, it is difficult to go further in the analysis, because of the lack of an actual comparison according to the level of education that considers the same source of information.

2.3 Credibility Criteria on Wikipedia Articles

Because of its collective and iterative writing process, Wikipedia contains articles that are heterogeneous both in terms of their level of completion and accuracy. While reading articles, it is possible to evaluate them by considering different criteria. Several empirical studies have begun to identify the criteria and procedures readers use for evaluating Wikipedia articles.

Yaari et al. studied the assessment of Hebrew Wikipedia articles by Bachelor's and Master's degree students [18]. For these authors, the credibility of an article is related to non-measurable criteria (such as the article coverage or its structure) and measurable criteria (such as the article length or the presence of external links). Considering the same issue, Lim and Simon interviewed undergraduate students who said they rely primarily on the article length, its table of contents, and the associated references in order to assess the information credibility [19]. They also state they use the warning banner and identify - or click through - external links.

Some of these criteria were also mentioned in a research conducted with students with an average age of 23 years [20]. The results indicate that credibility of Wikipedia articles is drawn from the text itself -essentially its accuracy, completeness, and length- the references it provides and, to a lesser degree, on the presence of images in the article. Rowley and Johnson' study only partially confirms these results on fifty Bachelor's and Master's degree students [21]. The references at the end of the article correspond to the credibility criterion participants mentioned the most often, followed up by mentioning the article references are not enough that incites mistrust. Unlike previous studies, the article length is not considered. Lim confirms that the credibility of a Wikipedia article is correlated to the amount of references regardless to the level of knowledge students have on the article topic [22].

These results can be reconsidered in the light of the distinction made between epistemic and non-epistemic credibility criteria. The epistemic criteria mentioned in these studies are related to the article contents (e.g. their accuracy). When considering the source, determining the expertise and the trustworthiness of the author is difficult because of the collective character of the edition and the frequent anonymity of the contributors. In the editorial model of Wikipedia, the references are thought to guarantee the credibility of the information. The references counterbalance the uncertainty on the expertise and the trustworthiness of the contributors. Indeed, source reference is an essential rule and a very important practice for the Wikipedia community [3, 23]. In our research, we also noticed that the young people mention non-epistemic criteria to establish the credibility of Wikipedia articles such as the length of the article, the presence of images or the presence of a table of contents.

3 Research Questions

From the literature review, we can conclude that criteria used by readers to assess credibility of Wikipedia articles do not fully converge. We also note that all the studies we found concern students at the university level only but do not consider younger people. For these reasons, it is appropriate to question to what extent the conclusions from the literature can be transposed to secondary-schools (from 11–12 years old pupils to 17–18 years old students). Since Wikipedia is a source known and used by a very large majority of the young people frequenting the secondary education and university, we can compare the perceptions of the credibility of articles according to the various levels of education. It is then possible to apprehend the evolution related to the epistemic and non-epistemic criteria mentioned by young people of different ages. If we refer to the research on the judgments of credibility of the young people, we could propose that the importance of epistemic criteria rises with advances in academic levels. But the research on the credibility of Wikipedia articles we mentioned above shows that students of Bachelor or Master's degree also refer to non-epistemic criteria.

In this paper, we also question the main criteria for assessing Wikipedia articles as follows: **Q1** What are the criteria young people consider as essential to evaluate a Wikipedia article? **Q2** Does the importance of different criteria evolve with educational level?

4 Methodology

The unpublished results presented in this paper arise from a survey using an on-line questionnaire realized in France. We obtained the answers of 841 young people aged from 11 to 25 years. The group contains 54.1% of females. 256 pupils are middle school (Collège in French) (from 11 to 15 years old), 265 in high school (Lycée in French) (from 16 to 18–19 years old), 148 in Bachelor's degree (from 18–19 to 21–22 years old), 172 in Master's degree (from 22 to 25 years old). The questionnaire contained 39 questions related to the socio-demographic details of the participants, to the use of Wikipedia and the perceptions of Wikipedia. In this paper, we present only the results related to the credibility of articles (for the other results and a thorough presentation of the methodology, see [1]). Young people had to answer the following closed-ended question "*Why makes a Wikipedia article credible?*]" by selecting one on several criteria among the following: *It is long; There are some photos in it; it contains information which seems accurate to me; there are no mispellings; there is a table of contents; it is well presented; sources are cited; the sources it cites seem of good quality to me; other (please detail).*

For each of the questions, a yes/no choice was asked. Epistemic and non-epistemic criteria were not distinguished in the questionnaire.

We filtered out the answers which were obviously not serious ones (considering some open questions we asked). The questionnaire was "supervised" by the teachers or school librarians and was to be filled in online by the participants.

Our main goal was to examine whether the frequency of certain criteria to estimate credibility of Wikipedia articles change with the education level. We also used descriptive statistics and ANOVA to analyse the collected data. ANOVA was chosen because it allows identifying significant differences among groups, in our case among participants from four groups: Collège, Lycée, Bachelor and Master levels. We applied the Tukey's test and report the p-value associated to ANOVA as well.

5 Results

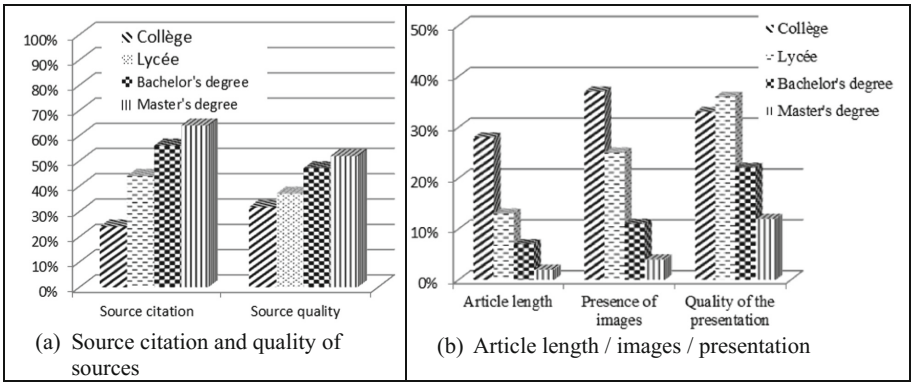
5.1 Frequency of Criteria Related to Assess Credibility of Wikipedia Articles

The criterion reported the most by respondents is accuracy of the content (46%). From their responses, we also see a strong propensity to mention the presence of references (44%) and the quality of the cited sources (40%). These three first criteria are epistemic. However non-epistemic criteria are also quoted as the quality of the presentation (28%), correctness of spelling (25%), presence of images (22%), presence of table of content (21%), and article length (15%).

5.2 Evolution of Credibility Criteria According to the Level of Education

One criteria of credibility (correctness of spelling) doesn't evolve according to the level of education, while two of them (the presence of table of content, accuracy of the content) evolve only slightly. In this section, we focus on the criteria that evolve the most as presented in Fig. 1.

Using ANOVA, we found significant differences within the entire sample for sources citation ($p < 0.001$***, $F = 26.3$), citing quality sources ($p < 0.001$***, $F = 6.9$), the length of the article ($p < 0.001$***, $F = 23.2$), the presence of images ($p < 0.001$***, $F = 25.2$), the quality of presentation ($p < 0.001$***, $F = 11.1$). The use of descriptive statistics as well as the Tukey test show significant differences according to the level of education.



(a) Source citation and quality of sources

(b) Article length / images / presentation

Fig. 1. Credibility criteria of wikipedia articles

Firstly, we can note a clear increase in credibility related to *source citation*; this criterion becomes the main one for Master's degree students (see Fig. 1a). Collège pupil group is different from other groups (significant difference with p-value < 0.001***). The difference between Lycée and undergraduate students cannot be considered as significant (p > 0.05). However, this difference is significant between Lycée and Master's degree students (p < 0.001***) but not between the Bachelor's and Master's degree students (p > 0.05).

We note a similar evolution on the criterion related to the *quality of sources* that are cited in the Wikipedia article (See Fig. 1a). Its frequency increases with the level of education but less sharply than the source citation criterion we analysed in the previous paragraph since only 52% of Master's degree students mentioned it. Collège pupils significantly differ from Bachelor's degree students (p < 0.05*) and from Master's degree students (p < 0.001***) but not from Lycée students (p > 0.05). Lycée students differ only from Master's degree students (p < 0.05*). There is no significant difference between Bachelor and Master's degree students (p > 0.05).

The *article length* criterion has also significant variations. The frequency in which this criterion is mentioned tends to decrease throughout education level (see Fig. 1b). Again, Collège pupils are different from other groups (p < 0.001***). Other levels are not significantly different (p > 0.05) apart between Lycée and Master's degree students (p = 0.053). Credibility attributed to the *presence of images* in an article also tends to decrease with the progress in academic curriculum (see Fig. 1b). It is mentioned as an important criterion by more than a third of Collège pupils, a quarter of Lycée students and less than two undergraduate students out of ten. According to ANOVA, the Collège and Lycée students clearly differ from Bachelor and Master's degree students (p < 0.001***) who have similar profiles regarding this variable (p > 0.05). The *quality of the presentation* of an article plays a role in credibility judgment for more than one out of three participants for Collège or Lycée but much less after (see Fig. 1b). Collège pupils and Lycée students answered similarly given this formal criteria (p > 0.05). Students after Lycée do not significantly differ according to their level. The answers given by Master's degree students are clearly distinct from Collège pupils and Lycée students (p < 0.001*** in both cases).

6 Discussion

The criterion to estimate trustworthiness of a Wikipedia article mentioned the most frequently by the survey participants is the information accuracy. This criterion was also given as a crucial feature in Lucassen and Schraagen' study [20]. We found this criterion is important whatever the level of education is. One possible reason is that this criterion is both easy to understand at any age and that credibility is often considered the same as information accuracy. The observation on the importance of the sources' citation converges with the results from the literature since we noted that this criterion was given unanimously as important to estimate the credibility of Wikipedia articles. However, the quality of the cited sources is mentioned at a surprisingly high frequency (40%) when compared to previous studies where it is not considered as an essential criterion.

The most interesting result is found in the variations of criteria for estimating credibility of Wikipedia articles among the different academic levels. The importance that is given to non-epistemic criteria decreases with the advance in the academic curriculum. According to ANOVA, cuts occur at different levels of education (Collège/other levels for the article length, Master/other groups for the quality of the presentation, Lycée/University for the presence of images).

Some parallels can be made with other studies related to information assessment. The relative importance the young people give to Wikipedia articles' length can be compared to some results produced in a more general context. According to Shenton and Dixon, considering 4 to 18 years old participants, the amount of information provided by a source indicates its quality for the youngest while this is not always the case for older participants [12]. We notice a similar evolution when considering the article length criteria over the progress in education.

In our survey, more than a third of Collège pupils and a quarter of Lycée students said they rely on the presence of images to give credit to Wikipedia articles while far fewer university students mentioned this criteria. Other studies have shown the important role images play in the information assessment process for high school students [24]. We can hypothesise that when they become older, the young use less visual elements to evaluate information [25] and that they focus more on epistemic criteria.

Conversely, we found that the young pay increasing attention to source citation and to the quality of the cited source with the progress in their academic curriculum. Young people can be aware of the importance of references in Wikipedia simply by using the encyclopaedia regularly. Doing so, they are used to the rhetoric structure of Wikipedia articles many of which include a bibliography section. When this is not the case, bands warn the readers about the lack of source citation, which implies implicitly that a good article should include references. According to this point of view, Wikipedia experience accumulated over the years would be formative in that it would contribute to orienting readers' assessment criteria. We should also mention the role of the educational institution. During their education, young people are gradually asked to perform academic tasks involving the provision of information accompanied by a bibliography. They are exposed to teachers' injunctions requiring them to cite their sources and this can influence the way they conceive the evaluation of credibility [26].

The higher the level of education, the more young people mention epistemic credibility criteria and the less they indicate non-epistemic criteria. This may show a specificity of the attitude toward Wikipedia. Other results from the same survey (see [1] for details) indicate that the more they advance in education level, the more suspicious young people are about the use of Wikipedia for academic purposes and the more they are sensitive to the mostly negative reputation of this source among teachers. Increasing attention to source citation and to their quality can be seen as a way to compensate for the perceived unreliability of the collaborative encyclopaedia. However, the growing attention to epistemic criteria may also be a more general cognitive evolution of young people. As noted above, research on young people's information assessment suggests that age is associated with increased attention to credibility issues and the use of more specific, accurate and more appropriate criteria. The results of this survey confirm this evolution.

7 Limitations of the Study and Future Research

A questionnaire provides declarative data and has the advantage of quantifying them in order to compare them, as for example in this study according to educational levels.

The data presented in this article reflects the students' responses about the means used to judge the credibility of articles. These representations are important because they reflect the students' knowledge on the subject and can influence evaluation practices. A student who is not aware that the references can be useful to assess the credibility of a Wikipedia article will not use them for this purpose. On the other hand, there may be a significant gap between representations and actual evaluation practices. It would therefore be necessary to use other methods, such as observation or think aloud, to identify the evaluation of methods used by young people from Collège to Master's degree.

In this article, we have observed the evolution of epistemic/non-epistemic criteria as the school curriculum progresses. However, we should not forget that many young people do not go to higher education. It would therefore be necessary to analyse also the perceptions of these young people. This study would make it possible to distinguish more clearly the effect of age from that of the level of education.

Finally, it would be interesting to examine whether we find similar evolutions in the frequency of epistemic and non-epistemic criteria according to the level of education and age to evaluate the credibility of other types of sources than Wikipedia. Similar work could also be engaged on Youtube or Twitter where the credibility indices are partly different.

8 About Teaching Information Literacy

In educational studies, there is a consensus that teachers should take into account students' prior knowledge and practices in their teaching strategies [27]. This principle is particularly important in the field of information literacy because tools and sources of information such as Google, Wikipedia and digital social networks are used frequently in everyday life. The study we present shows that only a minority of Collège and Lycée students are aware of the existence of appropriate epistemic criteria to evaluate the credibility of Wikipedia articles (citing sources, quality of sources cited). The study also shows that a significant proportion of these students mention non-epistemic criteria that do not seem the most appropriate to assess information credibility (length of the article, presence of the image, quality of the presentation). Even at the university level, a few students mentioned these criteria. These results indicate a confusion for students around the perception of credibility and the means to determine it. Our study thus reinforces the idea of the need for education on the evaluation of the credibility of information at the various levels of education.

Gradual training at the collège and lycée could help students become aware of their practices, distinguish more clearly the most appropriate criteria for determining information credibility, and understand how credibility is built into Wikipedia. It is essential to encourage young people to move from overall assessment of Wikipedia - partly based on its reputation – to a more objectified and precise assessment of a given Wikipedia article and piece of information it covers.

This training can enable them to take advantage of this resource. The study of the role of references in Wikipedia is also the way for them to understand the reasons and importance for source citation in general, all the more so as the students have to cite their sources in their academic productions. Moreover, bringing students' attention to the references of Wikipedia articles also has the advantage of showing that they have at their disposal potentially usable sources on the topic of interest. This seems important because students tend to neglect these resources [28]. In addition, a pedagogical approach with regard to the sources cited in the articles can help to initiate or reinforce the distinction of sources according to their degree of reliability, whether in secondary or higher education. Thus, Wikipedia can be seen as an educational mean which is relevant in an information literacy curriculum.

9 Conclusion

We found that the frequency of credibility criteria young people mention varies according to the education level. The criteria associated with formal characteristics and information quantity, are mentioned less as education level increases. Conversely, young people reported they pay increasing attention to source citation as they progress through their academic curriculum. In other words, we found that epistemic criteria increase with age while non-epistemic decrease.

Training young people from the college level (middle school) could bring them to have a critical view on their practices and to distinguish the most relevant criteria to assess information credibility. The knowledge on how credibility is considered in the collaborative encyclopaedia can be a mean to teach credibility criteria in a broader way.

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Print or Electronic Course Readings: Implications for Library Space and Information Literacy Programmes

Ane Landøy[1(✉)] and Almuth Gastinger[2]

[1] University of Bergen, Bergen, Norway
ane.landoy@uib.no
[2] Norwegian University of Science and Technology, Trondheim, Norway
almuth.gastinger@ntnu.no

Abstract. For several years, there has been a debate about digital vs. print format for study materials. The Academic Reading Format International Study (ARFIS) has shown that students clearly are in favour of paper, both in Norway and many other countries. These preferences have various implications not only for collection development decisions, but also for the availability of space in academic libraries. Study literature offered in digital format has huge advantages. It is not only more available, but makes it also makes it possible to free up much needed floor and shelving space in physical libraries. It also reduces the time and work spent on handling physical literature, from acquisition to re-shelving. So how can these advantages be balanced with students' reading preferences? The authors discuss these challenges and suggest to developing training sessions on "How to use digital study literature?" Some Norwegian universities have already done this, and their results will be described.

Keywords: Information literacy · Students' reading preferences · Electronic study literature · Norway

1 Introduction and Background

Over the past several years, Mizrachi and others have investigated the students' preferences for print vs. electronic study literature through an international set of surveys [1, 2]. The results are quite similar: students across many countries prefer the printed versions of study literature. Mainly, they give "ease of use for notetaking and highlighting", "more comfortable on the eyes" and "more familiar" as reasons for preference for printed literature.

Data and comments from Norwegian students were likewise gathered using the online Academic Reading Format International Study (ARFIS) questionnaire. The study was conducted in April 2015 and it surveyed undergraduate, graduate and postgraduate students of various subjects at different universities and university colleges in Norway (University of Bergen, University of Stavanger, Norwegian University of Science and Technology, Bergen University College, Sogndal University College and Stord/Haugesund University College).

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The ARFIS questionnaire has two parts. The first part consists of 16 statements about students' preferences for reading formats and factors that influence their preferences and behaviours. A five-point Likert scale was used for possible answers, ranging from "strongly disagree" to "strongly agree". Each of the 16 questions/statements provides space for comments. In addition, the first part contains one question about devices that are used for electronic course readings. Students could tick off multiple answers to this question.

The second part has six questions or statements gathering demographic information, like age, current study status (in other words, first year, third year, or Ph.D.), and discipline major or field of study. Additionally, a final open-ended question asks for any other comments on academic reading format preferences. The original survey was created in English, and the authors decided to use the English version. In order to make sure that all questions in English were understood properly, an explanatory statement was added to question 21. The dissemination of the URL to the survey was carried out by email. The authors themselves or other participating colleagues sent explanatory text and the link to the questionnaire to students from the Norwegian institutions mentioned above. One thousand and sixty three responses were assembled. The gathered data were then entered, coded, and analysed using the SPSS statistical package.

Norwegian students, like their international fellows, prefer printed to electronic study literature. Altogether, 70% of the students agreed (37%) or strongly agreed (33%) with the statement: "I prefer to have all my course materials in print format (e.g. book, course reader, handouts)", and 75% disagreed (41%) or strongly disagreed (34%) with the statement "I prefer to read my course readings electronically" [3].

Inspired by the findings that were informally reported at the Norwegian University of Science and Technology (NTNU) Library, Trondheim, the branch library for medicine and health set up a survey of their own students, with somewhat similar questions. The authors of that study also added focus groups and interviews with academic staff. Among the students, they found:

- Preferences for print format for texts longer than seven pages (75% of student respondents agreed or partly agreed, N = 130);
- Students of medicine used print books as study literature (55%);
- Almost 60% of the students usually highlighted or made notes in the printed study material, but more than 70% did not know about the corresponding features for e-books;
- When asked about what would be needed to use e-books as study material to a higher degree, 42% of the students indicated "more knowledge" about how to use e-books and 44% wanted "better platforms". However, 12% of the students replied that they did not want to use e-books.

When asked whether the library should prioritise printed or electronic books, the majority of students wanted the library to cut purchasing printed books, and rather maintain the supply of e-books. In the comments section, students mentioned the advantages of electronic literature, mainly their availability 24/7, and their ease of access. One student mentioned that s/he looked at the library e-books in order to evaluate which printed books s/he would buy personally [4].

There have also been earlier investigations of students' reading preferences in Norway. In 2013, University of Agder Library conducted a study where they provided

74 students in the Humanities and Social Sciences with e-readers (Kindle and iPad) preloaded with course materials. The most interesting finding for our purpose was that

> a total of 79% of the students thought the e-reader was good or very good for reading journal articles. A little less, 61%, had a similar opinion related to reading books. Despite a high degree of satisfaction with the e-readers, much fewer students thought they would solely relying on such a device. When having been given the opportunity to read literature from the reading list on an e-reader, 54% of the students replied that they still preferred to read print books. Only 11% would rely solely on an e-reader device, and 28% found that a combination of print books and online material on e-readers was best for study purposes. Seven percent answered that they did not know what kind of format they preferred books to be in [5].

Bakka and Landøy present results from another study on preferences for print vs electronic study literature. This study surveyed 256 first year students of Social Sciences at the University of Bergen, and the preferences are similar to the ones from other studies. However, one interesting finding is that 70% of the students indicated that they would like to participate in a library training about more efficient use of electronic books, if such training was offered [6].

2 Implications for Information Literacy Programmes

When the authors presented the results at ECIL2015, it was in collaboration and comparison with data from the Romanian part of the ARFIS study. In that paper it was suggested, based on data from another Romanian study, that perhaps one of the reasons for preferring paper material was the familiarity with highlighting and annotating. This was supported when looking more closely at the data from the survey, especially on the preferences according to the level of students. The younger students (first and second year) agreed more with the statements about preferences for printed material and disagreed more with statements about preferences for electronic study literature than students at master's level (Tables 1 and 2).

Table 1. Students' agreement with remembering best when read from printed pages (cross-tabulated with level of study).

Study level	Agree	Neither	Disagree	N
First year	82.1%	13.6%	4.3%	184
Second year	72.9%	17.6%	9.6%	188
Master	76.9%	18.4%	4.7%	277
PhD	74.8%	14.7%	10.5%	143

Table 2. Students' agreement with the convenience of reading electronically (cross-tabulated with level of study)

Study level	Agree	Neither	Disagree	N
First year	21.2%	16.8%	62.0%	184
Second year	20.1%	16.3%	63.6%	184
Master	16.7%	14.6%	68.6%	287
PhD	28.7%	14.7%	56.6%	143

With these indications, the Western Norwegian academic libraries who were part of the study decided to try an intervention. They received funding to develop a new course on "How to use electronic study literature in an efficient way". The course was given as a "training the trainers session" in Bergen in November 2016. The day-long course included practical work with several platforms for electronic books (in other words, Ebrary, ProQuest books, and Norwegian digital books from the National Library of Norway), and focused on finding and using tools for highlighting, annotating, and writing comments on these platforms. In addition, it provided a suggestion for a course agenda that participating librarians could use as a skeleton for their own teaching of students later on. The main objective of the training was to familiarise the librarians with what kind of supporting tools are available and where to find them.

After the training session in Bergen, the libraries planned to cascade the new knowledge to other colleagues, but unfortunately this has not happened yet, mainly because of organisational changes in the libraries and in their mother institutions. However, there are new plans for conducting these courses at all universities/colleges in Western Norway. The plans include a cascading effort for the entire library staff through formal and informal training sessions, and a newly developed 45 min library course for students. The course for the students will be subject-specific, and will focus on the main e-book platform(s) for a specific group of students. The training for librarians will be divided. Librarians in the "front-line" will be trained in responding to rather simple questions arriving on chat or at the circulation desk. The academic librarians will have to acquire deeper knowledge of the tools and functions, to be able to teach and fully support students. Some of the teaching librarians are also adding "How to apply extra features when reading e-books" in their ordinary information literacy courses.

3 Implications for Library Space

Being able to fully utilise electronic study literature offered by academic libraries would provide advantages for both students and the library.

For the students, the literature will be more available because of shorter loan periods and 24/7 availability. Electronic literature can be accessed from anywhere, also when the library is closed.

For libraries, the benefits include the possibility to free up much needed floor and shelving space in physical libraries. That is important because academic institutions all over the world are looking at ways of reducing costs, and space is one of the costs that has to be considered. Increasing the efficient and appropriate use of library spaces is important because academic libraries are usually situated in the centre of campus and each square meter, particularly on the campuses of urban or older universities, is very costly [7, 8].

While physical libraries are repositories of printed books and journals, they are also, as Watson and others argue, learning spaces, providing students with much-needed areas for quiet studying and academic collaboration [9]. So the need for study spaces is huge, and "weeding" in the stacks in order to reduce the number of shelves can be a good way of meeting this demand.

Some of the internal library operations are independent from the format of the book, however a shift to more usage of electronic books and less printed books would also reduce the time and work spent on handling physical books, from acquisition to re-shelving. The stafftime saved could be used for more and better support of students and academic staff or other library tasks.

4 Summary and Conclusions

The international research on students' preferences for printed vs. electronic study literature showed that Norwegian students have the same preferences for printed material as students in many other countries. However, there are some indications that this is not universal among all student groups in Norway. These indications lead us to the assumption that one reason for the preference for print over electronic study material is about the preference for a well-known format, or rather the lack of knowledge of online supporting tools. Therefore the obvious conclusion was to expand existing information literacy programmes by teaching special features of e-book platforms, like highlighting and annotating. If the students will want to fully utilise study literature in electronic format, this will have implications for librarians' teachings, and also for the development and use of library space. There is still space for more research in this area.

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Information Literacy for Different Groups in Different Cultures and Countries

Information Overload of Academic Staff in Higher Education Institutions in Estonia

Liia Lauri(✉) and Sirje Virkus

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

Abstract. The purpose of this paper is to present the results of a study that explores perceived information overload among the academic staff of higher education institutions in Estonia. This study aimed to examine the relationship between the perception of information overload, and information management, and information literacy. We formulated six research questions: How do the academic staff experience information overload related to their work? How do the academic staff develop their information literacy? What are the information sharing practices at the higher education institutions? What are the barriers to the effective information seeking and use? How satisfied is the academic staff with their own and their colleagues' work in higher education institutions? Are there any differences concerning the perception of information overload, development of information literacy and information sharing practices between universities and professional higher education institutions? The study combined quantitative and qualitative methods of data collection.

Keywords: Information overload · Information culture · Information literacy · Higher education institutions · Estonia

1 Introduction

Information overload is the condition where the amount of potentially available relevant information is a barrier to effective information use. Although this is not a new phenomenon, individuals and organisations face new challenges in the digital age. It has been stated that the information overload is rather a "co-product" of other problems associated with the digital age [1], namely, overload of work-tasks, lack of time, and fragmentation of the actions [2]. Misra and Stokols [3] have also analysed the health outcomes of information and technological overload.

The perception of information overload involves individual, social, and organisational facets. Certain aspects of individual information behaviour, social structures, and relations, as well as the organisational culture, determine how the information is valued, handled, and used in an organisation [4].

Academic staff has very versatile responsibilities at the higher education institutions (HEI), including a variety of teaching, research, and administrative tasks. All these duties are highly information intensive. The question is how information culture, policies, and standards as well as information and communication practices and

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enhancement of information literacy at the organisational level could impact the perception of information overload.

This paper focuses on the perceived information overload in relation to information management and sharing practices in the context of information culture in HEI in Estonia. This study aims to explore the relationship between perception of information overload, information management, and information literacy. The objective is to give recommendations to HEIs for the development of information culture and policies that support coping with the information overload.

We formulated following research questions for this study:

1. How do the academic staff experience information overload related to their work?
2. How do the academic staff develop their information literacy?
3. What are the information sharing practices at the HEIs?
4. What are the barriers to effective information seeking and use?
5. How satisfied is the academic staff with their own and their colleagues' work in higher education institutions?
6. Are there any differences concerning the perception of information overload and development of information literacy and information sharing practices between universities and professional higher education institutions?

The paper consists of six parts. Following the introduction, the theoretical framework of information overload and related concepts are presented. The next part discusses the empirical study: the research methods, the sample, and the procedure. Data analyses and results are presented after that. The paper closes with a discussion and conclusion.

2 Information Overload and Related Concepts

Information overload is not a new phenomenon. However, as the Internet and the digital age emerged, it has been more extensively perceived and studied by researchers. In addition to the phrase, information overload, communication and technology overload and even data overload have been coined [5, 6].

There seems to be a consensus by the early 21st century that the term "information overload" refers to a state where the flow of information exceeds the cognitive capacity to process it [7]. It has been found to go hand in hand with the other problems in the digital age, namely overload of work-tasks, lack of time, and fragmentation of actions [2]. Misra and Stokols [3] define the perceived information overload as a form of psychological stress occurring when the environmental demands perceived by an individual exceed his or her perceived capacity to cope with them. Their analyses of the health outcomes of information and technological overload have shown that higher level of perceived overload significantly predicts a higher level of stress, poorer health, and less time devoted to contemplative activities [3, p. 737]. Researchers have outlined several psychological and cognitive strategies that are used at the level of individual information behaviour to cope with that overload, such as escape and avoidance, selective attention, delegation, creative destruction [8], filtering, withdrawal [1], and queueing [9].

According to research, information and digital literacy could help to identify and select the needed information from the overwhelming amount of information more effectively [10] and also to gain control over the information environment [2]. This could be one of the strategies used both at the individual as well as the institutional level to cope with the data, information, communication, and technological challenges.

At the institution level, the information culture of the organisation provides a framework for addressing the information management issues, including those of information literacy and overload. Oliver [11] analyses the information management skills, knowledge, and expertise as essential components of the information culture pyramid model. The pyramid model of information culture also involves the issues of governance and trust at the institutional level. Institutional policies provide values, norms, and behaviours for information lifecycle within the organisation, thus facilitating (or not) the effective information use in the organisation.

3 Methodology

The study combined quantitative and qualitative methods of data collection (in other words, multiple-choice questions and open questions). The primary data collection method we used in this study was a questionnaire survey.

The web-based survey questionnaire, using the Limesurvey platform, consisted of thirty-nine closed and open-ended questions and took respondents approximately twenty minutes to complete. We divided the questionnaire into sections on behaviour and values, information management, usage of information resources, as well as questions concerning job and leadership satisfaction and self-reported judgement of individual performance. The respondents indicated their level of agreement to each survey statement on a five-point Likert scale (5 - *strongly agree*; 1 - *strongly disagree*).

The questionnaire covered the perceived information overload, development of information literacy, barriers to the effective information use, and information sharing practices as well as the usage of information resources, concerning the variety of sources and the frequency of their use. It included some open-ended questions providing an opportunity to comment on the answer.

For open questions and the comments, we used content analysis as the data analysis method. Data were processed with the NVivo software to identify key themes (nodes) and emerging patterns. Finally, we generated node matrices. The most frequently reported nodes are presented both in Table 1 and in the Results part.

4 Sample and Procedure

The higher education system in Estonia consists of seven universities and sixteen professional higher education institutions. For the current study, we selected the institutions based on ensuring maximum variation. Three public and one private university and five state and two private professional institutions of higher education participated in the study. The sample consisted of the academic staff (teaching faculty: professors, associate professors, lecturers) of the higher education institutions. The

assumption was that the academic staff represent the primary identity (including behaviour, norms, and values) of the higher education institutions. As a rule, they are also the ones who carry out administrative tasks.

A total of 144 respondents from four universities (n = 81, 56%) and eight professional institutions of higher education (n = 63, 44%) took part in this study. A majority were women (n = 93, 65%), while 35% (n = 51) were men. Almost half of the respondents (n = 66, 46%) were under the age of fifty. Fewer than half of the respondents (n = 59, 41%) were relatively new at their current job (up to five years). A majority (69%) had been working in the current institution for more than five years. The sample adequately represented the structure of the higher education sector in terms of the type of institution and the demography of academic staff in Estonia.

Most of the respondents (n = 119, 83%) stated that their work tasks either included administrative duties (n = 46) or include them to some extent (n = 73).

We used the Statistical Package for Social Sciences (SPSS) version 15 for data analyses. Qualitative data were analysed using QSR NVivo 10 software.

We obtained a prior consent from the rectors of the higher education institutions to include their institution in the study. An invitation to take part was then sent to the mailing list (if existing) or e-mail addresses of the academic personnel.

5 Results

The following section summarises the findings relating to the six research questions of this study.

5.1 Information Overload and Development of Information Literacy

The first research questions were: *How do the academic staff experience information overload related to their work,* and *How do they develop their information literacy?*

Sixty five percent of the respondents agreed that it has been difficult to cope with the information overload during the last month. At the same time, only 38% agreed that they have recently developed their information skills. However, the share of those who have not developed their information skills varies between universities and professional HEIs – 56% of academic staff in the universities and 41% of academic staff in the professional HEIs agreed with the statement. New information channels or software applications have been used by 35% of the respondents and not used recently by 56% of universities' and 40% of professional HEIs' academic staff.

The free-text comments revealed that while, on the one hand there is not enough time to develop the skills, on the other hand the level of existing skills is estimated to be high enough to satisfy the information need.

Information overload is a perceived problem among the academic staff of higher education institutions. At the same time, developing information literacy is not seen as a solution to the situation. Also, the new information sources and applications were not as widely used as expected.

5.2 Information Sharing Practices

The next research question was: *What are the information sharing practices at the HEIs?*

Sixty three percent of respondents from the universities and 79% from the professional HEIs agreed that a regular information sharing practice exists in their unit and the HEI.

Respondents were asked to use the free-text answers to describe the regular information sharing practices in their HEIs. We coded each answer and structured according to the emerging subject headings and classified as positive, negative, or neutral.

Table 1. Respondents' attitude towards information sharing practices

	Positive	Negative	Neutral
Openness	6	2	2
Style and format	**34**	**11**	6
Up to date	**33**	5	3
Practical information	9	1	-
Overload	7	6	-
Electronic information sharing	2	1	40
Traditional information sharing	1	2	27
Aiming to control	2	**10**	4
Regularity	**19**	**10**	16
The content of the information	**12**	4	3
Number of references	*125*	*52*	*101*

A majority of comments describing the nature of the existing information sharing system were positive (125). Critical comments (52) mostly concerned the style and format of information sharing, the controlling function of the system, or irregular information sharing.

The most significant number of positive comments (34) concerned the format and style of the information sharing. Concise, transparent, and flexible information sharing having both formal and informal as well as horizontal dimensions were described as positive examples of information sharing. The information sharing system was also positively described if containing the sharing of up to date information (33), being purposeful and operational. The regularity of information sharing was appreciated (19) as containing relevant as well as useful information and as a tool to harmonise the existing understandings.

Also, the most criticised aspects (11) concerned the style and format of information sharing. Similarly, systems where the messages duplicated one another, were random and sketchy, or had no clear rules or standards, received negative feedback. The respondents criticised (10) information sharing that they perceived as aiming at maintaining the existing power and hierarchical structures, with vertical information

provision rather than sharing of information, or when the information provided did not offer a clear understanding of organisational developments. The respondents also did not appreciate irregular information sharing (10). Information overload was also mentioned (6), describing situations where the information was too exhaustive, transmitted without filtering, and duplicated.

A majority of respondents (84%) had been involved in the joint activities of their unit (such as meetings, projects, working groups) during the previous month. Members of the academic staff of professional HEIs were more involved in the joint activities with the other units of the HEI than the academic staff of universities (58% and 44% respectively). Slightly more respondents from universities (59%) than from professional HEIs (54%) were involved in work-related joint activities with institutions outside their own HEI. Sixty five percent of the respondents from professional HEIs and 57% from universities have been sharing their own experiences with colleagues.

Compared to academic staff of professional HEIs, the academic staff of universities tend to prefer colleagues as a source of information to the formal sources (48% and 38%). For both groups, the colleagues' input complements the quality of formal information (63%).

The academic staff of the professional HEIs is more informed about the situation in their unit (87%) and the HEI (79%) than the academic staff of the universities. Sixty one percent of the academic staff of the universities agreed that they are informed about their unit, but only half of the respondents from the universities felt that they are informed about the overall situation of the university. Moreover, the academic staff of the professional HEIs felt more influenced by the knowledge about the overall situation of their HEI. Sixty five percent of the respondents agreed with this statement (universities 54% respectively).

To summarise, regular information sharing practices are more common in professional HEIs than in universities. Consequently, their staff feel better informed about the developments in their institutions. Facilitating horizontal information sharing is preferred to vertical, as the latter is described as controlling and ensuring the existing hierarchical structure. However, positive experiences with the information sharing systems and practices (where it exists) prevail over critical. Also, the academic staff of universities rely more on the informal information sharing than the academic staff of professional HEIs. A former study [12] has shown that information cultures where informal information sharing prevails feel more frustrated about the information overload, and they are more inclined to leave the current job.

5.3 Barriers to the Effective Information Use

The fourth research question was: *What are the barriers to effective information seeking and use?*

Only 6% of the respondents from the universities fully agreed that the information necessary for work-related decision making is organised in a way that it is easy to find in the HEI. Combined with those who answered that they "somewhat agreed" – the percentage was somewhat higher – 40%. The percentages of the professional HEIs were slightly higher, 11% and 65% respectively.

One hundred and ten respondents took the opportunity to provide comments when indicating the main barriers to the work-related information seeking and use. Although the reasons why the information seeking and use is not as effective as it could be, can be interrelated, the following factors can be outlined based on this study:

- Lack of time (indicated by 33 respondents): The workload of academic staff can be heavy and fragmented by a variety of professional roles (teaching, research, and administration). The administrative role often involves dealing with bureaucracy. Lack of time relates to the problem of information overload (13);
- Information is not well structured (22): the information systems are not user-friendly and are nonintuitively structured. The problem may be that information is out-of-date, derived from inconsistent sources, and controversial. There is a lack of institution-level policies on information provision and development of e-services and the absence of unifying standards. Information can be scattered in different information sources. There might be too much information as the same information is presented in many places;
- Access to information (18): This involves various kinds of restrictions. For example, restricted access (paid) journals are not available; intranet is not available; or, foreign language skills are required to understand the information. It can also be that the needed information is too specific and not available on the internet or the information is not shared (there is no will to share);
- Information seeking skills (13): The problems include limited knowledge and skills to navigate through various databases, the right keywords or the best wording for a search, finding the best sources, and distinguishing useful information from irrelevant.

Eleven respondents stated that they experienced no barriers to information seeking and use and felt they were able to find useful information based on their experiences and good contacts with other people.

It seems to be evident that well-organised information resources reduce the information overload in the organisation. However, it also seems that higher education institutions do not pay enough attention to the information resources and systems to support information users. This also involves an absence of policies and standards and access to information at the institutional level. The respondents consider lack of time, information overload, and lack of information literacy as the causes constituting barriers to effective information use in organisations.

5.4 Leadership and Satisfaction with the Work

As the leadership of the institution carries the general values, norms and behaviours, including those of information culture, sharing and practices, we were interested about the leadership style and satisfaction with one's work as well as the work of colleagues.

The respondents both from the professional HEIs and universities were satisfied with their immediate leader – 66% agreed that their leadership is interested about the well-being of their staff; 72% felt that their opinions matter and that the leadership supports them in work-related issues (77%). However, just 56% of the respondents agreed that the leadership successfully encourages cooperation within the unit.

Generally, the academic staff of professional HEIs was more satisfied with their work –40% fully agreed with the statement while 27% of the universities' staff fully agreed. However, together with those who somewhat agreed, the percentage was as high as 88% for respondents from the universities and 84% for the respondents from the professional HEIs. By and large, the respondents did not plan to change their job: 72% of respondents from the universities and 78% from the professional HEIs were not planning such a change.

Generally, the academic staff of the professional HEIs tended to appreciate the work of their colleagues and units more highly than the academic staff of the universities. Eighty one percent of the academic staff of the professional HEIs responded positively to the statement "*The work of my unit is effective*" (72% of the universities). The statement "*I am satisfied with the work results of my unit*" received 84% positive responses from the academic staff of the professional HEIs (60% from the universities). Eighty three percent of the academic staff of the professional higher education institutions agreed that their colleagues were capable (73% from the universities). Seventy one percent of the academic staff of the professional HEIs agreed that their unit was outstanding (56% from universities).

6 Discussion and Conclusion

Based on the current study it can be suggested that the phenomenon of perceived information overload is a useful construct for understanding the information environment of an institution. Overload as a type of psychological stress at the individual level can be explained in the context of information sharing and management practices as well as the information culture of the institution. Similarly, the individual skills of information handling can be understood in the broader organisational level of information awareness including attitudes and values to information and social interaction for knowledge creation.

Coping with information overload in information-intensive professions is essential for a successful work outcome. This depends on the information culture of the organisation (including leadership and shared goals), information management and sharing practices, and barriers to the effective information use as well as information literacy.

Information overload is a perceived problem for the academic staff of HEIs in Estonia. However, the problem is rather seen in the not so well developed information systems at the institution level than a need to develop the individual information literacy. Lack of time (overburdened people) relate to the problem of information overload.

Shared goals and trust are essential to facilitate the information sharing culture in an organisation [11], as well as the support of the leadership and the valuing of colleagues' work. According to the results of this study, the academic staff of professional higher education institutions tend to appreciate their colleagues and their work more than academic staff from universities. The reason may be that professional higher education institutions are smaller in size and more homogenous, in other words, it is easier to communicate and establish shared goals. What is more, the information sharing

practice is more regular and formalised, which may have an impact on the lower perception of the information overload. Although it is not clear yet if the development of information literacy is an institution-level policy in the professional higher education institutions, the academic staff is more aware of the importance of such skills. The reason for the lower perception of the information overload needs to be analysed further.

While it is not an easy task to change the culture of organisations, we offer these recommendations that influence the perception of the information overload in the organisation based on this study.

1. Organizations should address the importance of information culture in their organisation level policy on the governing of information systems and management along with their values and standards for information sharing and development of information literacy. The non-user-friendliness of information systems and lack of standards are two of the main obstacles to the effective information use in HEIs;
2. It is vital to enhance the horizontal information sharing within and between the academic units and also with institutions outside the HEIs. Building trust and establishing shared goals at the institutional level is necessary as this is crucial to ensure effective information sharing in the organisation;
3. Developing regular information sharing practices is related to the satisfaction with one's job, satisfaction with leadership, and valuing of colleagues' work. Even though informal communication is essential, a balance should be found between formal and informal communication. Non-formal information culture creates more frustration due to information overload, and there is a greater inclination to leave the job;
4. Addressing the framework for the development of information literacy at the institutional level could reduce the lack of time as one of the main barriers to effective information use.

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Secondary School Teachers' Attitudes to Information Literacy: A Study of A Questionnaire Validity

Vincas Grigas[1(✉)], Anna Mierzecka[2], Tímea Tomori[3], and Tibor Koltay[4]

[1] Vilnius University, Vilnius, Lithuania
vincas.grigas@mb.vu.lt
[2] University of Warsaw, Warsaw, Poland
anna.mierzecka@uw.edu.pl
[3] Eszterházy Károly University, Eger, Hungary
tomori.timea@uni-ezzterhazy.hu
[4] Eszterházy Károly University, Jászberény, Hungary
koltay.tibor@uni.eszterhazy.hu

Abstract. The objective of this paper is to determine the validity and reliability of an originally created questionnaire as an instrument to develop an understanding of secondary school teachers' knowledge on information literacy and practices implemented with developing student's information literacy skills in Hungary, Poland, and Lithuania. This research will support a research project that aims the harmonisation of various theories of information literacy with the proper application of information literacy to public (K12) education. This paper presents a pilot survey among Lithuanian teachers on a sample of 102 participants in the spring of 2018. We gathered data for this study using a computer-assisted web interviewing (CAWI) technique and administered an online survey using the 1KA.SI web survey tool. The collected data was analysed by IBM SPSS Statistics ver. 19. Internal consistency of the questionnaire measured by Cronbach's alpha coefficient. Scale and construct validity evaluated using Principal components analysis with Varimax Rotation. The authors feel assured in using the questionnaire for the wider scope survey.

Keywords: Information literacy · Teachers · Secondary school · The Big6

1 Introduction

1.1 Aims of the Study

This paper describes a pilot study with the aim of determining the validity and reliability of a created questionnaire. The questionnaire is an instrument to gain an understanding of secondary school teachers' knowledge of and attitudes toward IL, as well as practices implemented to develop student's IL skills in Hungary, Poland, and Lithuania.

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1.2 Background

The members and associated members of the research team were from Hungary, Lithuania, and Poland, working under the auspices of the Doctoral School of Education at Eszterházy Károly University, Hungary. They decided to investigate the possible prerequisites of coupling IL theory with school pedagogy. They think that not only can pedagogy be used in primary and secondary schools, but it can be used along with a form of educational theory and practice. That theory and practice is built on the assumption that its goals are attainable only in a growingly holistic system of institutions, mutually influencing each other, where pupils act autonomously and their self-organisation and self-regulation are enabled [1].

2 Theoretical Background

The nature of IL recently has undergone various changes, causing an overlap between IL and media literacy, as well as between IL and media and IL. All aim to foster the same skills while addressing different information constructs (for example, the printed word by IL and films and videos by media literacy) [2].

Taking into account that the overlap between IL and media literacy broadens the meaning of IL, we adopted its new definition by CILIP (2018) as follows:

"Information literacy is the ability to think critically and make balanced judgements about any information we find and use. It empowers us as citizens to develop informed views and to engage fully with society." [3].

This new definition of IL comprises not only IL itself, but media literacy, digital literacy, as well as information and IL (MIL).

Besides acknowledging the importance of a multiliteracies approach, originating in the ideological models of literacy [4], we see that there are convincing arguments that theoretical foundations of IL need to be strengthened [5].

It is also reasonable to suggest that discourses on education and IL are closely connected to each other and school is one of the information landscapes (communicative spaces), within which IL occurs [6].

We believe that harmonising IL theory with school pedagogy requires that we transcend the views of information users as incompetent non-knowers [7]. On the other hand, IL theory should be based on a plurality of approaches, in other words not being restricted to skill-based ones, but retaining their advantages.

This effort needs to be adjusted to the properties of the digital environment [8]. One of the reasons for this is in the fact that IL – while originally dominated by questions of access, due to the scarcity of information [9] – functions today in an environment, where there is an overabundance of information that causes information overload to a greater extent than ever [10]. In addition to this, we believe that IL has to be seen as communication, not forgetting about its complexity. Therefore, we should pay attention to additional issues, such as informational knowledge, operational knowledge as well as the motivating factors to acquire information.

Whatever theoretical deliberations we have, clearing the relationship between research and practice is a perpetual challenge [11]. This fact gave the motivation to start

a survey to acquire empirical data on the understanding of secondary school teachers' knowledge on IL. The present study is a part of this effort.

The investigation, described in this paper is about the preliminary phase of modest, but practical contribution to the successful exploration of IL in school settings, described above.

3 Method

3.1 Data Collection and Participants

We conducted the study in the form of a survey using Computer-assisted web Interviewing (CAWI) and gathered data via an online survey tool 1KA.SI, an open source software.

Data collection started on the 22nd of February 2018 and ended on the 27th of March 2018. Respondents to the survey were teachers from secondary schools in Lithuania. We selected respondents for the research from the top nine best secondary schools in Lithuania (we used the official school ranking list in Lithuania). By the end of the survey period, we gathered data from 102 school teachers – response rate was 23%. Almost half (49%) of those who entered introductory page finished the survey. We collected the data following confidentiality procedures.

Age of the participants: from 20 to 29 years – 4.9%; from 30 to 39 – 14.7%; from 40 to 55–52%; older than 55 – 27.5%.

Main teaching discipline: languages – 30.4%, Ethics and Religion – 2%, Physical Education – 1%, STEAM 47.1%, Arts – 3.8%, History and Geography – 8.8%, Technology – 2%, Economics – 2.9%, Psychology – 2%.

Student levels that mainly teach: Years 5–7 – 2.9%, Years 8–10 – 13.7%, Years 11–12 – 52%, Years 9–12 – 29.4%.

Experience in teaching: less than five years – 5.9%, 5–9 years – 2.9%, 10–14 years – 5.9%, longer than 14 years – 84.3%.

3.2 Measures

We created the questionnaire for developing an understanding on secondary school teachers' knowledge on IL and practices implemented in developing student's IL skills (acronym – KILS). This tool consists of 26 items grouped into three categories.

The first category – demography: asked questions about the main teaching discipline, levels mainly taught, experience in teaching, and age band.

The second category – teachers' familiarity with IL: asked questions about readiness for teaching IL, main source of IL skills, and opinion about what IL is, being prepared to teach IL and schools policy onIL, experience in ILteaching, whose responsibility to teach IL should be, and familiarity with concepts of information literacy and media literacy.

The third category – students' IL skills: teachers were asked to evaluate their students' IL skills through the five-point Likert scale: 1 – very low, 2 – below average, 3 – average, 4 – above average, 5 – very high. We based the design of this part on the Big6 six-stage model [11].

This research sought to test a questionnaire designed to collect data for the understanding of secondary school teachers' knowledge on IL and practices implemented for developing student's IL skills. We intended to find out:

- if there was awareness of the existence and importance of IL and media literacy;
- how they acquired their IL skills;
- if they felt prepared to teach IL skills themselves; and,
- what experience they had with IL teaching.

We implemented a pilot survey in Lithuania. We planned the tested and validated a questionnaire to use on a wide scale survey in three countries: Hungary, Poland, and Lithuania. This research will support a research project that aims the harmonisation of various theories of IL with the proper application of IL to public (K12) education. The authors invite researchers to use the same questionnaire in their countries and share data for comparison of results.

3.3 Analytical Approach

This study aimed to determine the validity and reliability of the KILS. We used Cronbach's alpha coefficient to measure the questionnaire's internal consistency. Also, we implemented a Principal components analysis with Varimax Rotation for an evaluation of scale construct validity. We used two statistical tests to define if the subscales were suitable for factor analysis: (a) the criterion of Kaiser-Meyer Olkin Measure of Sampling Adequacy (KMO) to measure sample sufficiency; (b) the Bartlet Test of Sphericity to examine the inter-independency of scale subscales.

4 Findings

4.1 General Results

The coefficient of a Cronbach alpha was 0.701. The group of questions was consistent when Cronbach alpha coefficient was higher than 0.7 [12]. If we continue with the Cronbach's Alpha based on standardised items, the coefficient would slightly increase to 0.745. It shows no need to increase the number of the items in the questionnaire.

Analysis of Corrected Item-Total Correction, Square Multiple Correlation and Cronbach's Alpha if Item Deleted (Table 1) showed that we could consider removing six items (numbers accordingly: 1, 12, 14, 16, 20, 24) from the survey. Or we could consider testing additionally to improve the questionnaire's internal consistency because of a low Corrected Item-Total Correction and Square Multiple Correlation. On the other hand, Cronbach's Alpha if Item Deleted is not substantially higher – the highest coefficient is 0.720. So, we decided to leave these items in a questionnaire. Also, there was no higher value of multiple square correlations. It suggests no items were measuring the same characteristic as the other items. Cronbach's Alpha if Item Deleted had fairly consistent values for all omitted items. It suggests that all items measured the same characteristic.

Table 1. Item-total statistics*

Items	Corrected Item-Total Correlation	Squared multiple correlation	Alpha if item deleted
1. What is your main teaching discipline?	.171	.283	.707
2. The student levels that I mainly teach are …	.336	.501	.686
3. I have been teaching for …	.196	.720	.695
4. Age band	.192	.707	.696
5. Identifying need for information**	.396	.509	.686
6. Identifying reliable information sources needed to address a given problem	.444	.612	.681
7. Finding needed information	.433	.614	.683
8. Evaluating the information	.475	.789	.681
9. Synthesising information	.390	.765	.684
10. Citing sources appropriately	.403	.577	.683
11. How would you describe your readiness for teaching information literacy?	.008	.611	.712
12. What was the main source of your information skills?	−.079	.204	.719
13. Information literacy skills are the same as library skills	.312	.409	.686
14. Information literacy skills should be taught explicitly	.270	.262	.690
15. Information literacy is concerned mostly with ICT	.536	.498	.669
16. Information skills will develop naturally as students do more research assignments	.360	.387	.681
17. I feel prepared to teach information literacy skills by myself	−.046	.669	.720
18. I am acquainted with common methods/process for helping students to deal with information	.180	.474	.697
19. I expect students coming to secondary school already have good information skills	.558	.577	.665
20. I see a librarian as an expert in educating information literacy	.212	.413	.694
21. My school has a school-wide plan of information literacy skills development	.417	.691	.675
22. At my school, I am provided with a variety of strategies for teaching information skills to students	.343	.700	.683

(*continued*)

Table 1. (*continued*)

Items	Corrected Item-Total Correlation	Squared multiple correlation	Alpha if item deleted
23. What is your experience in information literacy teaching?	.049	.578	.705
24. Whose responsibility to teach information literacy skills should be?	−.032	.365	.715
25. Are you familiar with the concept of information literacy?	.174	.660	.697
26. Have you ever heard about media literacy?	.235	.500	.696

*The order of items in a table is not the same as in the questionnaire.

**Items from 5 to 10 are part of a question: How would you rate your student's ability in IL skills.

4.2 Principal Components Analysis with Varimax Rotation

By implementing a principal components analysis with Varimax Rotation, we wanted to find out several aspects, that could help to optimise the questionnaire. As this was a pilot study, we tested a new questionnaire and we wanted to find out which of items could be left out. Reasons for leaving them could be: (a) the items measure the same underlying construct (if there are two highly correlated we consider to leave on which represents construct best); the items are not sufficiently representative of the construct we are interested in; and/or (c) we want to find out which items may be measuring the same construct.

We used the correlation matrix to check patterns of relationships. We checked for the correlation coefficients, which were greater than 0.9 to avoid a problem of singularity in the data. Also, we checked for items which do not correlate (lower than 0.3). There was no need for eliminating any items at this stage.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy test was implemented to measure how our data is suitable for Factor Analysis. The result was 0.708. Factor analysis was appropriate for this data and proves that patterns of correlation should show distinct and reliable factors. The result fell into the range from 0.7 to 0.8 and was considered as good by Kaiser [13]. He outlined that the values greater than 0.7 indicates patterns of correlations being relatively compact.

Bartlett's Test of Sphericity test checks whether the correlation matrix is not an identity matrix and should have value less than 0.05. In our case, Bartlett's test was highly significant ($p < 0.000$) and therefore factor analysis was appropriate. Both tests show the data was acceptable for conducting factor analysis. In Table 2 results of factor analysis are presented.

Table 2. Principal Component Analysis

Factor	Content	Eigenvalue	Variance explained (%)
F1	1a. Evaluating the information (.871), communality (.794)	5.4	15.9
	1b. Synthesising information (.838), communality (.764)		
	1c. Finding needed information (.790), communality (.725)		
	1d. Identifying reliable information sources needed to address a given problem (.752), communality (.658)		
	1e. Identifying need for information (.716), communality (.672)		
	1f. Citing sources appropriately (.666), communality (.557)		
F2	2a. I feel prepared to teach information literacy skills by myself (.885), communality (.833)	3.64	9
	2b. How would you describe your readiness for teaching information literacy? (−.825), communality (.758)		
	2c. I am acquainted with common methods/process for helping students to deal with information (.701), communality (.661)		
F3	3a. My school has a school-wide plan of information literacy skills development (.759), communality (.781)	2.31	8.48
	3b. At my school, I am provided with a variety of strategies for teaching information skills to students (.716), communality (.774)		
	3c. Information literacy skills should be taught explicitly (.572), communality (.439)		
	3d. I expect students coming to secondary school already have good information skills (.541), communality (.705)		
F4	4a. Whose responsibility to teach information literacy skills should be? (.801), communality (.682)	1.68	8.16
	4b. The student levels that I mainly teach are … (.691), communality (.638)		
	4c. What is your experience in information literacy teaching? (.603), communality (.669)		
F5	5a. I have been teaching for … (.876), communality (.845)	1.39	7.71
	5b. Age band (.846), communality (.847)		

(*continued*)

Table 2. (*continued*)

Factor	Content	Eigenvalue	Variance explained (%)
F6	6a. Have you ever heard about media literacy? (.723), communality (.634)	1.27	7.41
	6b. Are you familiar with the concept of information literacy? (.698), communality (.746)		
	6c. What was the main source of your information skills? (.666), communality (.522)		
F7	7a. Information literacy skills are the same as library skills (.740), communality (.635)	1.10	7.16
	7b. Information skills will develop naturally as students do more research assignments (.696), communality (.547)		
	7c. I see a librarian as an expert in educating information literacy (.498), communality (.548)		
F8	8a. What is your main teaching discipline? (.864), communality (.813)	1.05	4.88
	8b. Information literacy is concerned mostly with ICT (.462), communality (.641)		

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization (Rotation converged in 9 iterations).

Factor 1 (from 1a to 1f) accumulated items related to the Big6 skills.
Factor 2 (from 2a to 2c showed teachers preparedness to teach IL skills.
Factor 3 (from 3a to 3d) accumulated items related to formal rules on IL teaching at the school.
Factor 4 (from 4a to 4c) represented two items (2d and 3d) that were related to experience in teaching, and one item was logically unrelated (1d).
Factor 5 (from 5a to 5b) represents items, that were not logically related.
Factor 6 (from 6a to 6c) accumulated items related to acquainted with IL.
Factor 7 (from 7a to 7c) represented two items (1g and 2g) that were related to the way IL skills evolves, and one item (3g) is logically unrelated.
Factor 8 (from 8a to 8b) accumulated items, that were not logically related.

5 Discussion

Our main goal was to test out our freshly created questionnaire before starting a full-scale survey. We collected data for a pilot study that represented a whole range of age, discipline, student levels, and experience. It made us confident to proceed to further analysis. We decided to choose Lithuania for the pilot study.

Cronbach's Alpha showed that the group of questions was consistent, all items measured the same characteristics, and the results showed no need to leave out any

items. A deeper analysis of results made us check the results with other statistical methods. The results showed positive signs that our data is suitable for factor analysis. This method was more useful for finding overlapping items in the questionnaire. Factors analysis showed that there are two groups of items (5 in total), that we could merge into two items.

Factor analysis showed that items 2a. *I feel prepared to teach information literacy skills by myself*, 2b. *How would you describe your readiness for teaching information literacy*?, and 2c. *I am acquainted with common methods/process for helping students to deal with information* could be made to one item: (a) I feel prepared to teach information literacy skills by myself.

Secondly, factor analysis showed that items 3a. *My school has a school-wide plan of information literacy skills development*, and 3b. *At my school, I am provided with a variety of strategies for teaching information skills to students* could be merged to one item – At my school, I am provided with a variety of strategies for teaching information skills to students.

Factor analysis also showed a need to regroup questions order in a questionnaire following the order outlined after implementing Principal Component Analysis.

Before starting, a full-scale survey there would be a need to implement small pilot studies in Poland and Hungary to test out issues related with translation to respective languages.

Authors invite to use this questionnaire in other countries and to share collected data with others to have a wider context for results interpretation.

6 Conclusions

The purpose of our research was to examine the convergence between IL and school pedagogy. For this, we created a new measurement tool. In the present survey, we tested the validation and reliability of the measuring instrument, the questionnaire. The sample tested was n = 102 of the Lithuanian elite secondary school teacher population. When constructing our questionnaire, we separated three categories containing 26 items. The first part of our categories focused on demographic data; in the second phase, we were curious about the extent to which the teachers had their knowledge of IL until the teachers were able to disclose their students' IL knowledge in the last block. As shown in the first table our questionnaire was consistent enough. The Cronbach alpha coefficient fell to the ideal range from 0.70 to 0.85 accordingly. All items measured the same characteristics. Cronbach's alpha showed no need to leave out any items. From now on, due to the Bartlett's test's high significance, the factor analysis was found as suitable for factor analysis. Factor analysis showed that we could shorten the questionnaire by at least three items. Authors conclude that after removing those items, the questionnaire will be suitable for a full-scale survey.

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Appendix

The questionnaire for developing an understanding of secondary school teachers' knowledge on information literacy and practices

1. What is your main teaching discipline? [open question].
2. How would you rate your student's ability in information literacy skills?
   1 = Very Low, 2 = Below Average, 3 = Average, 4 = Above Average, 5 = Very High

   Choices: (a) identifying need for information; (b) identifying reliable information sources needed to address a given problem; (c) finding needed information; (d) evaluating the information; (e) synthesising information; (f) citing sources appropriately.

3. How would you describe your readiness for teaching information literacy?

   Choices: (a) I feel very well prepared to teach IL courses; (b) I think I should learn more myself to teach IL courses; (c) I would like first participate myself in organised IL course to teach IL courses; (d) I would like to teach IL courses with cooperation with some other person (i.e. librarian); (e) I don't think I could teach IL courses; (f) Other [open question].

4. What was the main source of your information skills?

   Choices: (a) It was part of my study program; (b) I participated in special additional courses dedicated to IL; (c) I learn with the help of my colleagues/family; (d) I learn myself; (e) I have never had the courses dedicated to IL; (f) Other [open question].

5. In my point of view …
   1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree

   Choices: (a) Information literacy skills are the same as library skills; (b) Information literacy skills should be taught explicitly; (c) Information literacy is concerned mostly with ICT; (d) Information skills will develop naturally as students do more research assignments.

6. I agree or disagree that …
   1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree

   Choices: (a) I feel prepared to teach information literacy skills by myself; (b) I am suited with common methods/process for helping students to deal with information; (c) I expect students coming to secondary school already have good information skills; (d) I see a librarian as an expert in educating information literacy; (e) My school has school-wide plan of information literacy skills development; (f) At my school I am provided with a variety of strategies for teaching information skills to students.

7. What are your experience in information literacy teaching?

   Choices: (a) I taught the course dedicated to IL; (b) I was cooperating with other teachers in teaching/preparing course dedicated to IL; (c) During my courses I included some materials connected to IL; (d) I think that IL teaching is not the topic I should be concerned; (e) Other [open question].

8. Whose responsibility to teach information literacy skills should be?

   Choices: Teachers' responsibility; Librarians' responsibility; Led by teachers, but in collaboration and support of librarians; Other [open question].

9. Are you familiar with the concept of information literacy? Choices: Yes; No; Other [open question].
10. Have you ever heard about media literacy? Choices: Yes; No; Other [open question].
11. The student levels that I mainly teach are … Choices: Y 5–7; Y 8–10; Y 11–12; Other [open question].
12. I have been teaching for … Choices: Less than 5 years; 5–9 years; 10–14 years; longer than 14 years.
13. Age band. Choices: 20–29 years of age; 30–39; 40–55; 55 plus.

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Migration of Clusters from Pre-session to Post-session: An Analysis of Elderly Students' Perceived Digital Literacy

Makiko Miwa(✉), Emi Nishina, Hideaki Takahash, Yoshitomo Yaginuma, Yoko Hirose, and Toshio Akimitsu

Faculty of Liberal Arts, The Open University of Japan, Chiba-shi, Japan
{miwamaki, nishina, hide, yaginuma, hirose, akimitsu}@ouj.ac.jp

Abstract. The Open University of Japan has offered a face-to-face digital literacy training session (DLT) every semester at all 50 study centers since 2010. Each student attending DLT completes a checklist at the beginning and end of their session. The objective of this study was to identify how students migrated from one cluster to another, representing their self-reported perceived digital literacy skills. We analyzed responses from 1,417 students who submitted checklists between Semester 2, 2014 and Semester 2, 2016 and completed all 20 items on both the pre- and post-session checklists. We developed clusters for pre- and post-session ability, based on each student's reported ICT skill levels on the 20 checklist dimensions, using k-means with the Hartigan–Wong algorithm. We also analyzed how each of the pre-session clusters shifted to post-session clusters using a Sankey diagram. In addition, we analyzed students' post-session checklist comments on DLT using a co-occurrence network method.

Keywords: Digital literacy · Elderly students · ICT skills · Learning analytics

1 Introduction

The Open University of Japan (OUJ) offers distance-learning programs at undergraduate and graduate levels through accredited courses broadcast by television, radio, and online, in addition to face-to-face sessions offered at 50 study centers nationwide. About 300 courses are broadcast on television or radio, while some 3,000 face-to-face sessions are provided at study centers. Provision of online courses began in the first semester of 2015, and 15 courses are currently taught this way. The rapid popularization of the Internet and the progression of information and communication technology (ICT) have brought about virtual environments that support students' learning. OUJ has taken advantage of ICT for adult students who undertake lifelong learning. Almost all television and radio courses are also accessible on the Web. Students can access these courses by personal computer (PC), tablet, and smart phone. Wakaba, the online student information management system of OUJ, is used for course registration, confirmation of exam results, and reporting of students' information online. All

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students have access to the OUJ mail system using designated e-mail addresses. However, these online services have not been fully utilized by students. This is mainly because OUJ students are relatively old (Fig. 1) and some of them have had little opportunity to utilize PCs and mobile devices for learning. To cultivate these students to fully utilize the Web-based learning environments of OUJ and prepare to take online courses, we have offered a face-to-face 12-h intensive digital literacy training (DLT) session called "The Personal Computer for Beginners" in classrooms with networked PCs at 50 study centers since the second semester of 2010.

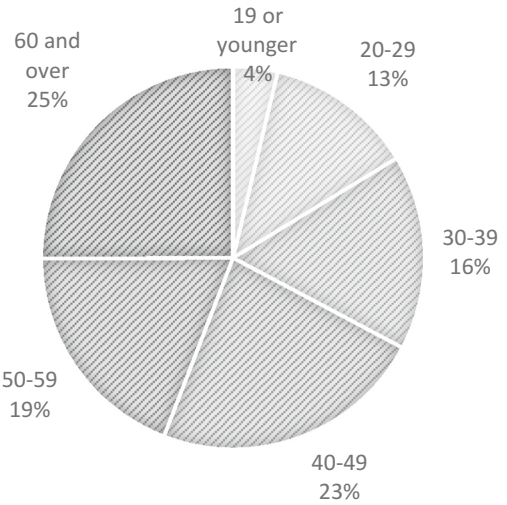

Fig. 1. Age distribution of OUJ students (spring, 2017)

The process of developing the DLT session has been reported in journal articles [1]. This paper reports the results of a study of students' learning assessment using students' perceived ICT skills pre- and post-session, which were self-reported between Semester 2, 2014 and Semester 2, 2016.

2 Literature Review

The term "digital divide" refers to the fundamental gap between those who have access to computers, the Internet, and online information and those who do not. Studies have reported older age as one of the significant sources of the digital divide in addition to gender, salary, education, and professional practices [2]. Schäffer suggested that generation-specific media use reflects what people learned during their adolescence and with the media available at that time [3]. Other studies identified cognitive abilities, computer self-efficacy, and computer anxiety as mediators of the digital divide [4].

Several studies have reported the effects of DL training for elderly people. Naumanen and Tukiain suggested that the learning program for the elderly be strongly

facilitated by peer support as well as having a jointly planned content that is tailored to the needs, motivation, and ability of learners [5]. In the USA, Echt et al. examined the improvements of computer skills by comparing different age groups (60–74 years vs. 75–89 years) and two types of training method in computer skills (animated multimedia CD-ROM vs. printed manual) [6]. When tested on their performance of skills learned, the younger age group made fewer errors, while the older group tended to have forgotten factual information they learned during the training sessions; however, there was no difference between the different training methods. Wong et al. compared differences in changes of perceived self-efficacy during basic-level computer training in Hong Kong using a pre- and post-survey method and noted that beginners' perceived self-efficacy tended to improve, while additional training for those who already had a certain level of ICT skills did not lead to improvement [7]. These findings indicate that acquisition of ICT skills is negatively associated with the age of the learner. Our study also found that elderly students tend to have lower ICT skills, but those who use a PC and the Internet more frequently retain the skills learned in the course [8]. Thus, existing studies support digital divide among learners due to age, and imply the need for special consideration of older students in improving their ICT skills.

3 The Personal Computer for Beginners

The Personal Computer for Beginners is a face-to-face hands-on training session designed to cultivate the basic ICT skills required for OUJ students to utilize PCs for access to the Web, the Wakaba information management system, and library services, and to prepare students to take online courses offered since the first semester of 2015. The average size of each DLT session is 20 students with one or two assistants. The session contents have been revised based on student performance. The session description follows:

> This hands-on training session is for students to learn to use a PC for the first time. It includes learning how to use the keyboard and mouse, how to find information on the Internet, how to use e-mail, how to use Word to write assignments, and how to manipulate PowerPoint to create a presentation with tables and figures. Students will be able to access broadcast television and radio courses online, learn to access Wakaba for course registration and examination results, and to utilize Digital Library Services.

Tailored textbook and model teaching materials were prepared by OUJ information literacy taskforce members. The textbook, designed for review lessons of the session, is provided to all students who attend the session. Lecturers can download the model teaching materials in PowerPoint from the dedicated Webpage and modify them for use in the classroom, where each student has access to a PC. Students can upload their assignments (e.g. PowerPoint presentation, short report) and mutually evaluate them.

The session consists of eight lectures with hands-on training, generally offered on weekends. Each lecture is designed to take 90 min. A brief description of each lecture is given in Table 1.

Table 1. Description of lectures

	Lecture title	Description of lecture
Lecture 1	How to use PC (keyboard & mouse)	How to manipulate PC and mouse to input data
Lecture 2	Introduction to WORD	Basic operation of word processing software using Word
Lecture 3	Web and e-mail	How to use browsers, Web search engines and e-mail
Lecture 4	Security and etiquette	Knowledge on security and etiquette required for using PC
Lecture 5	Wakaba and library service	How to use the student information system Wakaba and library online services
Lecture 6	Advanced use of Word	Functions of word processing software for writing reports and essays
Lecture 7	Presentation	Preparation of presentation materials and classroom presentation
Lecture 8	Guide to further study	Access to television and radio courses on PC, Web-based learning system, and self-learning site

The goals of this session are to:

- improve students' PC and Internet (Web) skills.
- prepare students to take online courses, and
- facilitate students' use of online course registration and administrative procedures.

4 Checklist for Assessing Student Performance

We used an instructional design method to develop the textbook and teaching materials. Specifically, we developed a list of learning goals for each chapter of the textbook, compatible with each lecture, and these were reflected in the learning materials (Table 2).

We developed a checklist to measure students' digital literacy skills for each of these learning goals. The students completed checklists before and after the intensive session to measure the attainment of their learning goals on a five-point Likert scale (1 = not at all; 2 = have done; 3 = sometimes; 4 = probably; 5 = yes, with confidence). In addition, students were asked to write free-response comments about the session in the post-session checklist. Both pre- and post-session checklists were accepted by the OUJ Research Ethics Review Board.

In total, 1,844 students submitted checklists for the DLT session between October 2014 and August 2016. Among them, 1,417 students completed all 20 items on both the pre- and post-session checklists. Free-response comments were reported by 108 students.

Table 2. Learning goals

Item	Learning goals	Item	Learning goals
1	Boot, log on, and log off study center PC	11	Answer Web-based trial exam questions
2	Input Japanese letters using Word	12	Check out books using OUJ's Online Public Access Catalog
3	Run application software	13	Counteract computer viruses
4	Access OUJ Website	14	Explain etiquette for using the Internet
5	Search for information using search engine	15	Compose a simple essay using Word
6	Exchange e-mails using OUJ account	16	Write and print out own documents
7	Change own password at OUJ	17	Copy, save, delete, and move files
8	Access OUJ courses on the Internet	18	Create 5–6 slides using PowerPoint
9	Send questions on the OUJ Q&A site	19	Perform presentation using PowerPoint
10	Track own records on Wakaba	20	Use self-learning site

5 Data Analysis

5.1 Cluster Analysis

For reliability, only data from checklists that were fully completed were used in the analysis. Table 3 lists the number of checklists submitted and analyzed for the study.

Table 3. Number of checklists submitted and analyzed

Semester	Analyzed	Submitted
Semester 2, 2014	256	377
Semester 1, 2015	342	476
Semester 2, 2015	224	306
Semester 1, 2016	388	409
Semester 2, 2016	207	276
Total	1,417	1,844

We assume a vector of 20 dimensions based on each student's perceived level of ICT skills reported in pre- and post-session checklists is a student characteristic. Thus, we developed clusters for pre- and post-session ability, based on each student's reported ICT skill levels on each of the 20 checklist dimensions, using k-means with the Hartigan–Wong algorithm. Using the elbow method for k-means clustering, we determined the optimal number of clusters to be four, as presented in Fig. 2, where the horizontal axis shows the number of clusters and the vertical axis is the sum of the square error.

We also analyzed how each of the pre-session clusters shifted to post-session clusters using a Sankey diagram. In addition, we analyzed students' post-session checklist free-response comments on DLT using a co-occurrence network method.

Table 4 shows the number of students classified in each cluster. Pre-session clustering results are presented in Fig. 3 and post-session results in Fig. 4.

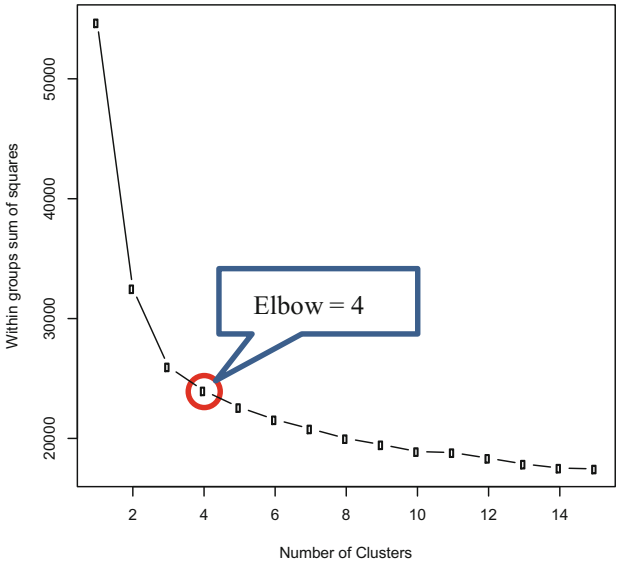

Fig. 2. Explained variance

Table 4. Number of students classified in pre-session and post session clusters

Cluster (pre)	Number of students	Cluster (post)	Number of students
A	201	X	483
B	300	Y	518
C	457	Z	303
D	450	W	113

Figure 4 shows students' perceived skill levels at the end of the session (post-session). Students were classified into four clusters: X (highest skill level), Y (high skill level), Z (low skill level), and W (lowest skill level). The differences among items were relatively small compared with the differences in pre-session clusters, particularly for cluster A. Perceived skill levels for items 18, 19, and 20 were improved for all clusters, probably due to hands-on experience in the class. Perceived skill levels on items 1 (Boot, log on, and log off study center PC) and 2 (Input Japanese letters using Word), which are basic PC skills, were improved even for the lowest skill cluster, W. On the

other hand, skill levels of item 9 (Send questions on the OUJ Q&A site) and 13 (Counteract computer viruses) decreased. Thus, the session contents related to these two items should be improved.

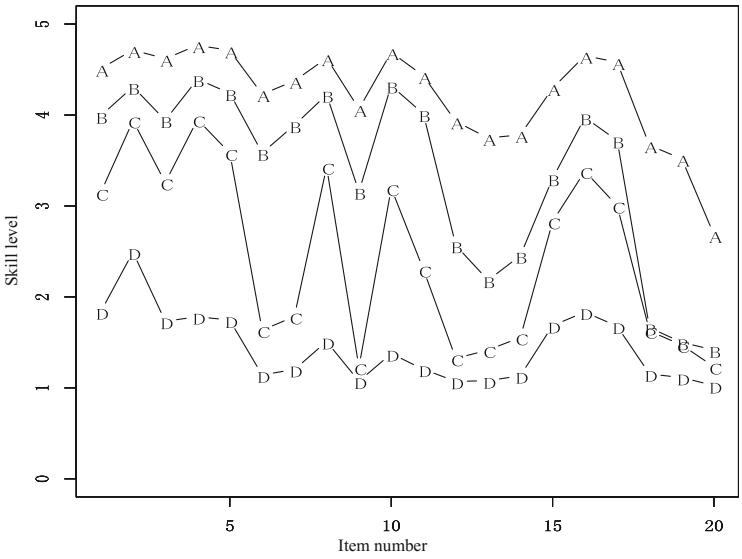

Fig. 3. Pre-session clustering results

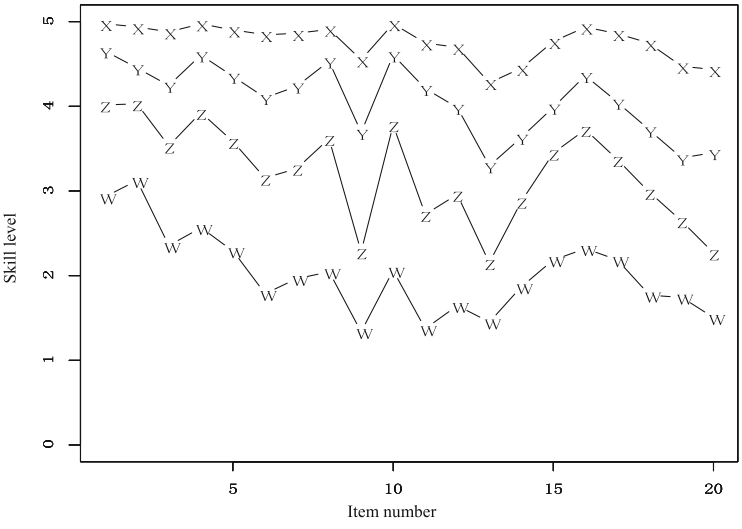

Fig. 4. Post-session clustering results

We also analyzed how each of the pre-session clusters shifted to post-session clusters using a Sankey diagram, as shown in Fig. 5. The number of students who migrated are shown, with their average age in parenthesis, in Table 5. As shown in Table 5, average age increased from left top column (A => X) to right bottom column (D = W), indicating that older students are left behind.

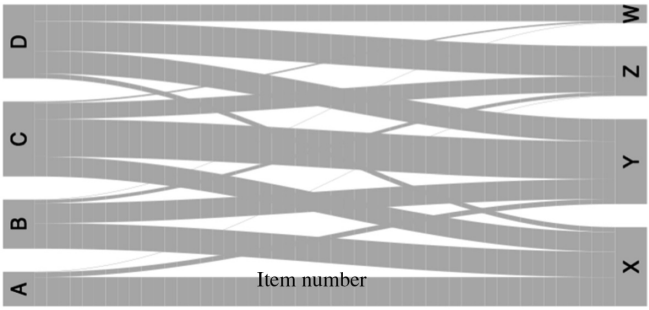

Fig. 5. Migration of clusters from pre-session to post-session

Table 5. Number of students migrated

	X	Y	Z	W	Total
A	177 (40.8)	31 (44.0)	2 (48.0)	0 (-)	210
B	156 (43.1)	121 (48.1)	21 (48.6)	2 (51.5)	300
C	120 (46.5)	230 (50.5)	98 (55.6)	9 (60.4)	457
D	30 (51.1)	136 (55.2)	182 (60.1)	102 (63.5)	450
Total	483	518	303	113	1,417

As shown in Fig. 5, almost all students in cluster A, the highest pre-session skill level, migrated to cluster X, the highest post-session skill level, while most of the students in the next-highest pre-session level, cluster B, migrated to one of the two highest post-session clusters, X or Y. About one-third of students in cluster C, the low pre-session skill level, migrated to X, Y, or Z post-session. On the other hand, about 20% of students in cluster D, the lowest pre-session skill level, migrated to cluster W, the lowest post-session skill level. This may be because some of the older novice students did not learn enough to be able to manipulate the PC by themselves.

In general, the number of students in the lower two pre-session clusters (cluster C = 457 and cluster D = 450) decreased post-session (cluster Z = 303 and cluster W = 113). Thus, the DLT session “The Personal Computer for Beginners” had an educational effect.

5.2 Content Analysis of Free-Response Comments

Only 108 students wrote free-response comments on DLT on the post-session checklist. We analyzed these comments using a co-occurrence network method. Figure 6 shows the network with Jaccard similarity coefficient 0.23 or higher.

Use of the words "presentation," "slide," and "PowerPoint" indicate students were impressed with learning PowerPoint presentation skills. Use of the words "first time" and "can" imply students learnt something new. The words "thank you" and "thanks" indicate that students were grateful to lecturers and assistants. On the other hand, use of the words "anxiety" and "future" reveal that some students need extra training.

To identify word differences between students of different skill levels, we counted word occurrences from groups of students who migrated from A to X (highest skill level) and those who migrated from D to W (lowest skill level). This is because the small number of students in each group made it impossible to perform word co-occurrence analysis. Thirteen students who migrated from A to X responded with comments. Their average age was 37.8 years. Two students said they had "used PowerPoint for the first time," four expressed "thanks" to the instructors, and one said they had "enjoyed the session." Meanwhile, 10 students who migrated from D to W commented. Their average age was 67.4 years. Three mentioned "using a PC for the first time" and three expressed "thanks" to instructors. However, negative expressions of "tired," "hard," and "painful" were reported by one student each.

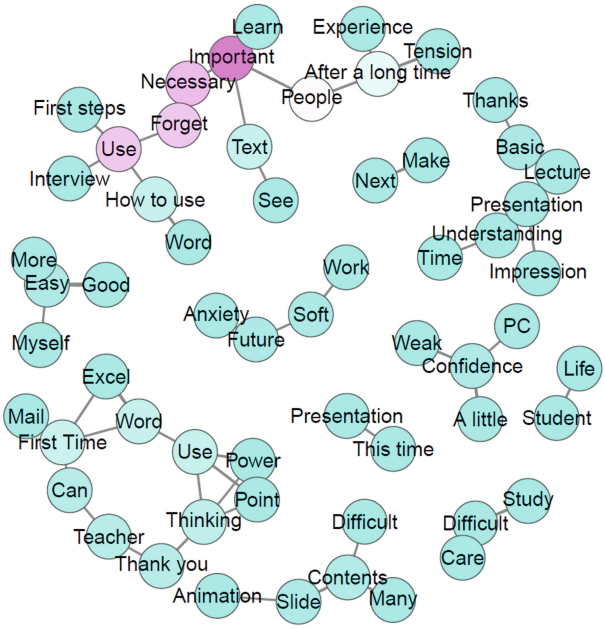

Fig. 6. Co-occurrence network of post-session free-response comments

6 Conclusion

An analysis of 1,417 students' self-reported perceived digital literacy skills was performed pre- and post-session to identify the educational effects of a DLT session between Semester 2, 2014 and Semester 2, 2016. We developed clusters for pre- and post-session ability, based on each student's reported ICT skill levels on each of the 20 checklist dimensions, using k-means with the Hartigan–Wong algorithm. We also analyzed how each of the pre-session clusters shifted to post-session clusters using a Sankey diagram. In addition, we analyzed students' post-session checklist comments on DLT using a co-occurrence network method. The results indicate that students' skill level had significantly improved, but some old novice students remained unskilled. These results are reflected on the future revision of session materials.

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Gender Differences in ICT Access and Use Among Brazilian Youngsters

Nádia Bernuci[1(✉)] and Gilda Olinto[2]

[1] IBGE, Rio de Janeiro, Brazil
nadiabernuci@yahoo.com.br
[2] IBICT, Rio de Janeiro, Brazil
gildaolinto@gmail.com

Abstract. The importance of gender equality in the knowledge society is being considered by the social and information science literature. Gender differences in ICT access and use suggesting lower levels of information literacy among women, also indicate that the perspectives of women in the Knowledge society are threatened. The objective of this work is to bring data and discussion on the Brazilian young generation, focusing on gender question. We point out questions about how girls are accessing and using the internet and their internet abilities. The data considered in the analyses presented were obtained from annual surveys from the Brazilian Bureau of Census (IBGE) and Regional Center for Studies on the Development of the Information Society (Cetic.br). Results suggest that, although girls are accessing the internet equally, they do not have the same profile of internet use and appropriation, and girls are being directed to some specific activities. Besides, the boys seem to show a better self-image of internet abilities than girls.

Keywords: ICT access and use · Gender differences · Internet abilities

1 Introduction

We can assert that access, diversity of use, as well as use ability with information and communication technology (ICT) are major aspects of information literacy, as emphasized by the literature on the theme. We can also assert that theoretical approaches and evidences that point to the existence of gender differences in ICT access and use, besides suggesting lower levels of information literacy among women, also indicate that the perspectives of women in the Knowledge society are threatened. This theme – gender differences in ICT access and use – should, therefore, become a serious concern of studies, and this concern is greater when the young generation, those that are being prepared to take action in the coming knowledge society, are the target of analyses. In this article, we focus on gender differences in aspects of internet access and use among Brazilian youngsters. We initially consider gender studies that deal with ICT and gender, a relationship that is being approached from different perspectives. We also take into account initiatives by major international institutions emphasizing the gender-ICT problem and proposing actions aimed at overcoming these gender divides. This literature and initiatives lead us to pose some basic research questions: Is there

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already gender parity in internet access by youngsters in Brazil? Are there significant differences in types of internet use and use abilities between young boys and girls in the country? Are there strong effects of socioeconomic and ethnic environments in how the internet is being used by boys and girls? Are there indications that girls are prepared to use the internet to promote gender equality?

To contribute in answering these questions, we analyse data from the Brazilian Household Annual Survey of 2015 (known as PNAD survey), a representative sample of the Brazilian population between 10 and 17 years old: 26.502.061 youngsters. The other data source considered here is the annual survey about children's Internet use, called ICT Kids Online Brazil also representative of Brazilian youngsters in 2016.

2 Data and Methodology

In order to evaluate the perspectives for information literacy among youngsters in Brazil, we bring about new information about ICT access and types of internet use by gender and race. Our analyses focus on internet access, aspects of internet use and internet abilities and skills.

We use as our main data source the Brazilian Household Annual Survey of 2015 (known as PNAD survey) [15]. This survey – based on a probability sample of the country's households - collects information about several socioeconomic characteristics of the Brazilian population since 1967. Access and use of the internet and other ICT devices – microcomputer, cellular phone for personal use and tablet - were included in the 2015 survey, the last survey with microdata available for analysis.

In 2015 the Brazilian population between 10 and 17 years old amounted to 26.502.061-13.527.007 boys and 12.975.054 girls. Another important methodological information is that the measure of 'access to the internet' we consider here refers to people that had at least one access to the net in the last three months prior the PNAD survey application.

The second data source considered in the analyses made here is the annual survey about children's Internet use, called ICT Kids Online Brazil, performed by the Regional Center for Studies on the Development of the Information Society (Cetic.br), a department of the Brazilian Network Information Center (NIC.br) [16]. The unit of analysis consists of children aged 9- to 17-years-old. This survey includes specific measures of online activities and internet skills by boys and girls.

3 Approaches to TICs and the Gender Question

The academic literature, as well as activism, focusing on women's and girls' relation to technology suggest some interesting approaches that can be taken into account in analyses of internet access and use by these social segments.

A first argument can be found in literature reviews of gender studies pointing out that initial work on the theme tended to reject technology in general, including ICT, because it was considered intrinsically masculine - being made and dominated by men. More recent work, however, tends to emphasize the idea that ICT, and the internet in

particular, can be used for the benefit of women, having the potential to transform society in the direction of gender equality [1, 2].

Another perspective, suggested by Rommes [3], emphasizes that there are different dimensions that should be considered to observe the gender question. One is the structural dimension that leads us to look at the products of the information society and analyse if these are being equally beneficial to men and women: is parity of access to instruments and resources guaranteed? The answer to this type of question leads us focus on large data to track access and use of ICT by gender. Other dimensions of analyses deal with the identity and symbolic aspects of ICT, which lead us to different approaches.

One of these approaches, considering the gender identity problem, begins with the assumption that technology is in fact moulded by and for men; and the question it poses is: Do girls and women have to abdicate their identity and try to adapt themselves to technical products associated with masculinity? The other related approach stresses the symbolic dimension of ICT and argues that technological products are mostly referring to the masculine world, contributing to discomfort and alienation on the part of girls and women. Some examples are software dealing with pornography and violence, including humiliating references to girls and women. To overcome these problems, and promote gender equity in the information society, the solution proposed by these theories involves identifying gender differences in how ICT is being used, as well as incentives for ICT competence among women, and investment in products designed by girls and women, promoting their ICT inclusion.

Another argument that is being increasingly brought to light, is the idea that the gender question is not homogenous to all types of environments. Women in different economic, social and cultural environments face different problems, including their relation with ICT. These socioeconomic and cultural conditionings have to be considered in studies involving the gender question, and these factors are especially relevant in studies done in underdeveloped or developing countries. Moreover, feminist movements on the Internet tend to be aware of and emphasize the diversity of women's lifestyles, visions, and expectations. Studies with this tendency in Brazil have emphasized, for example, that the racial theme has to be included in feminist movements [4, 5]. These studies also called attention to the role of the Internet in the popularization of feminism.

When the field of analysis is the country's young generation, as is the case here, these more recent approaches lead us to consider, besides observing differences in internet access, the types of internet boys and girls are using, the internet resources that these gender groups are mastering, indications of abilities among girls suggesting that they are being prepared to profit from this technology, using it for their own benefit, and also the weight of social and ethnic environments in shaping aspects of internet access and use.

4 Initiatives by International Institutions on ICT and Gender

In this session we consider some initiatives made by relevant international institutions towards the promotion of gender equality through the use of ICT. These efforts go in the same direction as the above mentioned theoretical approaches that tend to view

some advantages of using ICT for that purpose, besides emphasising its human rights aspect. The World Summit on the Information Society – WSIS [6] has included the gender question as part of the discussion in the event and this topic is included in its Action Plan. According to this document, gender equality and women's empowerment constitute one of the challenges of the information society. In its second phase, in 2005, in the compromise letter in Tunis, it was recognized that the gender digital divide, was considered to be connected to the human rights theme.

With the same concern, the Web Foundation [7] indicates three related ways through which women might use ICT to their benefit: informational power – having better access to relevant information and capacity to produce their own informational content; communicative power – to promote new informational channels and participation; and associative power – to create new political articulations and to improve existent structures.

Another initiative, the Media and Information Literacy- MIL proposed by UNESCO, is also based on human rights principles and detaches women's empowerment, considering their cultural and linguistic diversity. UNESCO recognizes the pervasiveness of ICT, especially that the use of the internet and mobile technology promotes new opportunities and forms of civic engagement. The gender question is also implicit in the emphasis made by the MIL approach in fundamental human rights, freedom of expression and opinion that can be enhanced with ICT use and appropriation. Security aspects, privacy and ethics in the digital era are also considered by the MIL approach [8]. The main MIL objectives are clearly applicable to women. These objectives are, according to UNESCO [9], to guarantee rights of expression, to defend information access, the ability to evaluate information content, to secure public participation in governance, and to contribute to assure that all voices are heard. One of these voices is, of course, that of women.

5 Gender Differences in Internet Use: Evidences from Previous Studies

In this section we bring about evidence from some gender studies about specificities of women's use of the internet.

In a review article, Ono and Zavodny [10] consider tendencies to the study of gender and the internet. According to them, gender differences in access to the net, considered a 'first level' gender internet gap, tend to disappear and studies on the subject tend to consider a 'second level' gender gap that focuses on different gender online behaviour. These authors also point out that one of the arguments brought about by the literature to explain differences in gender online behaviour is that girls and women tend to have an auto-image that is negative with respect to their technical capacity in developing activities in the digital environment. According to these authors, showing this tendency, women's search of different resources and potentials of the internet is limited, as well as the impact that the net can have in their private and professional lives.

This argument is also developed by Hargittai and Shaffer [11]. These authors did not find gender differences when considering measures of abilities in searching different types of information online. However, women tended to consider themselves as

less able with the internet. A problem with these findings, suggested by the authors, is that this negative auto-image would probably also have a negative effect on online behaviour, limiting internet uses and returns.

In the same vein, the global report about online rights by the Web Foundation [7], identified a lack of confidence by women in their ICT knowledge. Analysing differences in online competence, comparing men and women with the same educational level, data indicated that women tend to acknowledge less competence.

Other studies point out different gender profile of internet use. Analysing activities online by gender, Wasserman and Richmond-Abbot [12] found out that women use the internet more for communication purposes. Besides, they observed different tendencies in communication behaviour by men and women. The use of the internet to exchange messages, to maintain long distance contacts and to emphasize contacts with familiar persons were more intensely found among women. Men, on the other hand, tended to emphasize chats with unknown persons. Besides, also pointing out the more intensive use of the internet for communication purposes by women, another gender characteristic found by a comparative study in Latin America by Navarro and Sanchez [13], is the inclination of women to use the internet more for educational purposes. This tendency was also observed in another study of internet use by Brazilian students [14].

A negative online auto-image among women is compatible with the theoretical approaches, previously mentioned, suggesting that women feel less identified with a technology historically attached to a masculine world. However, the idea that women could profit from the technology to overcome their disadvantages, allied to the identification of specific behavioural profiles – as their communication abilities – seems to suggest the relevance of research focusing on use gender profiles, taking into account environmental characteristics.

6 Data Analysis

The data obtained by the PNAD 2015 allows us to generate information about aspects of internet access by Brazilian youngsters: approximately 26,502,061 individuals, from age 10 to 17. The total amount with internet access, considering a general measure – access in the last three months - is 19,680,412, corresponding to 74% of these youngsters. The percentage obtained indicates that this young group has more access to the internet than the total population, of which only 57.4% has internet access.

Before focusing on gender differences, we present the relationship of internet access by two other important socio-demographic variables - race and income level groups - which are shown in the two first tables that follow.

Table 1. Internet access by race – Brazilian population 10 to 17 years old.

Race	% with access	N with access	N without access	Total
White	83%	8,759,123	1,761,274	10,520,397
Afro-descendent	68%	10,813,197	4,986,611	15,799,808
Other	13%	108,092	73,764	181,856
Total	74%	19,680,412	6,821,649	26,502,061

Source: IBGE. Pesquisa Nacional por Amostra de Domicílios 2015.

Table 2. Internet access by monthly household income *per capita* - Brazilian population 10- to 17-years-old.

Income	% with access	n with access	n without access	Total
Up to 1/4 minimum wage	45%	1,954,879	2,406,074	4,360,953
More than 1/4 up to 1/2 minimum wage	65%	4,494,801	2,448,412	6,943,213
More than 1/2 up to 1 minimum wage	82%	6,792,073	1,461,221	8,253,294
More than 1 up to 2 minimum wage	93%	4,129,912	298,903	4,428,815
More than 2 up to 3 minimum wage	96%	926,051	42,793	968,844
More than 3 up to 5 minimum wage	98%	547,293	12,229	559,522
More than 5 minimum wage	99%	350,640	4,749	355,389
Without income or no answer	69%	484,763	120,741	605,504
Total	74%	19,680,412	6795,122	26,502,061

Source: IBGE. Pesquisa Nacional por Amostra de Domicílios 2015.

Data in Table 1 indicate that there is a substantial difference in internet access by race among Brazilian young boys and girls: Afro-Brazilians have clearly smaller access to the net. In Table 2, we also observe some differences of internet access according to income level. However, it is noteworthy that more than 90% of young people from families with only a little more than one minimum wage already have access to the net.

We turn now to our analysis of gender differences in ICT access and use in Brazil, beginning with comparisons between gender groups considering the same general measure of access, as shown in Table 3 below:

Table 3. Internet access by gender - Brazilian population 10 to 17 years old.

Gender	% with access	n with access	n without access	Total
Male	72%	9.786.908	3.740.099	13.527.007
Female	76%	9.893.504	3.081.550	12.975.054
Total	74%	19.680.412	6.821.649	26.502.061

Source: IBGE. Pesquisa Nacional por Amostra de Domicílios, 2015.

These results indicate that we have reached parity of internet access between genders among the country youngsters - in fact, with a slight preponderance of access by females (76%) in relation to males (72%). We seem, therefore, to have overcome this 'first level' gender gap as suggested by the literature. But is this positive information - gender parity in internet access - accompanied by parity in types of equipment utilized for this access?

Despite its potential for promoting inclusion in the Information Society, the use of the internet solely by cellphone may be limited since it does not allow a diversified access to a broad range of information. Internet use through computer and tablets can be considered as important instruments for education, enhancing opportunities. We therefore pose these questions: Is the use of the internet with a computer already widespread among youngsters of both sexes? Is the use of the tablet also involving this segment? Is use of the tablet already a reality for young Brazilians?

We try to answer these questions considering the total amount of respondents (representing 19.680.412 young Brazilians) who said that they had access to the Internet. The results are as follows:

Table 4. Type of equipment utilized for internet access by gender - Brazilian population 10- to 17-years-old

Equipment	Male	%	Female	%
Cellphone	8.014.276	81	8.555.045	86
Computer	7.255.001	72	6.991.241	69
Tablet	1.520.043	16	1.535.454	16

Source: IBGE. Pesquisa Nacional por Amostra de Domicílios, 2015.

The data in Table 4 indicate, initially, that the cellphone has a more generalized use than a computer, and that the tablet is still a rare instrument for this young group of Brazilians. These numbers also show that the use of the cellphone is mentioned more by girls, and that the use of the computer is more intense among boys.

These analyses of gender difference in internet access is here complemented with data, focusing on the differences in types of internet use. As mentioned in the discussion previously presented, gender differences in how the internet is being used would reveal the presence of a second dimension of gender inequality that might be more persistent and affect the perspectives of Brazilian girls in the knowledge society. On the other hand, some aspects of internet use by girls, as use for communication activities - creating and sharing content - could also suggest that they are being prepared to act in favour of their needs and rights, as also pointed out in our discussion.

Indicators of types of internet use considered here include: frequency of use, types of activities developed, and aspects of internet abilities. Measures of abilities involve direct inquiries about knowledge of several specific abilities, as well as the respondent's perception of their abilities. The data source utilized for this analysis is the annual survey Kids Online, mentioned in the methodology section. It is based on the most recent CGi report of 2016 [16], which includes some information and comments about gender differences in internet use. Since the focus on gender is not the central theme of the analyses presented in that report, we try here to retrieve and congregate data taking the gender dimension as the main focus of analysis. The idea of a second level of gender segregation which might impact girls' ICT appropriation, as discussed above, is what we seek to detect in the data analyses that follows.

We first present Fig. 1 showing gender differences in types of activities that they report doing online:

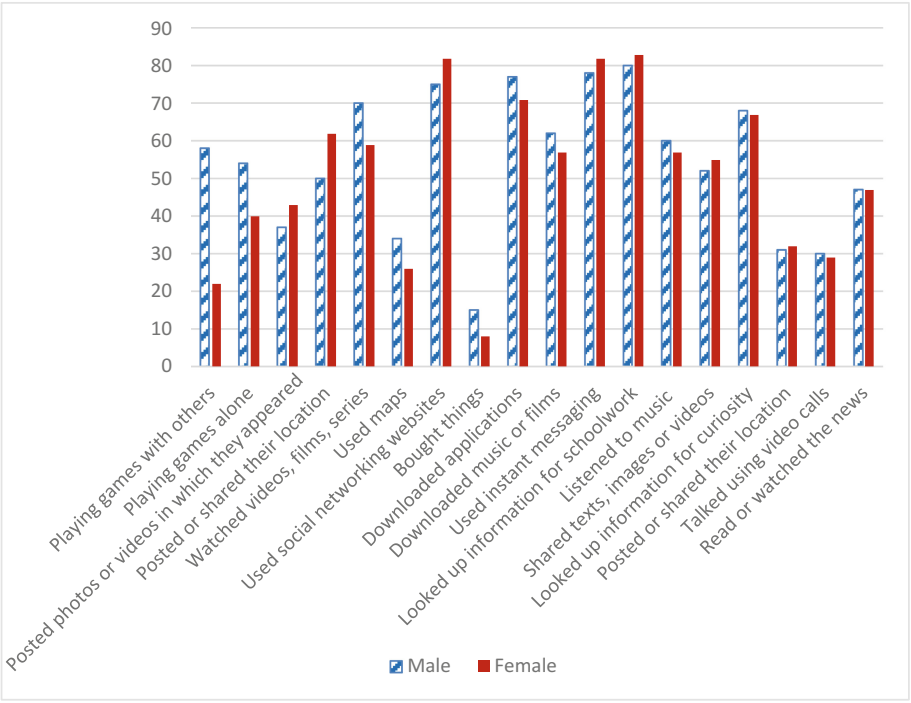

Fig. 1. Activities online by gender - Brazilian population 9- to 17-years-old. (Source: Cetic.br, Survey on Internet Use by Children in Brazil – ICT Kids Online Brazil 2016)

Data in Fig. 1 suggest that boys have more fun using the internet, surpassing girls in activities like playing games, watching videos and listening to music, besides using the net more for pragmatic activities, such as buying things, downloading, and consulting maps. This gendered profile of internet use has already been observed in previous works [11, 12, 14, 17]. The prevalence of playing games online among boys, for instance, seems to reflect the greater availability of software specially designed for them, and can be seen as one of the consequences of an ICT culture that is mostly produced and designed for this gender group. Another type of internet use more typical among boys is the pragmatic or technical approach, as it is the case of activities like shopping, downloading software and consulting maps, suggesting that they might value, or are being prepared for, a different kind of appropriation of the internet. Girls, on the other hand, prevail in activities related to communication, as sending messages and sharing information, posting and sending photos. This is an interesting tendency, since the internet might be used to give voice to girls. As mentioned above, social network sites can promote gender activism and become a resource to expose the multiplicity of experiences and representations of women, especially those who are

typically underrepresented. such as black women [5]. On the other hand, internet use for communication might indicate that girls are just internalizing their female role as keepers of their family and social contacts and building their social networks. This last interpretation should be credited to Bott [18], a pioneer in social network studies who emphasizes this female role of family communicator.

In the same study, we could also consider the relation of gender to variables trying to measure abilities online, with questions aiming at detecting the respondent's knowledge of each aspect considered in Fig. 2, above. Results indicate that boys and girls show similar levels of abilities, and again, girls seem to surpass boys in managing activities related to communication. Also, interestingly, girls are more able to deal with activities related to data protection in the internet. As expected, boys reported a higher percentage in practical actions, such as downloading, verifying internet use costs, and controlling location data.

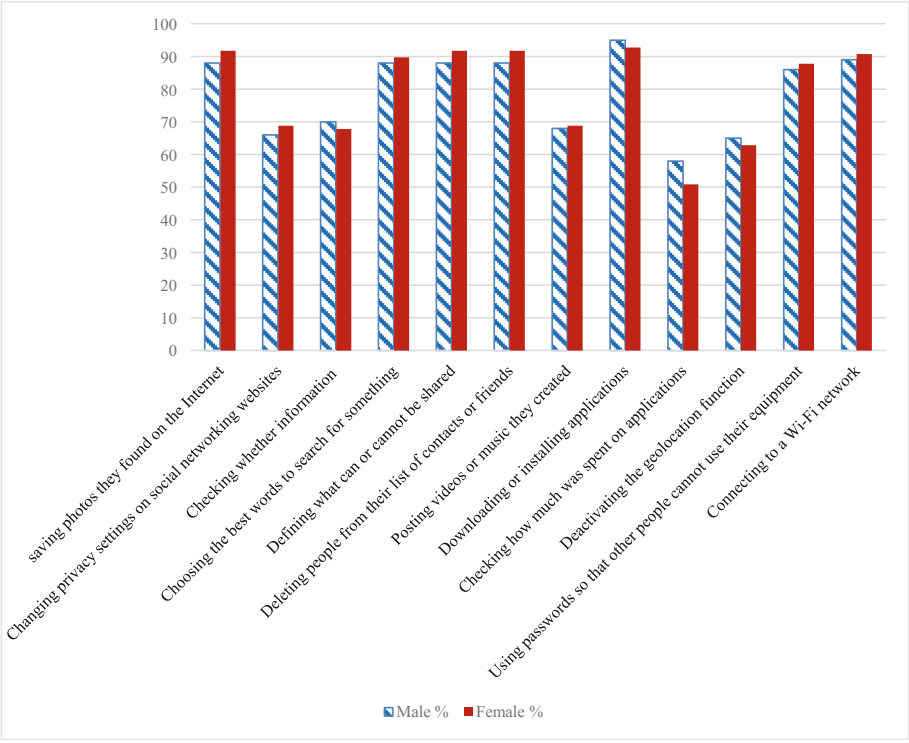

Fig. 2. Internet skills by gender - Brazilian population 9- to 17-years-old. (Source: Cetic.br, Survey on Internet Use by Children in Brazil – ICT Kids Online Brazil 2016)

Another group of questions focused on perceptions of abilities, which were measured through a few indicators. The relation of these perceptions with gender is shown in the following Table 5:

Table 5. Perceptions regarding their Internet skills by gender - Brazilian population 9- to 17-years-old

Sentence	Male agrees %	Female agrees %
Knows more about the Internet than their parents	76%	76%
Knows a lot of things about using the internet	74%	68%
There are a lot of things on the Internet that are good for children the same age as them	85%	78%

Source: Cetic.br, Survey on Internet Use by Children in Brazil – ICT Kids Online Brazil 2016.

Data in Table 5 suggest that, although boys and girls show a similar perception of abilities in using the internet when they are asked to compare themselves with their parents. However, girls do not evaluate themselves on the same level of abilities as boys, when they are asked to position themselves as someone that "knows a lot of things about using the internet". A less favourable self-image among girls does not seem to correspond to measures of their actual ability, in which boys and girls have similar results. A lower self-image regarding ICT in the female group was already found in other studies about internet use, as mentioned before [7, 11, 12]. This tendency of a poorer self-image among girls is also present in work done in the field of sociology of education, as those focusing on school performance: girls tend to feel themselves as less able in academic fields related to science and technology, despite having equivalent performance as boys [19].

7 Concluding Remarks

As a whole, data described here suggest that gender parity in internet access - the overcoming of the first level gender gap – seems to have been reached among young Brazilians, as in other contexts. However, gender differences in types of internet use and appropriation - the second level gender gap- seem to reflect the burden of gender culture, as suggested by the literature on the subject discussed in the text: Brazilian girls are being directed to some specific activities, and showing different profiles of internet use and appropriation. These evidences could, therefore, be interpreted that ICT is still associated with masculinity, making boys feel more at ease in doing certain activities, as is the case with playing games. Also, supporting this point of view, the boys seem to show a better self-image of internet abilities than girls, which may inhibit girls to exploit ICT resources or to become more sensitive to criticism in their digital activities. However, as appointed by more recent studies on gender and ICT, some of the characteristics observed, such as communication abilities - spending time in communicating, posting messages and taking photos -, in which girls surpass boys,

might indicate that these young girls are acquiring a specific knowhow that could have a positive impact on their perspectives in the knowledge society, as long as they recognize their potential for societal transformation.

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Information Problems Encountered by Asian Students at the European Universities. A Case of Poland

Zuzanna Wiorogórska(✉)

University of Warsaw, Warsaw, Poland
z.d.wiorogorska@uw.edu.pl

Abstract. For about a decade, we observed the internationalization of European universities and a growing number of Eastern and Southeastern Asian students at European universities. Asian students arriving at European universities face several information and communication challenges due to their different socio-cultural and educational backgrounds. This paper reports on a study conducted about Vietnamese students in Poland and their information behaviour, competences, and needs surveyed in the context of cultural background. Standardized, open-ended interviews were chosen as the most appropriate instrument. Interviews with 17 MA and Ph.D. students were conducted in April 2018. The study provides a holistic picture of Vietnamese students' information-related activities with regard to their cultural backgrounds and emphasis on cultural differences. It contributes to a better understanding of Asian students' information behavior and their expectations of academic libraries. It also helps establish an information literacy education tailored for this group of users.

Keywords: Cultural differences · Information literacy · Higher education

1 Introduction

For about a decade, we observed the internationalization of European universities. Universities wanted to go global both in the field of research and didactics. They opened their doors for students from beyond the European Union hence, currently we observe, a growing number of Eastern and Southeastern Asian students enrolling at European universities. Asian students arriving at European universities face several information and communication challenges due to different socio-cultural and educational backgrounds [1]. Cultural and linguistic differences can affect information literacy (IL) [2]. The topic of IL in a cultural context is one of the current trends in studies of information users' and still remains to be more deeply explored. Much has already been done in Australia and North America. However, academic environments of those countries have a common denominator in that English is their official language and also the language of didactics and all the tools in the educational milieu (for example libraries catalogs or information resources). In Europe, the situation differs. English is not widely spoken in the majority of EU countries, so incoming international students and university staff must communicate in the language that is neither their mother

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tongue nor part of the didactic process. For the purpose of this study the target group was be Vietnamese students who came to study in Poland.

2 Study Background

2.1 Vietnam

Vietnam's history dates back to 2,879 BC. For almost ten centuries (from 111 BC to AD 939) it was colonized by the Chinese. And even after the official declaration of independence, the country remained under the Chinese domination until the French occupation that started in 1858. The French left Vietnam in 1954 and that time the country was divided into North and South Vietnam. The USA controlled the Southern part till 1975. Since 1976 Vietnam has been an independent, reunified, socialist republic with a rapidly growing market economy [3, 4].

Although the Chinese dominance ceased a long time ago, principles of Confucianism underpin the moral and social attitudes that still influence all spheres of life of Vietnamese society. Education is one of Vietnamese foremost priority: education development is a primary national policy guaranteed by the Constitution of Vietnam, together with a provision of policy for scholarship and tuition [5].

2.2 Information Behavior of Asian Students

Information behavior, according to Wilson [6], are those activities a person may engage in when identifying their own need for information, searching for information, and using or transferring that information.

The issue of information difficulties faced by Asian students coming to study overseas is not new. In American literature, we can find the publication focused on college library orientation for this group that dates back to 1969 [7], even before the concept of *IL* was established. Until now, in the Anglosphere, the exploration of the relationships between international students and library services has been a vast field of research. However, it has focused mainly on identification of gaps in their information and searching skills, on determination of their library needs, or on their possible communication problems caused by a language barrier [8–11]. Even in the English speaking countries that were among the first to enroll students from Asia at their universities, not much has been published on the relationship between information competences and cultural background.

There were few Vietnamese researchers who wrote about cultural differences in the context of teaching English as Foreign Language (EFL). These studies generally supported a set of classroom guidelines for native English teachers who were supposed to start their work in Vietnam than a deep analysis of the problem, supported by a quantitative human research [4, 12].

3 The Study

This study was inspired by my 7-month post-doctoral research stay at the University of Danang in 2017, where I observed and surveyed Vietnamese students in their educational environment [13]. Having realized how much Eastern and Western education differs and how the cultural context influences information behavior and information skills, and knowing that there are more and more Southeastern Asian students at the University of Warsaw, I decided to continue my research on Vietnamese students, but this time with the aim to investigate those who came to study in Poland from Vietnam.

3.1 Methods

I chose a qualitative approach to collect data beginning with a theoretical framework established from a literature review [14]. I completed a survey of literature covering the themes related to international students', paying particular attention to the literature concerning the issues of IL and information behavior of Asian students at Western universities. From this framework I designed a hypothesis and a set of interview questions to obtain the richest and the most detailed data. Then, I interviewed Vietnamese students about their experiences. I asked them to share any information- and library-related experiences or problems they had encountered while studying in Warsaw.

3.2 Participants

Seventeen (N = 17) Vietnamese MA (n = 9) and PhD (n = 8) students enrolled at the University of Warsaw (seven females, ten males) participated in the study. They represented a wide variety of subject fields; the largest number of respondents studied Economics (n = 5), International Relations (n = 3), and Biophysics (n = 2); single respondents represented study in Biology, Geography, Law, Librarianship and Information Science, Pedagogy, Physics, and Psychology. I applied a chain-referral (snowball) sampling; the interviewees were asked to recruit their contacts.

According to enrolment data, in 2017/2018 there are 37 Vietnamese students at the University of Warsaw.

3.3 Instrument

A standardized, open-ended interview approach [15] was chosen as the most appropriate instrument for this exploratory study. Face-to-face (n = 15) and Skype (n = 2) interviews were conducted in April 2018. Each interview lasted up to 1 and a half hours and was conducted in English. For such a small research project, handwritten notes were chosen as the more effective and enough for data capture technique rather than tape-recording that requires a transcription of records afterwards. Based on experience of my previous research studies [16], I observed that interviewees were more relaxed when they saw that their words were not being digitally recorded; besides, note-taking saves time as it allows to have the text directly after the interview and to move immediately to the coding stage. Thus, interview data were manually coded, using the elements of

grounded theory and constant comparative methods [17], to create codes and construct categories from collected empirical data and identify the main issues/results.

3.4 Results and Analysis

Interview questions were divided into five sets and focused on the following themes: 1. Academic differences and similarities; 2. Teaching styles; 3. Learning styles; 4. Library experience; and, 5. Ways of access to information. Below, a synthesis of findings of each thematic group is presented.

Academic Differences and Similarities. Going for studies abroad, even if the study location is not far overseas, might pose serious cultural challenges. Moving from Asia to Europe is a big life experience. Not only one must change her/his everyday habits, but one must also face a new academic environment. In Vietnam, teaching and learning at all levels of education have been and remains examination-oriented [3, p. 96]. The majority of respondents underlined that in Poland they found an individual approach to students. They started to learn for their own sake since teachers focused more on students' improvement than on grades, are fair with exams, and *gave you several chances to pass the exam* [MA_Int.Rel.1]. There is no need of the repetitive learning practiced in Vietnam. The respondents also appreciated that in Poland they can learn a lot of practical issues, while in Vietnam the curriculum placed so much emphasis on the provision of theoretical information that there was very little space for practical experience. There, the curriculum was theory-overloaded [3, pp. 96–97, 99]. Quite often Asian students, mostly those studying in the frame of popular Erasmus programs, were compared to other international students, while their education system and outcomes differed significantly from European ones.

Teaching Styles. *Education in Vietnam is a hierarchical system, influenced by a Chinese Confucianism. One of the rules is to respect your teacher. Teachers give the knowledge. They are one step higher* [MA_Psych.]. Indeed, Confucianism has strongly influenced learners and learning styles. Vietnamese learners highly respect teachers and learning; learners are uncritical of the information they receive from their teachers or from the textbook; pedagogy is a one-way communication [3, pp. 97–98]. That is why the respondents noticed a big difference in teaching styles between Vietnam and Poland. They highlighted Polish teachers' openness and friendliness, their engagement in encouraging students to be active and to express their opinions during class discussion. They appreciated office hours when one can discuss anything and teachers' responsiveness to e-mails. Office hours did not exist in Vietnam, so the contact with teacher was possible only directly after a class). On the other hand, they admitted that in Vietnam, although the teacher-student relationship is based on hierarchy, it was more personal and does not finish beyond the university. Teachers and students invited each other to their homes or to restaurants, especially during big holidays, like Lunar New Year (known in Vietnam as *Tết*) or Teachers' Day. Some respondents seemed to miss this kind of link in Poland. In fact, they did not expect Polish teachers to hang out with them but they would like them to understand better the Vietnamese cultural background. Meanwhile, only four respondents said that they met teachers who made efforts to understand cultural differences, of which two spent some time in Vietnam for

professional reasons, so they had a wider perspective. Five respondents noticed no efforts on the behalf of teachers to reach out to them; one even stated directly that *some teachers prefer Western students* [MA-Int.Rel.2]. Four respondents mentioned that during classes while discussing any country- or region-related issues (for example in economics), teachers sometimes asked about this issue in Vietnamese context, but not often. Even less often were international students asked to prepare a presentation about their country. Some respondents had a feeling that expressing this kind of interest in their country of origin would be a nice gesture from teacher's part. It would not only help them feel more comfortable in the class but could also help overcome the barrier in expressing student's opinion. *At the beginning I stayed silent in the class, I was afraid of shaming myself in front of everyone* [MA_Psych.]. *I'm shy comparing to Western students. I don't feel comfortable with sorting my ideas and interrupting teacher* [MA_Int. Rel.1]. *I spent 20 years in Vietnam, when I came to study abroad I thought everyone is better than me. At the beginning I didn't feel self-confident* [MA-Econ.2].

In Vietnam students are taught to listen to the teacher; asking questions or expressing one's own opinion are often perceived as impolite and may harm one's reputation (known in Asian cultures as "losing face"). Hence, critical thinking skills are perceived as unnecessary and undesirable in Vietnamese academia whereas they are essential in Western education. The latter is highlighted in the latest definition of IL issued by CILIP [18]. Before coming to Europe, the respondents were aware that Western education put stress on creative expressions, critical thinking, and problem-based learning. They said they saw it in American films, on the Internet, and were reading about it. So they had some concept in their mind, but in practice it appeared very difficult to apply. *This is a weakness of Vietnamese students because we are educated to obey our professors' opinion* [PhD_Geogr.]. *In Poland you are expected to explain your point of view and to give arguments to defend your opinion. Teachers even like when you have an idea opposed to theirs* [PhD_Law]. *At the 1st year I was crying. Then, I started to think in a different way. I started to analyze what the teacher said, what I read in books and what I can say on the topic* [MA_Ped.]. *I like this approach, but it's difficult to improve it after a long education in Vietnam (…) I was struggling with forming an argument* [MA_Int. Rel.2]. *In Vietnam we didn't have academic debates. I was lost, I couldn't find evidence to support my opinion* [MA_Psych.]. Western teachers who are not aware how critical thinking is underestimated in Asia risk prejudging their students and labeling them as not skilled or not educated enough.

Learning Styles. I asked my respondents about the differences in learning between Poland and Vietnam. I wanted to know whether they could base on their previous learning experience or had to learn "how to learn" from the beginning. The questions were based on my observations made at the Vietnamese university [13], supported by litterature where Vietnamese curricula were described as dominated by theory and focused on exams' results. First, the respondents underlined the fact that in Poland they learned on their own. In their opinion, unlike in Vietnam, teachers did not explain everything during the class, but gave some general ideas that needed to be explored to prepare a wider perspective. To do this, students needed to use different resources. This approach, again, is contrary to the case in Vietnam where there was only one handbook

for each course and no additional readings were needed. Also, the respondents appreciated that they did not have to memorize a lot, that synthesizing is important, and the focus was put on research methodology. It was interesting that six respondents from different fields raised the issue of methodology was an issue. They underlined its importance in Polish education where a specific, discussed issue was tested with different approaches, unlike in Vietnam. Some of the respondents judged a European-centred approach in discussing subjects as challenging (particularly in economics and international relations), since these approaches were not well developed enough Vietnam. The respondents appreciated also that they did not have to spend much time in the classrooms, comparing to Vietnam where classes were usually held everyday (Monday-Saturday) from 7AM to 11.30 AM and from 1PM to 5 PM. Instead, they could spend more time studying in the libraries which were considered as an *inspiring and encouraging learning environment* [PhD_Geogr].

Library Experience. The majority of respondents appreciated a diversity of academic and other libraries in Warsaw as well as their developed infrastructure. Libraries in Warsaw offered a comfortable study space for silent learning (appreciated by ten respondents) and a wide choice of electronic resources with access to international publications. That is why respondents frequently visited them; this was not the case during their studies in Vietnam, where poor infrastructure, small, out-of-date collections and no access to databases were the reasons to not use the libraries. Apart from the issues mentioned earlier, probably the lack of IL education and the fact that one textbook was enough for each course additionally caused minimal library usage.

Even though Polish libraries have made much effort recently to adapt services and collections to international users' needs, my respondents defined areas that still require improvements. They pointed out library staff who do not always speak English well enough to communicate with non-English native users. Also, there is still not enough information in clear, simple English, particularly on the OPAC. The third issue is connected with too few publications in English. This problem should be explored deeper. In fact, the number of English prints in Polish libraries is small compared to Polish language publications. However, there are thousands of journals and e-books available, especially in academic libraries.

This low awareness of journals and e-books was strictly linked to the students' ways of access to information and it proves that respondents have a predominant habit of searching for printed publications due to the lack of e-resources at their Vietnamese universities.

Many did not know that the majority of English publications provided by the library are in electronic format.

Ways of Access to Information. Google is a starting information search point for the majority of students worldwide. This is a well-known fact, broadly discussed, and also confirmed in my previous studies on information behavior among PhD students in France and Poland [16]. Even the best IL education seems to be not powerful enough to change this habit. Still, it is important to show students which of Google-provided results are valuable, how to access them, and how to cite them to avoid plagiarism. In Vietnam, only a few academic libraries offer access to internationally recognized databases (like Ebsco or ProQuest), IL is not well developed, although much has being

done recently. Hence, almost a whole search and retrieval process of electronic resources starts and ends with Google. Since all but one of the students pursued their early programs of study, particulary on the BA level, in Vietnamese, they had low needs for using English language resources. Coming for studies to Europe and being enrolled in English programs, they needed to focus more on peer-reviewed and valuable information resources for the purpose of their final assessments, essays, and MA/Ph.D. theses. They were not aware of databases subscribed by the university, so they continued to search mostly in the library OPAC and in Google. They did not know that they were able to download fulltext documents through being connected to databases via an IP address. Only two respondents were offered training in searching for information. Three said their classmates helped them. Eight admitted that their teachers (of MA programs) or supervisors (in case of PhD students) recommended tools and databases to them. Still, all of that assistance was rather random since a majority of their teachers, in my respondents' opinion, were sure that at the MA or PhD level the students knew everything about information resources and proper referencing. For Vietnamese students this can be a struggle since plagiarism issues were not concerned crucial in their home universities.

English language is one more important factor that should not be omitted while discussing information problems encountered by Vietnamese students in Poland and in other non-English speaking countries, in general. For the students it is a foreign language in their communication with teachers, librarians, and university administration staff. There are non-native English speakers at both sides of the correspondence what makes it more difficult. For Vietnamese respondents, English language was the main barrier they had to face when they came to study in Poland. Ten of them said that their English proficiency was not sufficient enough to follow academic courses and actively take part in discussion. This was the second factor, after "losing face", that was slowing down their classroom activity. Besides, it took them some time to get used to the accent of Polish teachers who, in turn, were not always so eager to get used to the Vietnamese accent and pronunciation. Indeed, Vietnamese have difficulties in pronouncing some consonant sounds as /δ/,/θ/, or /z/as well as some initial consonant clusters such as sp-, dr-, br-, fr-, pl-, or str-; they also often drop of final consonant sounds [4].

Academic writing in English was a source of many struggles. This applied not only to the scholarly language itself, but also to avoiding plagiarism and applying critical arguments, mentioned as challenges by MA respondents, as well as paper/thesis structure, mentioned as challenges for Ph.D. students.

4 Conclusion

This study contributed to better understanding of Asian students' information behavior and their expectations towards academic libraries in the light of cultural differences. It also helped establish IL education tailored for this group of users. I believe that the application of the IL concepts and tools, theories of information studies, and cross-cultural psychology as well as research methods in LIS and in the wider social sciences

may lead academic libraries to the establishment of a successful program of support for Asian students. Such a program would not only assist them in their study adventures at European universities but would also extend to a life-long learning process after completion of their university education.

This study provided a holistic picture of Vietnamese students' information-related activities with regard to cultural background and emphasis on cultural differences. Universities cannot assume that MA or Ph.D. students have developed the necessary information skills. Asian students should not be compared to their European peers and they should be offered an extensive IL education that will address their needs. In order to become familiarized with those needs and to prepare a tailored IL course, educators (both academic teachers and librarians) should be more culturally aware and need to be able to define what Hall [19] named cultural unconscious and understand out-of-awareness cultural processes. They need to learn more about the students' cultural background and learn more about the processes of students' analysis. This will allow them to avoid prejudices and cultural misunderstandings. It will also help to empower incoming Asian students with the IL skills that will help them feel self-confident in searching for reliable, evaluated information. They may better understand how the cultural differences are produced so they can deal better with the classroom behaviors of teachers and peers, the discussed topics, and ameliorate their communication skills [1]. Besides, it will be also a specific long-term publicity stunt. After completing their education abroad, these students will return to their country as alumni of our university. Thus, they will be the particular kind of "ambassadors", able to give a direct recommendation to their compatriots who consider going to study abroad. If they experience education in a friendly, stimulating university that assisted them in developing information competences and gave them internationally-recognized qualifications, they will recommend it to others.

This study focused on Vietnamese students in Poland, however it may find application both for other groups of students representing Sinic civilization[1] and for other European countries.

Although Southeastern Asian countries differ in history, political systems, ethnic groups, or dominating religions, the core social and educational values, influenced by Confucianism are similar, so the attitudes and information behaviour of students coming from that part of the world may be comparable.

Also Poland, being a European Union member country where English is not an official language[2], but the first most spoken foreign one and a member of European Higher Education Area, can be compared to other European states in the terms of higher education programs and research requirements.

[1] I use here the term Sinic civilization, following the definition used in [20, p. 3]: "The Sinic civilization, or Confucian civilization, refers to the shared and related cultures of China and the Chinese communities in Southeast Asia, which includes China, Hong Kong, Taiwan, Singapore, Korea, and Vietnam. It also includes the Chinese diaspora, especially in relation to Southeast Asia".

[2] In fact after Brexit, English remains an official language in Ireland and Malta only.

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Information Literacy of Masaryk University Students and Evaluation of Campus-Wide Course

Pavla Kovářová(✉)

Masaryk University, Brno, Czech Republic
kovarova@phil.muni.cz

Abstract. Improvement students' information literacy should be an integral part of their university education. Online courses are used to educate hundreds of students. This paper presents knowledge and skills assessment of Masaryk University students in information literacy and its improvement after their completion of an online Course of work on information. We found improvement in both self-assessment and objective assessment in different media and information literacy competencies (access, evaluation, and creation of information). Results show topics that should be highlighted in the course because of weak results in pretests (library services, narrowing of a topic, self-presentation, and visualization). The correlation between self-assessment and objective assessment was found in eight of the twelve thematic areas. All topics had statistically important improvements of results. The smallest differences showed parts of the e-course that can be focused in order to improve the course including search query, search engines, suitability of the information resource, and social networks.

Keywords: Czech republic · Information literacy · Online course · Research · Tertiary education

1 Introduction

Information literacy helps students in their academic and personal lives. Its improvement is realized by the creation of professional texts based on feedback during their studies [1]. To create a good professional text, students must be able to get appropriate information from high-quality resources, assess and process this information and finally create their own text. Competencies in all these three components should be included in information literacy courses [2]. Within all components we should consider the role of authority, the process of creation, the value of information, the inquiry in research, the conversation in academic participation, and the strategic exploration by searching [3]. Both these standards highlight work with information in the electronic environment although information technology is only a tool to work with information, not the core of this work. They also illustrate different educational styles such as the connectivist paradigm.

The goal of this paper is to present results of the knowledge and skills assessment of students of Masaryk University in the Czech Republic. We used self-assessment and

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objective assessment to define both conscious and unconscious information needs to revise the content of the information literacy course. We can define the content of the course by a comparison of results of educational needs analysis and the desirable end state as defined by information literacy standards. We mainly based the standards on the Global Media and Information Literacy Assessment Framework [2] because we wanted to cover topics related to both professional and personal life. But we also considered the Framework for Information Literacy for Higher Education [3] to include an assessment of acquisition of specific academic tasks.

The assessment, as well as the course, were opened for all students of all grades and faculties at Masaryk University. We did not expect more than basic information literacy competencies of regular internet user. Therefore, the course could serve for students of all grades. The entire course was online (except the posttest in 2016) to reduce limiting the study to a specific time or place. We used problem-based learning and tried to avoid librarian jargon as much as possible. We focused on skills development in topics according to the student's choice. All students had to finish a task related to all of the twelve topics (see Sect. 3 of the paper). Tasks in all modules included a general assignment that each student applied to his or her topic. He or she created a professional text during one whole semester in partial steps through completion of weekly tasks. The student received five academic credits when he or she successfully completed the course. We used objective assessment after the graduation of the course, and we compared results before and after the course We also evaluated the form of the course by a questionnaire, but we are not reporting those results as a part of this paper.

2 Literature Review

Currently accepted information literacy standards [2, 3] (compared to the older ones) emphasize critical thinking and creating and sharing of new information. However, these topics are not in contradiction with older concepts; the difference is rather the extent that could also be seen in information literacy courses [4, 5]. Students often overestimate their ability to acquire information [6, 7] regardless of their gender or social status [8]. Students also evaluate their information and communication technology (ICT) competencies better than information retrieval competencies [9, 10]. The national-wide self-assessment in information literacy identified a lot of problems in competencies of Czech university students, especially in databases, information searching preferences, plagiarism, and referencing [11]. The level of their information literacy was influenced by factors: gender, study program, personal motivation, and whether they attended courses in information literacy.

A number of information literacy courses focus on work with information resources, particularly in resources searching and referencing [4, 12–14]. A bibliometric study mapping information literacy in 2000–2011 confirmed this emphasis on information retrieval as well as on the information technologies [15]. Less often, it is possible to find evidence through an information evaluation that students without training were often unable to assess the quality of information adequately [16]. Information literacy courses have a positive impact on working with academic information resources, namely using library resources, finding reliable resources, searching

(less Google), referencing, and increasing satisfaction with the research process [14]. Practical tasks found a positive impact of an information literacy course on information resources evaluation, and information searching by Google; on the contrary, students had the most problems with databases and large differences were found in search techniques and revision of the search query [12].

Students were aware of the importance of information literacy topics; they particularly emphasized the importance of referencing or citing sources). Therefore they recommended that making an information literacy course be compulsory during the first year at the university [12]. Information literacy education can be embedded in field curricula, long-term, or one-shot sessions. The longer the information literacy education is and the more it is connected with the real life of individual students, within their programs of study and as part of problem-based education the better the impact [2–5, 16]. Catalano [16] demonstrated a greater knowledge transfer in the situated learning against a traditional approach. The problem of one-shot courses lies in a short time to practice, which also limits the development of critical thinking [4].

E-learning leaves the time when study takes place and the topics under study to the student's choice, but the role of the tutor is important [17]. Study credits are also important for students [14]. On the contrary, there is a large number of students who choose not to complete the course. This occurred due to the absence of personal contact and the lack of motivation of students to participate when the course is not compulsory [18].

3 Methodology

The research had two related goals. The primary goal was to find out the level of information literacy of Masaryk University students. This level could be improved by the campus-wide information literacy course. Therefore, the second goal was to identify changes in the competencies of students after completing the semester-long online course by comparing the pretest and posttest results. Both results should be reflected in field curricula or the information literacy course to strengthen education in identified insufficient competencies.

Based on information literacy competencies we defined twelve topics, one for each module (for more about the content creation see Sect. 1 of the paper):

- Access: defining the topic, the Internet as a source of information, databases, information resources, and information retrieval;
- Evaluation: organization of information, evaluating resources and information, and effective reading; and,
- Creation: text creation, formal text processing, visualization, presentation and publishing, sharing, and collaboration.

By the recommendation, input and output competencies were identified [19] as well as self-assessment and objective assessment [4]. We found conscious and unconscious information needs (lack in knowledge and skills) and how they changed after the course by this combination of assessment methods. We used a Likert scale for each of the twelve topics in self-assessment. Pretest and posttests had similar forms of 24 questions where two questions were always focused on one of the twelve topics of the

course, but in each version of the test, the questions were applied on the different text. Questions covered different levels of Bloom's taxonomy. The pre-test answers for each question also offered the possibility of "I do not know." That was not offered in posttests.

Data were collected using an online questionnaire during the 2016 and 2017 autumn semesters in 2016 and 2017. Questions about input competencies were asked in the first two weeks of each semester while posttests after the studying time were administered from December to February. Questionnaires and tests were distributed to all students enrolled in the course at the time of data collection, and they were mandatory in order for students to complete the course. We received 1287 responses in the pretest and 602 responses in posttests from all nine faculties at Masaryk University.

4 Results

We had an unequal representation of respondent according to gender: (28.2% were men and 58.5% women; others chose not to answer this question. All faculties were represented in our research sample with a significant predominance of Faculty of Arts (57%). Other faculties had fewer than 7%, three faculties fewer than 1% (Faculty of Medicine, Faculty of Law and Faculty of Sport Studies). 61.2% of respondents attended bachelor grade; 15.5% had a follow-up master's degree; 2% had a five-year master's degree; and 1.8% had completed a doctoral degree.

Students self-assessments of their competencies in all three components were quite similar. The best self-assessment, the access component, was strongly influenced by the self-assessment of searching in databases. This topic resulted the worst results in self-assessment. A slightly better self-assessment was given to the creation of text, sharing and cooperation, and presentation and publishing. On the other side, searching on the Internet got the best self-assessment followed by defining a topic, formal processing of text and organization of information (see Fig. 1).

The correlation (Spearman's rho) between self-assessment and objective assessment before the course was found in eight of the twelve thematic areas. The four areas where correlation was not found was defining of a topic, information resources and retrieval, information organization, and information evaluation. Correlation significance at the 0.05 level was found in effective reading, formal processing of text, and sharing and cooperation. The variables that were significant at the 0.1 level were presentation and publishing, creation of text, searching on the Internet, formal text processing, and searching in databases, in ranked order from the weakest correlation.

Competencies of the students in different topics are the main part of the research. Average points in pretest showed topics that are the weakest in the general population of this research. Students are aware of some of these problems but not all. Nonetheless, the information literacy courses for students of the Masaryk University should cover all of the topics to improve their lack of a basic level in their information literacy. In considering the importance of the topic, the most common mistakes can be used to highlight good and bad solutions of addressing tasks in the topics. In the pretest, students had the most problem with library services, self-presentation, and visualization, while suitability of resources, social networks, and orientation in the document

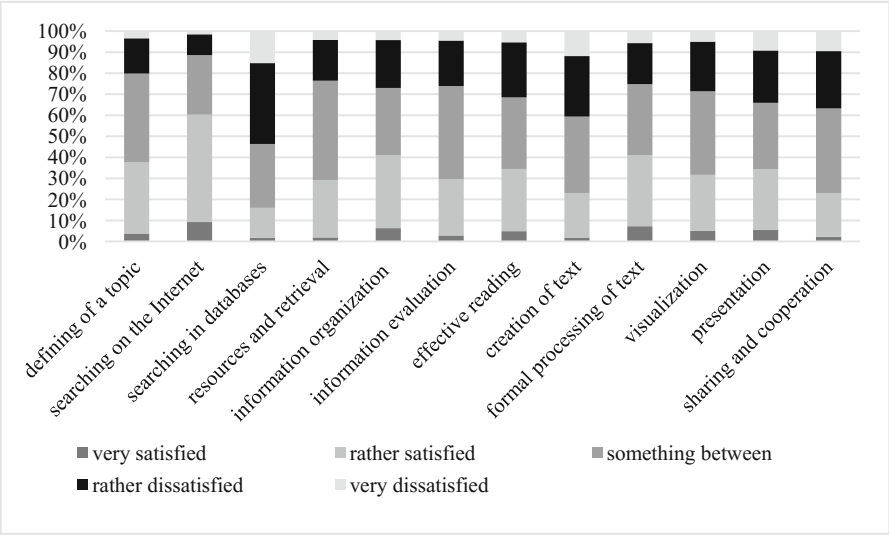

Fig. 1. Self-evaluation in the course topics

were the least problematic topics. Another important result was also the number of "I do not know" answers because that showed a conscious lack of competency. More than 40% of these types of answers were given to self-presentation, visualization, and search query. The average points in the posttest can warn the students about a topic that is still less known after graduating. After the course, the worst results had questions about the type of text, search query, form of text, and visualization. On the other hand, references, data storage and backup, resource evaluation, and orientation in a document had the best results. But the difference between average points in the posttest and pretest, illustrating changes in competencies, is the most important assessment for the course evaluation. Therefore, this value was chosen as a key to the topics ranking in Table 1.

We found improvement in posttest scores compared to pretest in all basic values of the variables (see Table 2). 8.9% of students gained zero points in the pretest, and no student got more than 20 points. Only 8.4% of students got twelve or fewer points (half from the maximum) in the posttest. We can see also less variable results in the posttest compared to pretest; the statistical deviation is smaller by more than a quarter.

We found also statistically important differences between the means of the pretest score and the posttest score ($t = -43.755$, $df = 549$, $p < 0.000$). Statistical difference was also found in pretest results between students who met only the pretest and who also met the posttest ($t = 2.492$, $df = 1103$, $p = 0.013$), where the group that only completed the pretest had a higher mean in the pretest. Men had a statistically better result in pretest than women but women had statistically better improvements in test points (in both cases t-test with $p < 0.05$). We found statistically different results according to faculties in the pretest: the best result was in the Faculty of Medicine while the worst was among the Faculty of Sport Studies. Faculty also differed in terms of the

Table 1. Points gained by students in different topics of tests (ranked by the difference in average points in posttests and pretests).

	Difference (output - input avg. points)	Pretest			Posttest
		Avg. point	The most common mistake	Percent "do not know"	Avg. point
Sharing	0.64	0.19	Sharing presentation by LinkedIn	27.5	0.83
Terms and services	0.57	0.27	Footnotes in Google documents	32.3	0.84
Library services	0.56	0.13	Articles in periodicals in the library catalogue	5.7	0.69
Self-presentation	0.54	0.14	Rights in creative commons	49.5	0.68
Access to full text	0.47	0.29	Technologies of distance access to databases	31.8	0.76
Narrowing the topic	0.47	0.19	Using synonyms (not narrower terms)	3.8	0.66
Databases	0.42	0.28	Choosing databases with full texts	20.8	0.70
Evaluation of resources	0.38	0.47	Websites as resource for professional text	17.5	0.85
Effective reading	0.38	0.46	Notes in active reading	15	0.83
Visualization	0.38	0.17	Using a retrieved graph in infographics	48.3	0.54
Graphs	0.34	0.34	Appropriate type of graph (change in time)	11.4	0.68
Referencing	0.34	0.55	Form of references of different types of resources	7.9	0.89
Backing-up	0.33	0.55	Functions of online services (back-up, mind maps etc.)	31.2	0.88
Tagging of information	0.33	0.33	Types of metadata and structures	13.9	0.66
Argumentation	0.28	0.29	Subjective opinion, generally accepted call	7.4	0.57
Form of text	0.27	0.27	Grammar in Czech	21.4	0.54
Orientation in document	0.27	0.57	Role of annotation in the document	24.1	0.85
Keywords	0.27	0.46	Keywords only to minorities of the text	0	0.73
Quotations	0.26	0.47	Different form of quotations and paraphrases	12	0.73
Social networks	0.17	0.63	Specialization of different social networks	12	0.81

(*continued*)

Table 1. (*continued*)

	Difference (output - input avg. points)	Pretest			Posttest
		Avg. point	The most common mistake	Percent "do not know"	Avg. point
Type of text	0.17	0.22	Goal of the abstract in the text	12.4	0.40
Search engines	0.15	0.50	Specialization of Google Scholar	16.6	0.65
Search query	0.09	0.33	Boolean operators (choosing of within and or)	40.9	0.42
Suitability of resource	0.07	0.73	Reviewed article as inappropriate	2.7	0.80

Table 2. Descriptive statistics for pretest and posttest scores.

		Pretest score	Posttest score
N	Valid	1287	550
	Missing	0	737
Mean		8.82	16.8564
Median		9.00	17.0000
Mode		10	17.00
Std. deviation		4.216	3.08816
Skewness		−.390	−.549
Std. error of skewness		.068	.104
Kurtosis		−.105	1.013
Std. error of kurtosis		.136	.208
Minimum		0	3.00
Maximum		20	24.00

change in test points (posttest minus pretest, $p < 0.05$. Here, the Faculty of Science had the best result got Faculty of Science and the Faculty of Medicine had the worst. We found a correlation between the pretest score and both the study grade (the higher grade, the better result) and the mark of the subject (the better mark, the better the pretest score). This was significant at the 0.01 level. There was no correlation between these variables and the change in test points.

The paired t-test showed a statistically significant improvement ($p < 0.000$) in all tested competencies (topics). We found statistically better results for men in 14 questions in the pretest; women were better only in quoting. Master students were better than bachelors in 11 questions; bachelors were better only in library services and argumentation. In posttest, we found differences only in 7 questions where men were better in three of them (search engines, search query, and argumentation) and women in four (library services, evaluation of information resources, type of text, and quoting). Masters students were still better in 11 questions (some different than in the pretest); bachelors were better in the evaluation of information resources and graphs.

5 Discussion

Students self-assessed their competencies in different topics mostly in the middle part of the Likert scale. We can see the worse result was in databases compared to all other topics. This result can be influenced by experience with databases often limited only with academic work and not in all study programs. This result is in-line with previous research [11, 12] as well as the best self-assessment in searching on the Internet [6–8]. Compared to other publications [9, 10] we did not find significantly better self-assessment in ICT competencies compared to information retrieval competencies – not only databases but also presentation, publishing, sharing, and cooperation (often using online services) received bad self-assessment. These competencies are parts of component "creation" according to media and information literacy. That confirmed the necessity to emphasize also those topics that have previously been given little attention [4, 12–15].

Students entered the course with different levels of competencies in information literacy. Students were oriented quite well in some topics (social networks or parameters of a resource appropriate to the scholarly text), but in others, their skills did not score well in the pretest (library services, self-presentation, and visualization). We identified weak topics and also common mistakes that can be used to improve the study materials not only in our course but in other courses. Our results showed that, although we can hear about Google generation, digital natives, and similar concepts, students still lack knowledge and skills in information literacy in the context of the electronic environment. It is still also essential to address the traditional topics that students still perceive as necessary, such as information retrieval or library services [12, 14, 16]. Students are aware of their limited knowledge in some topics, such as self-presentation or Boolean operators. Many students also chose the incorrect answer in library services, where only 5.7% of students were aware of their knowledge lack and chose the answer "I do not know". This topic got the third-best improvement in average points, which means that students should realize that libraries offer different services than they thought. Our results were similar to those of Landová et al. [11]: we found differences in information literacy according to gender and faculty in pretest but there were no differences in competencies improvement according to these variables.

Even in the final test, students particularly dealt with questions about search query (Boolean operators) that corresponds to research results [12]. Other problems were found in the formal part of creation (grammar, type of text, and visualization). These are broad topics. That should be improved more through face-to-face courses, for example, in blended learning). While topics that had good results in posstest included processing of information as well as in other research [14], in our research, these topics got only an average change and not the highest change in competencies.

The evaluation of the course presented in this paper was based on the changes in competencies in different topics. We found statistically important improvement between pretest and posttest scores as well as in all defined topics. We should consider the possible impact of the difference between the group that met only the pretest and the group enabling t-test because students met both pretest and posttest. We found a statistically significant difference in scores of these groups but to the detriment of the

group included into the t-test. Therefore, the change is not influenced by omitting weaker students in the posttest. The course can be evaluated as effective with a positive impact on information literacy of students of various programs and degrees. Although we can discuss the suitability of online course and chosen approach corresponding more old-fashioned approach to teaching information literacy, we perceive this course mostly as the basic level of information literacy education at the Masaryk University substituting the lack of competencies gained at secondary schools. Small courses more focusing on individual students and focusing on approach corresponding Framework for Information Literacy for Higher Education [3] should follow up.

6 Conclusion

This paper has two interconnected goals based on the research analyzing input and output knowledge and skills of students of an information literacy Course at Masaryk University. The primary goal was based on input competencies because they describe the level of strong and weak topics in information literacy regardless of any course. We found problems in both digital and information literacy and in all components of media and information literacy. That shows the necessity to cover information literacy in courses in all subtopics because students still need to help in all of them (although in different strengths). We also found differences in competencies according to gender, faculty, and study grade. We highlighted topics that should be in the core of interest of information literacy education because of the lack in competencies.

But impulse for providing content not only through online information literacy courses can also be seen in topics where the best improvement were seen in our course. Some topics that did not see very strong improvement can be better studied in face-to-face courses (for example, visualization). We found statistically important improvement in all topics covered in tests and in the course. Therefore, we can evaluate this course as effective with a positive impact on students' competencies.

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Information Literacy Instruction

Gaming for Multiliteracies: Video Games in a Case Study with Primary School Students to Enhance Information, Visual and Media Literacies

Eduardo Cruz-Palacios(✉)
and Miguel Ángel Marzal García-Quismondo

Department of Librarianship and Information Science,
Universidad Carlos III de Madrid, Getafe, Spain
eduardocruzpalacios@gmail.com, mmarzal@bib.uc3m.es

Abstract. Objectives: The aims of this study were to evaluate the effectiveness of video games when learning multiliteracies competences, study how to use video games on educational contexts, carry through a program with primary school students, and draw recommendations to design similar projects. Methodology: The 21st century competence-based education and pedagogical potential of video games are analyzed from a multiliteracies perspective. A program aimed at primary school students for the learning of information, media and visual literacies competences was designed. Video games were used as digital objects, context, environment and media. Learning outcomes were measured by analyzing the tests and activities undertaken. Outcomes: Video games are effective didactic materials in increasing student motivation to learn, understand complex ideas, and engage in projects. This program has helped students develop their information, media, and visual literacies. Recommendations to design and develop similar projects are given in terms of organizing pedagogical activities, suggesting the use of blogs and wikis, and managing digital repositories destined to learning objects in which video games are considered didactic materials.

Keywords: Multiliteracies · Competence education · Information literacy · Visual literacy · Media literacy · Gaming · Video games

1 Introduction

Sociocultural changes that have occurred last decades due to the use of digital technology in communication have caused many literacy models to have emerged. They differ in their approach, employing varying media, cognitive processes, methodology, pedagogical goals, and so forth. Multiliteracies focuses on multimodal and multilingual globalization [1].

To achieve multi-literate people in democratic systems, education must change. Learning must now be related with competences that group technical skills, knowledge, and methodologies to solve problems in the knowledge society.

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Video games are used more and more in education. Its ludic quality is effective in motivating learners. However, they can turn into a double-edged weapon if not used correctly. Therefore, it is necessary to know how to use them in ways that take advantage of their pedagogical potential.

In this case study conducted in the context of a doctoral thesis and the research project, VOREMETUR, video games were used to help twelve-year-old students improve their information, media and visual literacies competences.

2 Multiliteracies and Education

Multiliteracies involves: (a) making meaning of media where information is encoded and transmitted through information communication technologies (ICT); (b) evaluation of information, media, and contexts; (c) a vast, diverse amount of information sources; (d) social networks and collaboration; (e) digital identity; and (f) democratic systems characterized by participation and the values of justice, solidarity, freedom, equality and respect.

Information, communication, and image competences are especially important in the knowledge society [2], which requires that education focuses on citizenship. People must have skills to search and retrieve information with various, varied technologies (printed, audiovisual or digital); have cognitive capabilities to transform information into knowledge by critically analyzing, contrasting, reconstructing, and using it to solve problems; be able to express themselves and disseminate information in different communication contexts by using multiple media; and have criteria and values for the ethical and democratic use of information and knowledge [3].

Classrooms are immersed in a digital transformation led by ICT. Barriers of space and time are eliminated and knowledge is created collectively owing to educational networks: (a) those whose nodes are the schools that work collaboratively to develop projects, share knowledge, and manage resources; (b) virtual learning communities that promote diversity, interculturality, and social inclusion; (c) and those of personal learning environments that allow learners to share and manage knowledge as well as solving problems collaboratively.

The development of teaching materials has evolved through the use of ICT starting with the use of audiovisuals to illustrate lessons. PCs were used to learn how to use software and search for information related to subjects of interest. Printed material is being replaced by digital resources and learning objects. Copyright licenses facilitate access, reading, editing, and dissemination of digital content.

The teacher must guide the educational process, by designing learning, being a curator of knowledge, and accompanying the student cognitively and affectively. The student must play the key role and be in charge of his/her own learning [4].

Learning, according to Connectivism, involves: (a) diversity of opinions; (b) connection of nodes and information sources; (c) the ability to know is more important than the known; (d) interaction; (e) relations between disciplines, ideas and concepts; and (f) adequate and up-to-date knowledge as the intention of learning activities. Decision-making is itself a learning process [5].

3 Video Games and Learning

The relation between video games and learning must be explained by elucidating their pedagogical upsides and finding out how to use them in educational contexts.

The former involve interaction, motivation, cognitive and spatial skills training, immediate feedback, problem solving [6], and the improvement of the ability to manage resources, autonomy, and multidisciplinary learning [7]. Video games are related to the psychology of social learning [8] and their uses depend on their genres [9]. They can be used according to different theories of learning such as, behaviorism, cognitivism, constructivism, and sociocultural perspective [10]. Their pedagogical potential stems from the game experience, which is active, experimental, situational, and based on solving problems and providing immediate feedback [11]. In fact, there are many principles of learning in video games [12].

In using video games in education, the educator must first define the learning objectives, followed by the pedagogical activities with video games. Use of video games must be guided by the teacher. Although their use is recommended in certain subject areas, it is not necessary that video games content correspond to the specific curricular area of study, since they can be used to develop skills instead of acquiring knowledge. In fact, video games allow working in a multidisciplinary and cooperative way, fostering research, decision making, teamwork, and assumption of responsibilities. However, all video games are not suitable for any learning objective or sociocultural context. In addition, owing to its playfulness, students may find it difficult to relate fun with learning, so it is of the utmost importance to explain to them why they must play [13]. Some ways of how video games can be used in education are: (a) as context; (b) to develop competences; (c) to increase motivation and commitment; (d) to teach content; (e) to evaluate learning; and f) to make students serve as game designers and developers [14].

Good practices can be found in the "Gamepaddle" project [15], where students modeled a digital city, taught adults the relationship between video games and 21st century culture, designed a card game about video games, and reflected on urban environment and citizenship. Another excellent example is the report carried out by the Interactive Software Federation of Europe and European Schoolnet regarding educational projects. There, video games were used for media literacy, the improvement of behavior and attitude, designing real projects based on game experience, socialization and bullying, the promotion of teamwork and collaboration, and the learning of both knowledge and competences [16].

4 Design and Development of the Program

4.1 Context

This case study describes was carried out at Miguel Hernández public school in Fuenlabrada (Madrid, Spain) [17] with a group of 24 twelve-years-old students. All sessions took place in the computer room that housed 25 PCs for students, another one for teachers, a projector and a screen.

4.2 Competences Frameworks

Competences frameworks have been used to determine learning objectives and design adequate pedagogical activities for twelve-years-old children.

I based the competences for our program on the The European Union Digital Competence Framework for Citizens. These competences included [18]: 1.1. Browsing, searching and filtering data, information, and digital content; 1.2. Evaluating data, information, and digital content; 2.5. Netiquette; 2.6. Managing digital identity; 3.1. Developing digital content; 3.2. Integrating and re-elaborating digital content; 3.3. Copyright and licenses; 4.2. Protecting personal data and privacy; and 5.3. Creatively using digital technologies.

I assessed the adequacy of the pedagogical activities I designed with the help of the Wales education reform that has integrated digital competences into its curricula [19].

I used the ACRL visual literacy framework to determine what aspects of images are relevant: (a) nature and extent; (b) search; (c) meaning analysis; (d) sources evaluation; (e) use; (f) design; and (g) ethical, legal, social and economic issues [20].

4.3 Structure, Planning and Learning Aims

The program consisted of five modules that group seven didactic units. All units had one session, except the last one which had two. Each session lasted one hour and a half. Sessions took place in 2018 on February 19 and 26; March 5, 12, and 19; April 9, 16, and 23. The Modules and their Didactic Units are shown in Table 1.

Table 1. Modules and didactic units of the case study

Modules	Didactic units
1. Video games and culture	1. Video games and culture
2. Information literacy	2. Information search and retrieval
	3. Information sources
3. Web communication	4. Digital identity
	5. Creating knowledge collaboratively
4. Visual literacy	6. Image as information
5. Presentation with digital technology	7. Presentation with digital technology

The first didactic unit objective was to become aware of the cultural value of video games in the 21st century.

The second didactic unit objective was learning why and how to use the following information search and retrieval systems: advanced Google search; a Spanish digital reference service [21]; and the OPAC of Fuenlabrada libraries [22].

The third didactic unit objective was learning relevant criteria to determine whether information sources are reliable and useful to meet information needs.

The fourth didactic unit objective was learning aspects of visual and social behavior on the web that influence digital identity.

The fifth didactic unit learning objectives was practicing teamwork while learning how to create knowledge collaboratively on a web site. The following skills were involved: communication, planning, decision making, information search and retrieval, design, sharing of responsibilities, and creation of digital content.

The sixth didactic unit objective was learning the following aspects of visual materials and images: nature and extent, search, meaning analysis, sources evaluation, effective use, design, ethical, legal, and socioeconomic issues.

The seventh didactic unit objective was learning how to prepare a presentation with digital technology.

4.4 Gaming

According to what was presented in the 5th International Congress of Video Games and Education [23], gaming is the use of video games as didactic materials, hence, for pedagogical purposes. Learning processes must not be guided by game experience.

First, learning objectives were. After that, pedagogical activities were designed to lead the students to the intended learning. In essence, video games have been used as (a) digital objects to be searched and retrieved; (b) a context about which communication on social web must be analyzed, to create knowledge by designing and development web sites collaboratively, and to prepare a presentation with digital technology; (c) an environment where digital identity is built up within video games and on the networks that allow gamers to manage their profile and personal data; and (d) rules-based systems and media in which game experience is an information source.

Video games provided by the teacher were Plants VS. Zombies [24], The Simpsons Hit & Run [25], and Zoo Tycoon 2 [26]. A Thyssen-Bornemisza Museum's video game [27] was also used.

4.5 Pedagogical Activities

All didactic materials and explanation of pedagogical activities undertaken are available on a web site in Spanish language [28].

First didactic unit pedagogical activities included: (a) asking students to complete a test regarding one's habits of using libraries, how to search on the Internet, and use of social networking sites and visual materials; (b) providing students with demographic data and graphics about the use of video games; (c) students talking and discussing their habits of playing video games and those of relatives; and (d) students playing the video games offered by the teacher [24–26] while analyzing their objectives, history, and aesthetics.

Second didactic unit pedagogical activities were: (a) a unit on 'learn to use': advanced Google search, a Spanish digital reference service [21], and the OPAC of Fuenlabrada libraries [22]; and (b) use these systems to search for video games available on libraries' collections and for information related to them.

Third didactic unit pedagogical activities were: (a) to be told the concept of information source and aspects to determine whether a web page is reliable and relevant for one's information needs; (b) complete an exercise that consisted of relating

different web sites regarding video games to a type of information source (digital newspaper, e-commerce, wiki, library catalog, online encyclopedia, and social networking site); and (c) play a video game offered by the teacher and design a web site.

Fourth didactic unit pedagogical activities were: (a) to be told about the concepts and characteristics of digital identity; (b) talk and discuss the relationship between video games and identity: to be the main character in a story by choose among a range of characters according to one's personality, creating a character based on oneself, and using an avatar to identify oneself on the digital platforms that are needed to play online; and (c) complete an exercise that consisted of analyzing and describing how, on a social networking site, visual information and social behavior affect people's digital identity.

The fifth didactic unit pedagogical activity was to carry out a project to create a web site about one of the video games offered by the teacher. The activity was guided by the teacher and consisted of the following steps:

- assemble groups of 4 or 5 students;
- choose a video game per group;
- assign each student to the role of an information researcher or a web designer where information researchers searched for the needed content on the Internet while web designers built the structure of the web site on a free blogging platform;
- decide the contents of the web site;
- ask all the members of each group to take the information retrieved and place it on the website.

Sixth didactic unit pedagogical activities were: (a) to be told the importance of analyzing visual elements on web sites in terms of navigation, information retrieval and copyright; (b) analyze the web site of a museum [29]; and (c) play a video game created by that museum [27]. The objective of that video game was to solve clues to find paintings in the museum. Students used both the video game and the digital collections of the museum to search and retrieve information regarding the paintings of the video game, create a digital document in which all the information retrieved is organized, and send it to the instructor by email.

In the first session of the seventh didactic unit the pedagogical activities were: (a) to be told what aspects are relevant in a public presentation with digital technology in terms of what to tell, organization of content, visual material, verbal and non-verbal communication, and necessary digital technology; (b) to be told the types of gamers and their characteristics; (c) work in groups of 4 or 5 students to prepare a presentation with digital technology about a type of gamer; and (d) do a rehearsal of the presentation.

The pedagogical activities in the second session of the seventh didactic unit were: (a) conduct a rehearsal of the presentation prepared in the last didactic session; (b) deliver the presentation in front of classmates; (c) receive feedback from classmates and the teacher in terms of successful features of the presentation as well as and what needed to improve; (d) complete a test about students' habits of playing video games and eagerness to be involved in education projects with them; and (e) measure improvement in information, visual, and media literacies competences.

4.6 Outcomes

Outcomes stem from the teaching of methods and tools, discussion of topics, exercises, tests, and projects. The program was scalable, as exercises were based on the competences acquired and modular, as there were blocks aimed at achieving specific didactic objectives. Due to the nature of this case study, outcomes are presented qualitatively and quantitatively. Finally, I offer a selection of the most remarkable findings that resulted from activities undertaken and according to learning aims.

The first session test consisted of 8 questions: 2 closed, 4 open, and 2 with true and false statements. No student knew what an OPAC is. When asked about criteria to determine the suitability of information sources, 50% of students mentioned the importance of contrasting information sources. As for behavior on social networking sites, 96% knew they should not accept friendship invitations from unknown people, 83% knew they should not publish content or comments about things they would not do in real life, and 79% understood that what is done on social networking has consequences in real life. As for visual materials, 71% understood that they must ask to publish images when people appear on them. When asked about relevant aspects of images, 17% mentioned that relevance was tied to some aspect related to the nature and extent, 8% to the search, 13% to meaning analysis, 33% to sources evaluation, 0% to effective use, 4% to design, and 8% to ethical, legal, or socioeconomic issues.

The second session consisted of familiarizing the students with three information systems not known to them. All students did well with Google advanced search and the OPAC [23]. Seventy one percent managed to answer a question with the digital reference service [22].

In the third session, all the students managed to complete the exercise of associating types of information sources and design a layout about a video game web site on a sheet.

The fourth session exercise consisted of 10 questions: 4 open, 5 closed and 1 with true and false statements. Tasks involved searching for information on a social networking site and describing and demonstrating reasoning about digital identity. Students' responses were rated 'well-answered'; on average their responses were well-answered, or 8.27 out 10.

In fifth session project there were 6 groups of students. All groups successfully created the web site. However, one group did not manage to structure the pages created.

In sixth session exercise, all the students did well when searching and retrieving information. Although 9 pieces of information were asked, the average retrieved per student was 5.71.

The last session test about students' habits of playing video games consisted of 10 questions: 1 closed, 1 of associating, and 8 open. The results showed that 96% of students liked video games and 83% of them would like that video games were used in education. On average, they played 8 h and a half per week. The other test consisted of 20 questions: 6 multiple-choice, 6 of associating, 4 closed, 3 with true and false statements, and 1 of ordering. Questions were grouped according to literacies. As for information literacy, we looked at an OPAC functions, the utility of information search

and retrieve systems, information search strategies, and evaluation of information sources. The average percent of students answering the questions correctly was 80%, 66%, 83%, and 67%, respectively. As for media literacy, we looked at information organization on web sites, elements and their functions on a web site, and digital identity on social media. The average percent of students answering correctly was 74%, 63%, and 67%, respectively. As for visual literacy, we looked at visual materials as media to access to knowledge, sources of information about artworks, ethical use of images, and how to use effectively visual materials to create presentations with digital technology. The average percent of students answering right was 70%, 72%, 96%, and 79%, respectively.

Overall, findings suggest a significant improvement in information and visual literacy, especially in using advanced search and creating digital content with visual materials. Although students already knew the importance of safety on social media when sharing personal data, they become much more conscious regarding the impact of their behavior on digital identity. They also understood how to analyze and design web sites according their layout, functionality, and content.

4.7 Recommendations for Similar Projects

Students did not sometimes perceive the learning objectives when they are made to play. It happened when they had to analyze a video game and design a web site. To solve this, it is recommended that in certain activities the time to play be spent at home instead of in the classroom, as well as indicating what tasks learners must do and hand in. Nevertheless, there will be times when playing in class is necessary.

A more ambitious project could involve first, requiring students to create a blog in which they had to report the progress of a video game experience. The blog would assist them in developing their writing skills in a digital medium. They would also combine different information media (text, image, video, and hyperlinks), learn to organize information in a medium that is destined to grow continuously, and understand how to use copyright licenses to protect their intellectual property rights. In this way their visual and media literacies skills might improve. Second, a larger project might involve developing information management skills and creating knowledge collaboratively knowledge with virtual desktops and wikis. Such a project might create a virtual learning community within video games to make students learn to manage Digital Identity. And students might use digital collections of cultural institutions that have video games to improve information literacy competences.

To enable other students to enhance their information, media and visual literacies competences, it is recommended to manage an ad hoc digital repository of learning objects and learning objectives the description of pedagogical activities that must be undertaken, and a list of the necessary resources. If so, the inherent interoperability of digital repositories allows the saving of resources in terms of designing similar projects, preserving didactic material, and sharing of knowledge.

5 Conclusions

A knowledge society demands competences consists of technical skills, knowledge, and methodologies to solve problems in an environment characterized by a heterogeneity of information sources, different media (text, image, video, hyperlinks), digital identities to allow people express themselves and share knowledge, and democratic systems with interculturality, equality, respect for others, freedom, solidarity, ethics, and participation. These competences, studied by multiliteracies, must be inculcated into citizenship through education, which, hence, must be changed. Learning must be the connection and sharing of knowledge that allow the development of information, media, and visual literacies competences. Teaching must be the design of learning, by choosing adequate environments, pedagogical activities, and didactic materials to become students into their learning protagonist and teachers into their guide.

Video games have several pedagogical upsides: sensory, cognitive, motor, management and communication skills, literacy, cultural socialization, active and immersive experience, immediate feedback, engagement, motivation, development of identity and group affinity, collaboration and cooperation, expression and choice freedom, creativity, material intelligence, multimodality of information, exploration, curiosity, and responsibility. In every single learning process, it is especially important to know how to design pedagogical activities that lead students to achieve the intended learning. Video games should not determine learning but, instead, be a part of it, by choosing the appropriate ones for audience and learning objectives. In addition, video games' versality allows to design learning processes that transcends game experience. Gaming must be a didactic strategy, never an end itself.

In this case study, video games have been used as (a) digital objects to be searched and retrieved; (b) a context for enabling students to study which social web communication must be analyzed, create knowledge by designing and developing web sites collaboratively, prepare a presentation with digital technology; (c) an environment where digital identity is built; and (d) a medium whereby which game experience is an information source. Findings suggest students (a) demonstrated improvement in the searching and retrieval of information and evaluation of information sources competences; (b) gained knowledge and consciousness about digital identity; (c) acquired understanding of web sites structure and functionality; (d) learned relevant aspects of visual materials; (e) acquired skills in making presentations with digital technology. Educators' knowledge about how to use effectively video games in learning contexts has especially been useful to design and carry out this case study.

However, the learning resulting from this case study program does not enable students to cope with knowledge society problems, since information, media, and visual competences require a scalable learning integrated into the curricula. Isolated literacy programs fill gaps in small-scale contexts but to aspire to multiliterate citizenship, schools must integrate these competences in their didactic methodology transversally. To design and carry out those didactic methodologies, there will be needed a considerable number of didactic materials. Digital repositories for learning objects are of the utmost importance, since they allow the management, organization, interoperability, and use and digital preservation of didactic materials.

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Adapting the New ACRL Framework to IL Education at Tampere University of Technology

Miikka Sipilä[1], Mervi Miettinen[2(✉)], and Johanna Tevaniemi[2]

[1] University of Tampere, Tampere, Finland
miikka.sipila@uta.fi
[2] Tampere University of Technology, Tampere, Finland
{mervi.miettinen, johanna.tevaniemi}@tut.fi

Abstract. In 2016, the Tampere University of Technology (TUT) Library adopted the new ACRL Framework for Information Literacy for Higher Education to its information literacy education. ACRL encourages libraries to deploy the frames to best suit their own situation and needs and, accordingly, the TUT Library has adapted the frames to better suit the needs of its technical students and researchers. This paper will present the ways in which the TUT Library has adapted the Framework to teaching of information literacy, how partnership with teaching staff members was built through active collaboration, and the initial results of these changes as evaluated by both students and teaching staff.

Keywords: Information literacy · ACRL framework · New IL frames · Higher education · Academic libraries · Collaboration · Teaching

1 Introduction

Information literacy (IL) has been widely recognized as one of the most important skills in the future: systematic and high-quality teaching in IL promotes learning skills, increases student commitment to the university community, improves the quality of theses and supports the postgraduate studies, and/or employment of students. In 2016, TUT named IL as an important part of the university's strategy and education development programme, after which IL teaching became integrated into each degree programme. The integration involved updating teaching content. The TUT Library became the first Finnish library to upgrade its IL teaching content according to the ACRL (Association of College & Research Libraries) IL framework [1].

This article briefly introduces the concept of ILcy and the creation and implementation of new IL frameworks in teaching by the TUT Library. We will discuss the different phases of the process, with a special focus on the importance of cooperation between departments in planning new IL teaching. At the end of the article, we will present surveys on IL skills for students and teaching staff members, and their results.

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2 Information Literacy

2.1 IL Definition

Before the rise of social media and networks, library organizations in the U.S. and the UK had drawn up definitions of IL. These definitions were similar in many, but not all, respects. Different organizations have adapted these definitions during the years, as the ACRL definition from 2000 [2] included some of the elements of the American Library Association's definition from 1989 [3] such as the extent of information needed, the ability to find the information effectively and efficiently, incorporating new information with existing knowledge, and an understanding of the information environment [4].

ACRL's IL standards and new, updated frameworks are not extensively used in the UK although they are used in several other European countries [5], including Finland. At TUT library, the IL definition based on the ACRL standards was initially adopted, and as the new frames were introduced in 2015, adapting them into the curriculum was a natural process (more on this in Sect. 3.1). In 1999, the UK-based SCONUL (College of Societies, National and University Libraries) developed an IL model that comprises seven competence pillars that were also included in ACRL's definition in the following year. According to the SCONUL definition, an information literate person is able to "construct strategies for locating information" and has "the ability to synthesize and build upon existing information, contributing to the creation of the new knowledge" [6, p. 6].

In the SCONUL definition, IL is approached as a development process: a person can gradually develop from novice to expert in each of the seven pillars, that are based on IT and library user skills. These two abilities are not included in ACRL's definitions, but according to Mackey and Jacobson, they can be identified on the background of ACRL's standards, recommended indicators, and outputs [4]. The SCONUL model also addresses the development of literacy in each of the pillars. Only when the skills develop does the level of building upon existing information and creating new information increase. The IL goals of MSCHE (Middle States Commission on Higher Education) [7, p. 11–12] also emphasize the development of students' skills from the start of studies to postgraduate studies. Mackey and Jacobson also point out that in IL discussions, SCONUL makes a difference between learning skills and more advanced skills that prepare individuals for higher education activities and jobs. SCONUL has also developed and expanded on its definitions of the seven pillars recently [4].

2.2 The ACRL Framework for Information Literacy

ACRL's New IL Frames [1]

- Authority Is Constructed and Contextual
- Information Creation as a Process
- Information Has Value
- Research as Inquiry
- Scholarship as Conversation
- Searching as Strategic Exploration.

According to Carol Burgess, the development from the 2000 standards to the new IL frames is based on *Threshold Concepts and Transformational Learning* (2010) by Meyer and Land. In the work, the authors defined the theory of threshold concepts, in other words, concepts of learning experiences that open up new perspectives and turn our attention to things we had not noticed before. The new way of understanding, interpreting, or examining the information needed can make a person think and act differently [8].

According to Foasberg, ACRL originally introduced the new IL frames that would replace the standards. This was because the Information Literacy Standards Committee had requested adjusting and updating the standards extensively due to permanent changes in technology, academic communication, and the lifecycle of information. In 2014, the framework preparation working group presented several proposals that were released for comments and discussions [9]. In January 2016, the ACRL Board officially adopted the frames.

As Foasberg states, there is a risk that some libraries will try to use the frames as another standard, measuring expected general skills on the basis of them. Some scholars argue that the standards and frames can be analyzed and combined into a coherent whole. Foasberg notes that while it makes sense to adapt some of the current approaches to the frames, it is important to start by addressing the different philosophies behind the documents and their effects. This is important because the frames are not simply the same standards in a new package, but they offer a way of improving our procedures. Approaches to deploying the frameworks and improving existing pedagogy should be included on the basis of the philosophy behind each document [9].

2.3 Teaching IL in Finland

Finnish universities underwent major changes in the 1990s: information technology transformed the sector, particularly university libraries, and more attention was paid to learning processes and the competence of university graduates. The internet spread fast, and electronic publishing and international cooperation started to grow, which also required libraries to redefine the basis of their operations and their role [10].

Finnish university libraries had offered teaching in the use of libraries decades before these changes. As a result of the transformation of education, the teaching materials and facilities, computers, and IT services used by libraries received more attention. Electronic publishing, catalogues, and services became more common, and libraries started to teach information retrieval and searching skills. Sinikara and Järveläinen [10] point out that these new approaches had one important thing in common: they emphasized the library user's perspective rather than the library's. The new, holistic approach to learning opened up new opportunities to develop libraries and the libraries found their new role as teaching providers [10, 11].

The shift of the educational paradigm, the exponential growth of electronic scientific thinking, and the giant technological leaps were a challenge for university libraries, forcing them to reconsider their teaching concepts. It became clear that the traditional teaching libraries had provided before was not enough. As a response to the new challenges, Finnish university libraries thought that the ACRL IL standard [2] could be the solution. Interest towards SCONUL's definitions was also high in Finland, because SCONUL described the development of IL more clearly than ACRL's standards. However, the Finnish libraries considered ACRL's standards for higher education to be the best solution based on interlibrary cooperation, information sharing, and the setting of shared goals [10].

In the early 2000s, Finland implemented a national programme to develop IL teaching in all universities and universities of applied sciences. University libraries started adapting the goals of IL teaching together, the most important of which was to integrate IL teaching more firmly into university studies. The libraries also wanted to map out the key elements of IL, prepare an IL curriculum, and develop online teaching. In addition to this, university libraries established a collaborative network [12] and launched an interlibrary project [13]. In 2013, Finnish universities of applied sciences and FUN (Finnish University Libraries' Network) published their recommendations on IL for higher education [14].

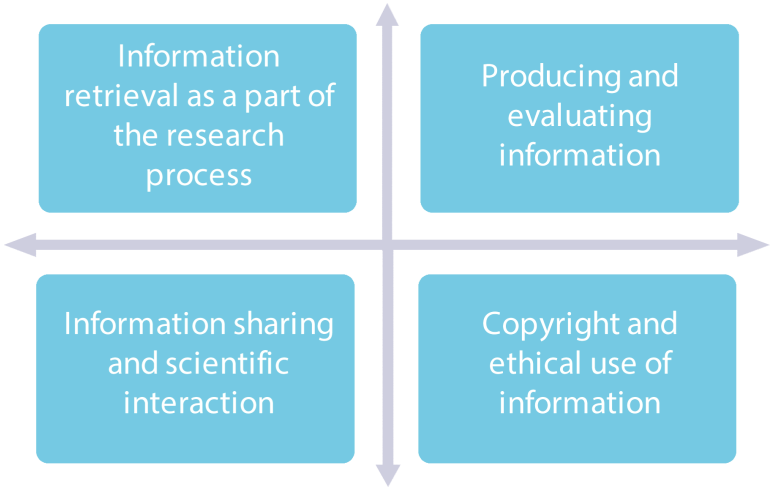
3 Teaching IL in TUT

3.1 Modified IL Frames in TUT Library

Like all Finnish university libraries, TUT Library has used the IL definition that is based on ACRL's IL standards from 2000 [2]. Since fall 2016, IL teaching in TUT has followed the new frames [1] published by ACRL in 2015. Although IL teaching in TUT emphasizes the ACRL definition, the most important skills affecting the IL competence of contemporary university students, as identified in the different definitions of IL, were taken into account in the planning.

The TUT Library embraced the new IL frameworks in 2015. In the introduction to the new frames, the authors wrote that "each library and its partners on campus will need to deploy these frames to best fit their own situation" [1]. As for example Zhang et al. [15] note, IL teaching requires customization and attention to detail in order to take the differences between technical disciplines into consideration. Thus, the TUT Library has also adapted and combined the new IL frames to make them fit teaching in the technical fields, taking into account the philosophy behind them (see for example [9]).

TUT's four IL frames are:



These frames follow the ACRL framework: the ACRL frames Searching as Strategic Exploration and Research as Inquiry have been combined to form a new frame titled *Information retrieval as a part of the research process* that encompasses information retrieval as an iterative process. The frames Information Creation is a Process and Authority is Contextual and Constructed have been substituted with a more general *Producing and evaluating information*, which focuses on the ways information is produced. *Information sharing and scientific interaction* is based on the Scholarship as Conversation –frame, and ACRL's Information Has Value is contained within the *Copyright and ethical use of information* –frame. The aim has been to simplify the ACRL frames and focus on the needs of technical students, which often require a very practical and "hands-on" approach to IL, which is stressed through the frame names.

At TUT library, the frames have been adapted into teaching through a careful process of identifying key ideas and concepts in each frame, and finding out how these ideas and concepts can be integrated into teaching. As with the original framework, the aim is to permanently change the way the students seek, use, produce, and evaluate information. Teaching methods vary from lectures to group work, independent study, and flipped learning. As per our experience, technical students tend to be very confident on their own competencies and therefore the teaching aims at encouraging students to test and try out through a learning-by-doing approach.

In order to gain a sufficient level of IL at university level, the student should master these four frames by the end of their studies. However, learning IL is not a linear process from one frame to another. Instead, the contents of each frame depend on the student's own level (new student, BSc, MSc, researcher). The contents of the frames are taught to students based on how their information needs evolve and change as their

studies progress. For example, under the frame "Producing and evaluating information", first-year students learn to recognize different information sources, BSc's learn to evaluate these sources, and MSc students and researchers learn how authorities are formed and how information should be questioned. Students can also return to concepts they have already learned about within each frame whenever they need to.

3.2 Reframing IL Teaching in the TUT Library

The TUT Library reformed its teaching of information retrieval skills in 2016. Before the reform, the teaching had been less comprehensive and systematic. No uniform teaching that would cover all students was provided for first-year students, and IL teaching was included only in some of the bachelor's degree programmes. In master's studies, IL was taught in one optional course, and its content partly overlapped the content of IL teaching in the bachelor's degree programmes. Furthermore, the library planned the teaching practically independently with little cooperation with departments.

As for example, Wakeman [16] has criticized the approach where IL teaching is perceived as the library's own teaching. Instead, it should be seen as an important and integrated part of the curriculum. In Wakeman's view, detaching IL teaching from the rest of the curriculum can easily lead to not recognizing the lifelong learning skills covered by IL. In this context, the integration of teaching by the TUT Library into all degree programmes must be seen as an important change in the importance of IL teaching throughout studies. Similarly, Saarti [17] points out that one-off teaching in IL is not enough at the university level, but instead IL teaching should be included in all stages of basic teaching. Furthermore, IL teaching should develop and become more advanced as the student's skills improve. Because the technical and scientific disciplines taught in TUT tend to develop fast and require the latest research, it is justified to integrate IL into other teaching discipline-specifically. Students graduating from TUT must be able to search for, use, and apply the latest scientific information from several sources.

In 2016, IL teaching was recognized as an important competence area also by the TUT management. Teaching in information retrieval skills became mandatory for all undergraduate students: first-year students, BSc seminar attendees, and master's students. The purpose of this was to secure equal access to high-quality IL teaching to all students. In their first year, students attend three hours of IL teaching (one-hour lecture and two hours of exercises), in bachelor's studies three hours (one-hour lecture and two hours of exercises), and in master's studies two hours of exercises. Course attendance is mandatory and substitute assignments can only be used in exceptional cases. All the teaching provided by the library was integrated into the existing courses of faculties, and the library stopped providing separate credit bearing courses. However, the TUT Library is still responsible for planning and implementing IL teaching, and the teaching is provided on the library's premises. In other words, the TUT Library has not adopted the "liaison librarian" model where a contact person from the library gives short presentations alongside other tuition.

In spring 2016, the educational information specialist from the TUT Library met teaching staff and academic officers from each teaching subject in order to identify the most suitable courses for IL teaching at each level. The planning emphasized the approach of Zhang et al. [15]: teaching by the library was integrated into the course content of degree programmes. An important selection criterion was that students had a clear need for information during the course, and the library's information retrieval teaching could help meet that need, ensuring that the students would be motivated. For example, the assignment for first-year students at the Faculty of Engineering Sciences was to design an amusement park ride, and during the library class, the relevance of standards and patents as information sources was included as a central theme.

The planning of the teaching involved the teaching staff of faculties, while the library was responsible for planning and organizing the teaching. Collaboration between the library and teaching subjects is critical for the success of the new model (see, for example, [18]). The important goal is to build a partnership through collaboration, and as Oakleaf et al. [19] point out, the important aspect of this process is that the library's information specialists are involved in the planning and implementation of teaching as active and equal partners with faculty staff. This new collaboration with teaching subjects enabled taking the differences between TUT disciplines into account in the planning of teaching content. The special materials (such as the printed archives used in architecture studies or the technical standard and patent databases) received more attention in teaching, that responded to discipline-specific needs better.

4 Results

4.1 Self-assessment by Students

Bachelor's students completed a survey as part of their IL studies in the school year 2016–2017. The survey contained questions on the usefulness, strengths, and weaknesses of the teaching, and the students' wishes for IL teaching. It also included a self-assessment section where students assessed their own IL skills before and after the teaching. One hundred and thirty students in different fields completed the survey.

The teaching received a lot of positive and encouraging feedback. The students' responses emphasized the usefulness of the teaching: many wondered why IL teaching was not provided in the first year. At the moment, IL teaching is offered in the first year, but these students were not aware of it. The most important benefits named by the students were the ability to locate field-specific information sources, form effective search terms, and use search techniques. In other words, the students themselves valued the TUT IL frame *Information retrieval as a part of the research process* as the most useful. As the students are in the process of writing their BSc. thesis, this is to be expected.

In particular, the students gave good feedback on the group exercise that reviewed the databases of the discipline in question. Several responses highlighted the importance of discipline-specific teaching. The students also wanted us to pay more attention to this, because there are notable differences between disciplines in, for example, the types of publications used. Taking the differences between disciplines into account is

one of the most important areas of development in the teaching of information retrieval skills, and the library staff and teaching staff members at faculties hold regular meetings to discuss this.

Feedback on the lecture was mixed. While some found the theoretical background useful, others did not consider the knowledge of scientific publishing procedures to be important at the bachelor's thesis phase. However, this has been identified as a key concept of the *Producing and evaluating information* frame of the TUT model, and as the teaching is further developed, will be subjected to revision in how the issue will be taught.

The students gave high grades to their information retrieval skills, particularly after the IL teaching. On a scale from 1 to 5, the students gave their skills an average grade of 3.0 before the teaching and 4.1 after the teaching. Before the teaching, 30 of the respondents felt like their IL skills were very or fairly poor, but none of the respondents assessed their skills as poor after the teaching. As many as 117 of the respondents assessed their skills as fairly or very good after the teaching, compared to 31 students before the teaching. However, it is wise to consider that self-assessment and its limitations. While ideally self-assessment increases the students' engagement with their learning, it has been claimed that not all students assess their learning on the same scale, and that differences for example in gender may cause variation in self-assessment [20]. Therefore, results gained through self-assessment should always be analyzed with caution.

4.2 Survey for Bachelor's Seminar Teachers and Thesis Supervisors

We also carried out a survey for bachelor's seminar teachers and thesis supervisors and received 12 responses (TUT offers a bachelor's seminar in 15 subjects). The survey was based on the adapted IL frames, and its aim was to find out how the teaching staff members assess the IL skills of the students completing their bachelor's theses. The teaching staff members were asked to evaluate their students on a 3-level frame, ranging the students' skills from bad to very good. Based on the results, the students' skills differed somewhat from the level suggested by their self-assessment.

Overall, the teaching staff members and supervisors evaluated the students' skills as ok or very good on the several areas of the IL frames. In the **Information production and evaluation** frame, over 90% used at least some good, reliable sources, and similarly, in the **Information sharing and scientific interaction** frame, over 90% could discuss their topic and related literature. However, over 20% of the students could not identify scholarship as a conversation and identify different views on their topic, and 15% could not bring out relevant themes and views into their discussion as expected by the frame **Information retrieval as a part of the research process.** Finally, in the **Copyright and the ethical use of information** frame, only 1.7% of students were unable to use references and mark citations correctly.

While the results of the teacher survey are very encouraging, the teaching staff members did not share the same level of confidence as the students did: the teachers were more cautious in assigning "very good" skills whereas the students themselves were clearly more optimistics about their competence in IL, seeing their skills as very good after attending the IL teaching.

5 Discussion

The TUT Library is deeply invested in IL teaching. The first results reveal that the experiences with the teaching have been clearly positive. The content of the teaching has been adapted to the technical fields, and collaboration with the teaching staff from faculties has been particularly helpful in modifying the content for the different disciplines. Furthermore, collaboration with faculties has increased awareness of the library's activities and highlighted the library's role as an equal partner in the planning of teaching.

The results of the surveys for bachelor's students and teachers reveal that while students find the teaching useful, their teachers and the information specialists at the library still find deficiencies in their information retrieval skills. The results support the hypothesis that students assess their information retrieval skills higher than they actually are and struggle to understand information retrieval skills fully (see, for example, [19]). In the students' view, information retrieval skills only comprise finding the information, and they lack a more comprehensive understanding of how to evaluate and use information. This was evident in the students' responses that concerned practically only the use of databases. Other more extensive themes related to teaching, such as source criticism and using information, were not discussed in the responses.

The information retrieval skills of young students is reflected by the fact that they know how to use the equipment and search for the information, but they have problems assessing the relevance and reliability of the sources. For example, when we have stressed that Wikipedia articles are not a usable source on theses, the students have turned to other sources that are as quick and easy to find. In other words, students are not using only scientific sources, but they might also use white papers that advertise the technical superiority of a particular company's products, referring to these as proven facts in their theses.

Based on our experiences, students in technical fields, in particular, use mainly electronic sources, often neglecting printed material, such as the basic literature and handbooks of their field. The comments by bachelor's seminar teachers support this statement: based on their observations, many students use only advanced pieces of research as sources but fail to understand the topic comprehensively because they have not learned the information covered by the basic literature.

However, these surveys cannot be used for drawing detailed conclusions because of the clear differences in the teaching of information retrieval skills to first-year students before the survey. Furthermore, this was the first survey of its kind, meaning that the results cannot be compared with earlier teaching. However, the trends are positive and better results can be expected from students who have completed all the stages of the information retrieval teaching: first-year, bachelor's, and master's levels.

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Examining Subject-Specific Information Literacy Elements on Economics and Business Administration for Use in a MOOC

Stefan Dreisiebner(✉)

University of Graz, Graz, Austria
stefan.dreisiebner@uni-graz.at

Abstract. Recent literature on developing Information Literacy (IL) of students suggests that curricula should not only involve generic skills, but also knowledge about subject-specific content and research practices. While there are already several studies examining subject-specific IL in various contexts, no thorough analysis has been performed so far to identify the main resources that are addressed in various IL teaching materials for economics and business administration. Therefore, this paper presents a qualitative content analysis of several subject-specific teaching materials on IL for economics and business administration, available either as books or as publicly accessible online resources. The results reveal a strong focus of subject-specific IL teaching materials for economics and business administration on fact databases. In an additional step, the results of the analysis are used to suggest the content of a subject-specific extension on economics and business administration for a generic MOOC (Massive Open Online Course).

Keywords: Information Literacy · Subject-specific skills · Economics and business · Content analysis

1 Introduction

Emerging from its early origins in the user training in libraries [1], the concept of Information Literacy has seen constant developments. Today, there are several definitions for the term Information Literacy (IL), which has overlaps with the concepts of Media Literacy, Computer Literacy, Internet Literacy and Digital Literacy [2]. A common definition of IL has been published by the American Association of College and Research Libraries (ACRL), which was last updated in 2016. Accordingly, "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" [3, p. 3].

Today, IL can be considered as a necessary skill of white-collar workforce [4–6]. Information is growing to be a key business asset, which leads to employees spending a growing amount of time on searching and organizing information [6, 21]. This is also acknowledged by recent management literature, underpinning the relevance of IL skills [22]. Nevertheless, the challenge remains that managers lack awareness of the very concept of IL [12].

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Recent literature on developing IL of students suggests that curricula should not only involve generic skills, but also knowledge about subject-specific content and research practices [7, 8]. Additionally, IL teaching in a subject-specific context is considered beneficial to students [9]. While several studies have examined the IL skills of business students [10, 11], workplace requirements and IL perception by employers [6, 12] or discussed various teaching approaches [13, 14], no thorough analysis has been performed so far to identify the main knowledge areas that are addressed in various IL teaching materials for economics and business administration. Therefore, the aim of this study is to answer the following research question: What are the most common resources emphasized in subject-specific teaching materials on IL for economics and business administration?

When it comes to teaching IL, several recent studies have suggested the use of new digital channels, especially Massive Open Online Courses (MOOCs) [15–17]. MOOCs are freely accessible online courses with no entry barriers aiming at unlimited participation which emerged in 2008 out of the Open Educational Recourses movement and which have, since then, rapidly grown in number [18, 19]. While a growing number of MOOCs on IL has also become available in the meantime, these usually stay on a generic level and do not emphasize subject-specific IL contents [20]. Therefore, the results of the present analysis are also used to suggest the content of a subject-specific extension on economics and business administration for a generic MOOC.

By conducting a qualitative content analysis of several subject-specific teaching materials on IL for economics and business administration in German language, available either as book or as publicly accessible online resource, this article contributes to current literature on subject-specific IL facilitation. First, it reveals a strong focus of subject-specific IL teaching materials for economics and business administration on fact databases. In addition, literature databases, press databases and journal rankings are commonly mentioned in the materials. Second, it shows that there are generally still few teaching materials in the particular context of this study available. Third, it shows that existing teaching materials tend to become outdated quickly due to discontinuation and renaming of sources. Fourth, building on these results, it proposes a potential content framework for future subject-specific extensions on economics and business administration for existing and future IL MOOCs.

2 Literature Review

Recent research on IL in context of economics and business administration has addressed various aspects of the subject area:

First, several studies have evaluated existing IL skills of business students. A study among Austrian business students using a standardized questionnaire revealed that these students only had mediocre IL skills. Compared to students of other subjects, the business students scored worst [10]. Another study among US students used a commercially available IL assessment to investigate the relationship between IL and business writing. The data showed a clear connection, as students with good performances in the IL assessment produced better emails, memos and technical reports [11]. Another paper has provided an introduction to rubrics developed in collaboration between librarians and instructors for assessing the IL of finance students [23].

Second, studies have also examined the information behaviour of business students. A study among Canadian business students found that they prefer electronic sources over print, have mainly acquired their IL skills through self-study and are reluctant to consult a librarian during the research process [24].

Third, several studies have focused on evaluating IL teaching for business students. Interviews with librarians at US business schools have been conducted to assess the progress with IL instruction of business students, which revealed widespread, but still developing efforts [25]. An exploratory study among librarians and teaching faculties of three business schools in Canada investigated the factors affecting student IL learning outcomes by means of interviews. It revealed that learning outcomes are influenced by a combination of IL program components, the learning environment and student demographics [26].

Fourth, several studies discuss various teaching approaches and present experience reports of integrating IL instruction into curricula. A survey conducted before and after a training module jointly conducted by a US business librarian and a faculty showed a significant learning gain of the students compared to a control group [13]. A similar study describes the collaboration of business professors and librarians in an introductory business course in the US. A survey conducted before and after the project showed a significant gain in IL skills of the students [14]. Another study conducted in the US uses various case studies to find how business education experimental learning initiatives serve to develop and reinforce key IL competencies [27]. Another paper describes how IL skills have been adopted as learning outcomes into a business curriculum and suggests a suitable assessment instrument [28].

Fifth, there are studies focusing on workplace requirements in the business world. A content analysis of 21 job profiles of business and finance occupations in the US Department of Labour O*Net database found IL skills to be demanded by 19 job profiles [6].

Sixth, there are studies that examine the perception of IL in the business world and by teachers. Interviews with US recruiters and employers showed that they are not in general familiar with the term IL, but when they are informed about its components, they recognize and value it [12]. A study among Austrian business school scholars showed that they are mainly familiar with the concept of IL and find additional IL training of their students necessary [29].

These examples show that there are already several studies examining various subject-specific aspects of IL. Nevertheless, no thorough analysis has been performed so far to identify the main knowledge areas that are addressed in various IL teaching materials for economics and business administration.

3 Analysis of Subject-Specific IL Teaching Material

The following analysis focuses on subject-specific teaching materials on IL for economics and business administration in German language that are publicly available either in print or online. Public availability is understood here either as a book that is available for borrowing through libraries or as online materials that can be found through search engines and that are available for download free of charge. The research

of available teaching materials was conducted in March 2018 using the search engine of the Austrian Library Network (ALN) [30], which features 8 million records of more than 80 academic libraries, and Google web search engine. The search terms used included the German terms for *Information Literacy* in combination with either *economics* or *business*. Depending on the combination of the search terms, the search revealed between 2 and 82 results in the database of the ALN and 17,000 results in Google web search. As a next step, the search results were checked for public availability. Due to the vast amount of results, only the first 200 results of the Google web search were examined. The search eventually yielded five teaching materials that matched to the criteria (Table 1).

Table 1. Analysed subject-specific teaching materials

Title (English translation)	Media type	Publisher, Year	Source
Successful Literature Research	Book	Books on Demand, 2011	ALN, Google
Information Literacy – Business	Book	De Gruyter, 2014	ALN, Google
Information Literacy for Business	Slides in PDF format	University of Hagen, n.d.	Google
How do I find information about the economy and business research?	Script in PDF format	European University Viadrina, 2018	Google
Retrieve – Cite – Record: Research Data in the Social- and Economic sciences	Folder in PDF format	Leibniz Information Centre for Economics, German Data Forum and Leibniz-Institute for the Social Sciences, 2014	Google

Two of the teaching materials are available as books through libraries and three of them online, whereby one consists of slides from a lecture, one is a script for students and one is a professionally published folder. This folder has a strong focus on research data, but also introduces subject-specific information sources. Beside these publicly available teaching materials, the Google web search revealed several further courses on subject-specific skills for economics and business offered at higher education institutions, mainly through libraries. These offers are generally intended for students and staff members and not as publicly accessible teaching materials available for download.

In a next step, a summarizing content analysis [31] of the materials was conducted. The coding scheme was developed following an inductive approach, focusing on the resources suggested to the students in the teaching materials. Beyond describing subject-specific resources, the teaching materials also address generic skills (e.g. how to formulate good search terms). This study did not aim to analyse these generic contents in detail. In addition, generic information sources were excluded (e.g. *Google Scholar*).

Table 2 shows the aggregated results of the content analysis. For each of the categories of considered resources, it states in how many of the analysed teaching materials they are addressed. Additionally, the number of subject-specific sources is given that was named throughout the analysed teaching materials and it is indicated how many of them are mentioned in more than one teaching material (in percent).

Table 2. Aggregated results of the content analysis

Category	Teaching materials including category (%)	No. of sources within category	Multiple mentioning (%)
Fact databases	1	29	0.21
Literature databases	0.8	8	0.5
Encyclopaedias, dictionaries	0.6	23	0.05
Rankings of journals	0.6	9	0.45
Web portals	0.6	8	0.25
Press databases	0.6	5	0.2
Public and research institutions	0.4	8	0.5
Repositories and data archives	0.4	7	0
Specialized libraries	0.4	7	0.14
Open access databases	0.4	4	0
Thesauri	0.4	1	0.1
Scientific journals	0.2	13	0
Journals for practitioners and business newspapers	0.2	8	0
Publisher	0.2	7	0
Rankings of researchers	0.2	6	0
Classification systems	0.2	5	0
Conference calendars	0.2	4	0

All of the analysed teaching materials include fact databases like *Eurostat*. This was also the category with the most frequently mentioned sources – 29 different fact databases are named in the teaching materials, out of which 21% are mentioned in more than one of the teaching materials. 80% of the analysed teaching materials include subject-specific literature databases like *EBSCOhost Business Source Premier*. Eight different literature databases are mentioned, out of which 50% are stated in more than one of the teaching materials. Encyclopedias and dictionaries (like *The Concise Encyclopedia of Economics*), rankings of journals (like *VHB-JOURQUAL*), web portals (like *INOMICS*) and press databases (like *Factiva*) are named in 60% of the teaching materials. For each of these categories 23, nine, eight and five different sources are named, respectively. Out of these, rankings of journals are those with most multiple mentions with 45% of the resources named in more than one of the teaching materials.

40% of the analysed teaching materials name public and research institutions as possible sources for subject-specific data (like the *Federal Employment Agency*), repositories and data archives (like the *Social Science Open Access Repository*), specialized libraries (like the *Leibniz Information Centre for Economics*), open access databases (like *EconStor*) and thesauri (like *WISO Thesaurus*). 20% of the analysed teaching materials name scientific journals (like *Management Review Quarterly*), journals for practitioners and business newspapers (like *The Financial Times*), publishers (like *Springer Gabler*), rankings of researchers (like *RePEc/IDEAS rankings*), classification systems (like *JEL Codes*) and conference calendars (like *SSRN Conference Announcements*).

In all categories, the highest number of sources is mentioned for fact databases (29), encyclopedias and dictionaries (23), and scientific journals (13). There is great diversity among the teaching materials regarding the mentioned sources. The highest rate of one source being mentioned in more than one teaching material is 50%, which applies to literature databases and public and research institutions. Journal rankings, too, reached a rate of 45%. With all other sources, the rate was below 25%. Several sources are named in just one of the teaching materials.

The teaching materials address a considerable number of aspects of generic basic knowledge such as how to use truncations, and include generic sources like *Google Scholar* or the web catalogue of the Austrian Library Network. Although these resources are generic themselves, in some cases they are presented in a subject-specific context like by searching for a book on economics.

4 Discussion

The search for subject-specific teaching materials on IL for economics and business administration showed that there are still few explicit teaching materials in German accessible to the public either as book available through a library or as online resource. Overall, the search identified just five teaching materials meeting these requirements. All of these materials were prepared by librarians or information scientists, which reflects that these professions are highly committed to IL teaching [32].

The analysis further showed that teaching materials on IL for economics and business put great emphasis on various subject-specific literature sources, especially on fact databases, literature databases and press databases. In addition, various subject-specific rankings are emphasized, especially journal rankings. One of the teaching materials also provides information on how to find various relevant conferences through subject-specific conference calendars. Knowledge of how to obtain data is of special relevance in the business world [21]. For example, identifying economic trends by scrutinizing economic data can be a competitive advantage for enterprises [6]. This might be one of the reasons, why different fact databases are the most frequently named resources and are the only category that is mentioned in all of the examined teaching materials. One of the teaching materials even had a special focus on how to retrieve research data.

Several of the sources named in the teaching materials had a language- and country-specific focus. This is in accordance with literature that emphasizes the language- and country-specific dimension of IL skills [8, 33].

The analysis of the teaching materials revealed that the field is highly dynamic. With the oldest teaching material being from 2011, several of the named sources have not been continued or have been renamed at the time of analysis. This highlights the relevance of constantly updating teaching resources in this field, which is a challenge especially for teaching materials provided as printed books. The possibility of regularly updating teaching materials is one of the advantages of electronic materials like MOOCs.

The results of the content analysis allow to create a possible framework for the content of a subject-specific extension of a generic MOOC on IL, which are available in rising numbers [20]. Accordingly, such a MOOC should include subject-specific information resources, thesauri and rankings. In addition, classification systems, web portals and conference calendars could be included. Additionally, a MOOC could also include information about specialized publishers, libraries and institutions. In accordance with the day-to-day tasks the workforce is facing in the business world [6, 21], especially fact databases should be acknowledged.

In addition to the special resources discussed by this study, such a MOOC could also address specific additional skills. In a business environment, employees have to be able to critically assess financial and economic information in an ethically sound way, a skill which is referred to as *Critical Business Information Literacy* [34]. Also, relatively new skills like working with social media data [25, 26] could be addressed. Additionally, studies have shown that among students of all disciplines, students of economics tend to be most likely to show unethical academic behaviour [35]. This might indicate the need for a more thorough focus on ethical information use and behaviour in IL learning contents for business students.

As this analysis revealed, several of the sources in the analysed teaching materials are country- or language-specific. This emphasizes the importance of considering the target group of the MOOC when defining the content and selecting examples accordingly. The low awareness of the term IL in the business world remains to be an additional challenge [12]. This emphasizes the importance of a careful and thorough introduction to the concept and its relevance for everyday business tasks.

5 Conclusion, Limitations and Outlook

The aim of this study was to examine the most common resources emphasized in subject-specific teaching materials on IL for economics and business administration. This paper presented a qualitative content analysis of several subject-specific teaching materials on IL for economics and business administration in German, available either as books or as publicly accessible online resources. Thus, this article makes the following contributions to current literature on subject-specific IL facilitation: First, it reveals a strong focus of subject-specific IL teaching materials for economics and

business administration on fact databases. In addition, literature databases, press databases and journal rankings are commonly mentioned in the materials. Second, it shows that that there are generally still few teaching materials in the particular context of this study available. Third, it shows that existing teaching materials tend to become outdated quickly due to discontinuation and renaming of sources. Fourth, building on these results, it proposes a potential content framework for future subject-specific extensions on economics and business administration for existing and future IL MOOCs.

This study has several limitations, which in turn open up paths into further research. First, the sample in this study was limited to German teaching materials and books available through the Austrian Library Network. Looking further on English language materials would allow to see if there are country-, language- and culture-specific differences. Second, the search focused exclusively on the concept of IL and not on related concepts. This potentially also resulted in the relatively small sample of five teaching materials examined. Third, only publicly accessible materials were analysed. Further research could include teaching materials used by various subject-specific trainings from libraries.

The implications for a possible subject-specific MOOC extension on economics and business administration can lay the foundation for an additional unit of a MOOC on generic IL skills for higher education students, which is currently being developed within an Erasmus+Strategic Partnership project [20]. Further research seeks to evaluate the application of these materials among students of economics and business administration.

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How Does Information Literacy Instruction in Secondary Education Affect Students' Self-efficacy Beliefs and Attitudes?

Tuulikki Alamettälä(✉), Eero Sormunen, and Md Arman Hossain

Faculty of Information Technology and Communication Sciences, Tampere University, Tampere, Finland
{tuulikki.alamettala, eero.sormunen}@tuni.fi, armanhossain.isl@gmail.com

Abstract. This paper reports the findings of a study on how students' self-efficacy in and attitudes to online research develop in a two-year information literacy intervention in the lower secondary school. The data was collected by a questionnaire administered before, in the middle of, and after the intervention. A repeated measures ANOVA was used to reveal the effect of the intervention. The teaching intervention changed students' behavioral intentions in the evaluation of search results and in source-based writing. No intervention effect was observed in other attitude factors or in self-efficacy beliefs. The authors suggest that self-efficacy and attitudes should be considered as explicit learning goals in pedagogical practices in order to develop them more effectively.

Keywords: Information literacy instruction · Online research · Intervention

1 Introduction

Information literacy (IL) is defined as 'a set of abilities individuals require to recognise the information need and to locate, evaluate and use the needed information effectively' [1]. IL instruction typically aims to improve students' IL skills, and learning outcomes are assessed accordingly [2]. As argued by Pinto and Fernandez-Pascual [3], the concept of IL can be extended beyond knowledge and skills to include attitudes and motivations of individuals for searching, evaluating, processing, and communicating information. The aim of this study is to examine how long-term inquiry-based curriculum-embedded IL instruction affects students' self-efficacy beliefs and attitudes.

Bandura [4] defined *self-efficacy* as individuals' confidence in their own capabilities to organize and execute the course of actions required to perform a task or attain a goal. Previous research suggests that individuals with high self-efficacy use their skills [5] and develop their skills [6]. Individuals with low self-efficacy tend to avoid challenging activities [7] and are less likely to develop their competencies [8]. Aesaert et al. [6] found that competent primary school students had quite realistic ICT-related self-efficacy beliefs, but less competent students overestimated their ability severely. The researchers suggested that realistic but slightly overoptimistic beliefs have a positive effect on students' acquisition of competences.

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Eagly and Chaiken [9] defined attitude as 'a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour'.

We adopt here the three-component model of attitudes widely used in social psychology to define the construct of attitudes [10]. The three components are (1) *affect* (feelings, likes, or dislikes about the attitude object), (2) *cognition* (ideas and beliefs about the attitude object), and (3) *behavioral intention* (the intention to act a certain way with regard to the attitude object).

Our literature review did not reveal any previous studies on how IL instruction changes students' self-efficacy beliefs and attitudes in primary or lower secondary schools. Pinto and Fernandez-Pascual [11] conducted a study having the same elements but university students as subjects. They carried out an intervention study on the first-year library and information science students and measured students' attitudes and self-efficacy before and after the intervention. Students' self-efficacy increased in relation to 23 IL skills, but attitudes improved only in nine skills.

Some studies in science education suggest that guided-inquiry approaches have positive effects on both the young students' cognitive and affective characteristics. For example, Gibson and Chase [12] found that learners' attitudes toward science can be improved through teaching interventions. Koksal and Berberoglu [13] found that a guided-inquiry teaching intervention improved sixth graders' attitude toward science.

Our literature review indicates that we lack studies on how IL instruction affects students' self-efficacy beliefs and attitudes in primary or lower secondary schools. However, studies in other fields, such as ICT education, indicate that self-efficacy beliefs and attitudes may influence how students acquire new competences and skills. Hence we should understand better how the various ways of teaching IL and online research affect these traits. Another poorly studied area is how teaching affects students' conceptions of good practices in online research.

We argue that although it is important that instruction develops students' skills, there are other factors, such as attitudes and self-efficacy beliefs, which should also be considered as learning goals. Attitudes and self-efficacy beliefs have a role in how students engage with the task at hand and use their skills. A wide range of research in psychology gives evidence that attitudes affect individuals' behavior [14, 15]. The same mechanism can be concluded to hold for information practices, see [16]. Enhanced self-efficacy beliefs in and attitudes to online research provide the potential to encourage students to actively practice and exploit their IL skills.

The study focuses on the following research questions:

1. How does the teaching intervention change students' self-efficacy beliefs in online research?
2. How does the teaching intervention change students' attitudes to online research?

2 Methods

The nature of this study was quasi-experimental using a non-equivalent groups design. The selection of groups was based on a convenience sample. Quasi-experiments are useful in cases where the random assignment of subjects into test and control groups is difficult, for example, in intervention studies conducted in schools [17, 18].

2.1 Participants and Procedure

The study was conducted in a lower secondary school located in a medium-sized city in southern Finland. The total number of students in the school is about 300, and they all are from the neighbouring area. All students have access to the school without entrance examinations. The school serves as a teacher training school.

Data collection was started in the autumn term 2015 when the students entered seventh grade (13–14 years old) and was completed in the spring term 2017 when the students completed their eighth grade (14–15 years old). The intervention group consisted of three parallel classes (35 girls and 23 boys). Two other classes not exposed to the intervention performed as a control group (19 girls and 17 boys). Thus, the number of students was 58 in the intervention group and 36 in the control group.

The intervention was integrated into three courses held in autumn term 2015 (Course 1), spring term 2016 (Course 2), and autumn term 2016 (Course 3). The intervention was designed and implemented by a Finnish language teacher. The second course combined Finnish language and history, and two history teachers collaborated to organize it. All teachers had years of experience and were also training student teachers. The control group was taught by teachers working independently from the intervention.

The courses were within the regular curriculum of the school, but the teachers redesigned them to emphasize information literacy skills as an important learning goal. In the beginning, Guided Inquiry [19] was introduced to the teachers, but they were free to embed it into their pedagogical practices as extensively as they thought appropriate. The key instructional principles of Guided Inquiry that the teachers aimed to follow were: to devote attention to the first phases of the inquiry process and to give more space for students to choose topics that interested them. In order to keep track of information sources, inquiry logs were introduced to the students.

In course 1, students made a brochure about good practices in social media. In course 2, students worked on a source-based presentation and a fictional text, both about the Finnish Civil War. In course 3, each student prepared and presented an argumentative speech. The main learning goals were that the students learn to search information on the Web, evaluate sources critically, and use information meaningfully in a given task. The details of the teaching intervention are reported in [20]. The control group received standard instruction based on the curriculum.

2.2 Materials

The survey tool to measure self-reported attitudes and self-efficacy beliefs was designed by using the validated SORAB (Survey of Online Reading Attitudes and Behaviours) instrument by Putman [21] as a framework. Because the SORAB survey is designed only for online research, we added a set of items to cover library aspects of information searching and use.

To develop a survey of self-efficacy beliefs, we first modelled the online research process into three subtasks: 'Web searching', 'evaluation of sources', and 'use of Web sources' and designed new candidate items for each subtask. A set of items was adopted from the SORAB's Efficacy for Online Reading factor, and included in the subtask model. Further, three items of library use were added. The resulting scale included one generic item for online research, five for Web searching, four for the use of the library, six for evaluation, and six for writing. All items started with the phrase 'I am able to …'. A 5-point Likert scale from 'Very well' to 'Not at all' was used.

A set of items for the attitude components affect and cognition were adopted from the SORAB's factors F3 (Anxiety) and F5 (Value/Interest). The core set was extended by items about traditional learning materials and their use. Eight items were related to positive and four items to negative attitudes toward online research. Four items contrasted Web and printed sources, six related to traditional forms of learning and use of learning materials, and two dealt with use of the library - 24 items in total. A 5-point Likert scale from 'Fully agree' to 'Fully disagree' was also used here.

The third attitude component was designed to measure behavioural intentions in online research. It was based on a careful analysis of good practices for analysing information needs, formulating search statements, evaluating and reading search results, and writing texts based on selected sources. Ten items were related to the planning and searching stage, fifteen to the reading, evaluation, and selection stage, and eight to the use of sources in writing the end-product (33 items in total). A 5-point Likert scale ranged from 'I always do this way' to 'I never do this way'.

2.3 Data Collection

The questionnaire was administered before the intervention, after the second course, and after the intervention. The items on self-efficacy beliefs and attitudes regarding behavioural intentions were included in all three data collections. The affect and cognition components of attitudes were surveyed only two times (pre and post) to avoid students' overloading.

The total number of students participating in the survey was 94. Two outliers, whose answers showed that they had filled in the questionnaires without consideration, dropped the number of students to 92. Some students were absent in one of the data collections or failed to answer some individual items. Because SPSS applied listwise deletion of subjects in case of missing data, the number of students in the statistical analysis varied from 78 to 82.

The first step was to conduct an exploratory factor analysis (EFA) to find reliable scales for the measurement of students' self-efficacy beliefs and attitudes. The number of students in the study was quite small compared to the number of items [see 22, p. 683–685]. The problem was solved by grouping the items into five theoretically consistent subsets and applying EFA to these subsets.

Table 1. The summary of the factor analysis and reliability tests

Factors	Number of items	Loadings	Cronbach's alpha	Test-retest reliability*	Examples of representative items (translated)
Attitudes: searching intentions	7	–	.779	.506–.661	Before a search, I think carefully which keywords I will use
Attitudes: evaluation intentions	5	–	.785	.500–.581	I try to find out who is the author of the webpage
Attitudes: writing intentions	4	–	.736	.560–.680	I prepare myself for writing by taking notes from sources
Attitudes: online learning	4	.645–.803	.774	.408	It is important for me to be good at searching information on the Web
Attitudes: traditional learning	4	.572–.730	.739	.562	I like to search information in the library (books, journals)
Self-efficacy: searching	3	.622–.825	.746	.424–.525	I am able to choose the best link from the search engine's result page
Self-efficacy: writing	3	.620–.748	.727	.504–.570	I am able to make notes of what I have read

*All statistically significant $p < 0.01$

Data distributions for ten items deviated seriously from normality (|kurtosis| or |skewness| > 1) and were removed before EFA. Principal axis factoring was used as the extraction method with oblique rotation (Direct oblimin) with requirements: communalities > 0.3, loadings > 0.4, cross-loadings < 0.3, and Kaiser-Meyer-Olkin measure (KMO) > 0.5. Eigenvalues (>1) and scree plots were analyzed to find a good estimate for the number of factors searched [see 22, p. 665–706]. The EFA results are summarized in Table 1.

The reliability of psychometric scales are typically estimated by Cronbach's alpha. All scales meet the requirement for $\alpha > 0.7$ [see 22, p. 709]. In addition, we could estimate the test-retest reliability by analysing correlations (Pearson's r) of data collected by the same scale three times (only two for the attitude components affect and cognition). All correlations were statistically significant ($p < 0.01$) and mostly higher than .5. Although scores as high as .8 are desirable, in practice such high scores are difficult to achieve in scales for behaviour, beliefs, and attitudes [23]. We argue that we had enough evidence of the stability of our scales to be used in this study.

2.4 Statistical Analysis

Statistical analyses were performed using SPSS version 25. Normality checks were carried out numerically by the Shapiro-Wilk Test because our data set is relatively small. The sets of data which did not pass the Shapiro-Wilk Test were evaluated graphically using the normal Q-Q Plots. All data was at least approximately normally distributed.

A mixed between-within subjects ANOVA was conducted to assess the impact of the teaching intervention. A mixed between-within subjects ANOVA is an extension of a repeated measures ANOVA and can be used in a study with two independent variables: one is a between-subjects variable (e.g., group: intervention/control) and the other a within-subjects variable (e.g. time: pre/post) [24, p. 284–292].

3 Results

The key results are presented in Table 2. The results suggest that the students in the intervention group adopted more positive behavioural intentions in the evaluation of search results ($F(2, 154) = 4.05$, $p = .019$, partial $\eta^2 = .050$). The effect size was nearly medium (suggested norms for partial eta-squared: small = .01; medium = .06; large = .14 [24, p. 217–218]). Within-subjects contrasts revealed that the differences were statistically significant between pre- and post-measurements ($p = .004$, partial $\eta^2 = .103$), and between pre- and mid-measurements ($p = .048$, partial $\eta^2 = .050$). No learning effect was observed after the midpoint ($p = .575$).

The results also indicate that the intervention had an effect on the students' behavioural intentions in writing ($F(2, 152) = 3.533$, $p = .032$, partial $\eta^2 = .044$). The effect size was again nearly medium. Within-subjects contrasts showed that there was a statistically significant difference between pre- and mid-measurements ($p = .021$, partial $\eta^2 = .069$). No difference was observed between the pre- and post-measurements ($p = .085$), or mid- and post-measurements ($p = .270$). Figure 1 shows the change in the test scores over time in the intervention and control group regarding behavioural intentions in evaluation and writing.

Table 2. The scores of attitudes and self-efficacy beliefs measured before (PRE), in the middle of (MID), and after (POST) the intervention.

			PRE		MID		POST				
Item	Group	N	M	SD	M	SD	M	SD	F	p*	η^2
Attitudes: searching intentions	Interv.	48	3.59	0.60	3.64	0.62	3.39	0.69	.324	.724	.004
	Control	31	3.60	0.61	3.54	0.69	3.31	0.59			
	Total	79	3.59	0.60	3.60	0.64	3.36	0.65	8.532	**.000**[1]	.100
Attitudes: evaluation intentions	Interv.	48	3.29	0.72	3.40	0.73	3.42	0.74	4.050	**.019**[2]	.050
	Control	31	3.44	0.73	3.21	0.80	3.13	0.63			
	Total	79	3.35	0.72	3.32	0.76	3.31	0.71	.656	.521	.008
Attitudes: writing intentions	Interv.	47	3.61	0.91	3.79	0.77	3.81	0.75	3.533	**.032**[3]	.044
	Control	31	3.74	0.63	3.51	0.83	3.70	0.57			
	Total		3.66	0.81	3.68	0.80	3.77	0.68	1.028	.360	.013
Attitudes: online learning	Interv.	50	3.67	0.55	–	–	3.55	0.70	.198	.657	.002
	Control	32	3.87	0.79	–	–	3.82	0.59			
	Total	82	3.74	0.66	–	–	3.65	0.67	1.033	.313	.013
Attitudes: traditional learning	Interv.	50	3.41	0.74	–	–	3.17	0.81	.009	.926	.000
	Control	32	3.67	0.71	–	–	3.41	0.55			
	Total	82	3.51	0.74	–	–	3.26	0.73	10.308	**.002**[4]	.114
Self-efficacy: searching	Interv.	48	4.08	0.52	4.11	0.49	4.12	0.55	.510	.602	.007
	Control	31	4.10	0.52	4.12	0.54	4.24	0.39			
	Total	79	4.09	0.52	4.12	0.51	4.16	0.49	.997	.371	.013
Self-efficacy: writing	Interv.	48	4.20	0.63	4.09	0.56	4.08	0.61	.586	.558	.008
	Control	31	4.15	0.48	4.14	0.60	4.16	0.43			
	Total	79	4.18	0.57	4.11	0.57	4.11	0.54	.566	.569	.007

*Statistically significant $p < 0.05$
(1) pre > post ($p = .000$, $\eta^2 = .184$), mid > post ($p = .002$, $\eta^2 = .123$)
(2) pre < post ($p = .004$, $\eta^2 = .103$), mid < post ($p = .048$, $\eta^2 = .050$)
(3) pre < mid ($p = .021$, $\eta^2 = .069$)
(4) pre > post

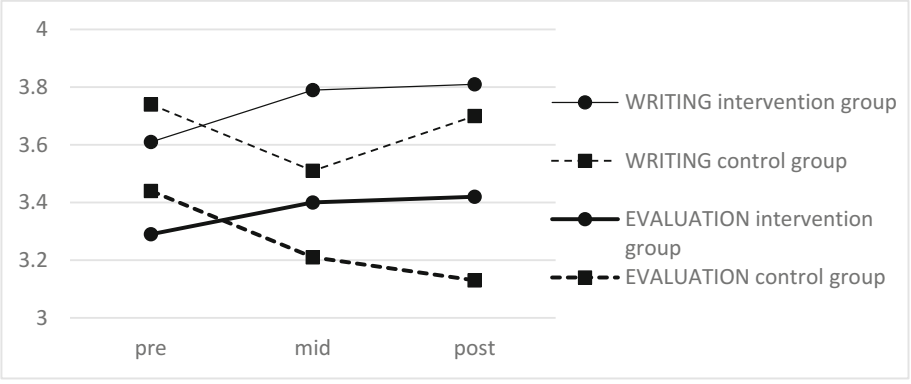

Fig. 1. The effects of the intervention on students' behavioural intentions in evaluation and writing.

No statistically significant difference was found between the intervention and control group regarding the development of students' searching intentions ($F(2, 154) = .324$, $p = .724$). The intervention had no effect on the affective and cognitive attitudes measured by the factors online learning ($F(2, 80) = .198$, $p = .657$) and traditional learning ($F(1, 80) = .009$, $p = .926$). The teaching intervention had no effect on students' self-efficacy beliefs in searching for information ($F(2, 154) = .510$, $p = .602$) or in writing ($F(2, 154) = .586$, $p = .558$).

4 Discussion

The aim of this study was to investigate the effect of long-term, inquiry-based, curriculum-embedded information literacy instruction on students' self-efficacy beliefs and attitudes. The results show that the teaching intervention had a positive effect on students' behavioural intentions regarding the evaluation of search results and writing. No effect was observed in other attitude factors or self-efficacy beliefs.

The students in the intervention group adopted more developed behavioural intentions in the evaluation of search results. Most of the development happened during the first year. It can be explained by the fact that the first two courses explicitly required the students to practice evaluation. Source criticism was emphasized, especially in the second course. Learning to evaluate the trustworthiness of sources was set as an important learning goal by the history teachers [20]. The last course was more focused on finding arguments for a speech.

The results also suggest that the intervention group adopted more advanced intentions in source-based writing. Again, the change took place during the first year and can be explained by the type of assignments. In the first two courses, students wrote a lot, but not in the last one where the end product was a speech. Especially the second course required a lot of writing in two subjects. Also the teachers reported that the students made progress in writing [20].

One of the learning goals of the intervention was to learn to search on the Web and other information channels. However, no difference was found between the groups regarding the development of students' behavioural intentions in searching. This unfortunate result requires further consideration: during the whole research period, the teachers for the intervention group reported that the students had problems in searching for information. The short instruction that the school librarian offered in the beginning of the seventh grade was obviously not enough. The teachers did not design any concrete activities to practice Web searching. For example, the importance of finding a personal viewpoint on the topic was emphasized but not demonstrated regarding how to apply these ideas in searching. After the third course, the teacher argued that she should have emphasized searching practices more [20].

The results suggested that the teaching intervention had no effect on students' self-efficacy beliefs because no change took place in self-efficacy scores either in the intervention or in the control group. However, this result is difficult to interpret alone because the development of skills and self-efficacy beliefs might interact. As Bellini et al. [25] and Aesaert et al. [6] argued, the self-efficacy beliefs of inexperienced individuals are typically inaccurate and unrealistically high, and when they get more

experienced, their self-evaluations become more accurate and less biased. This means that if students' skills are improved in the intervention (students get more experienced), their estimates of self-efficacy will become more accurate. Yet, the scores of self-efficacy belief might go up, remain the same, or go down. All depends on what was the original level of their beliefs and how much their skills developed in the intervention. Our preliminary results of students' performance tests show that skills improved in the intervention group [26, forthcoming]. Thus, we may make a paradoxical conclusion that the intervention might have an effect on students' self-efficacy belief although they remained at the same level. This will be further elaborated on in the forthcoming paper.

Unlike in the research of Koksal and Berberoglu [13] and Gibson and Chase [12], our results suggest that the intervention did not affect students' attitudes, except behavioural intentions in evaluation and writing. Similarly to our findings, the intervention in Pinto and Fernandez-Pascual [11] did not lead to substantial progress in university students' attitudes.

The two-year period from the seventh grade to the eighth grade is an exceptionally long time to collect data about the effects of a teaching intervention. Other factors external to the intervention may affect the development of students' attitudes. We found two examples of this type of change in our data. Firstly, in the whole sample (intervention and control group together), the scores changed to favour less traditional forms of teaching and learning ($F(1, 80) = 10.308$, $p = .002$, partial $\eta^2 = .114$). This trend was not connected to the intervention, nor to any change in the attitudes to online learning, suggesting that some other factors external to the study might be behind this trend. Secondly, the analysis revealed that the scores across the groups in behavioural intentions in searching ($F(2, 154) = 8.532$, $p = .000$, partial $\eta^2 = .100$) showed a declining trend. This means that the students as eighth graders were less likely to follow good searching practices presented in the questionnaire items.

5 Conclusions

This study generated new knowledge about information literacy instruction and its effect on students beyond procedural knowledge and skills. Results revealed that the teaching intervention changed students' attitudes positively in terms of behavioural intention in the evaluation of search results and source-based writing, but no effect was observed in other factors.

The results demonstrate the importance of the type of the activities and especially the training that they offer to the students. When students were more engaged in certain aspects of IL and online research, their behavioural intentions regarding these aspects improved. In other words, through training, students become aware of good practices - and hopefully will use them in real life, as well. However, the results imply that in lower secondary school, students seem to need continuous training in order to acquire and maintain good information literacy and online research practices.

All in all, it seems to be a challenge to develop self-efficacy beliefs or attitudes through IL instruction. They should be considered as explicit learning goals and explicit attention should be given to them.

The case study focused on students at one single school. Subsequently, the results cannot be generalized to Finnish lower secondary schools or other schools.

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Why Information Literacy Integration Does't Work: Exploring the Experience of Academic Staff

Hiroyuki Ida(✉)

UCL Institute of Education, London, UK
h.ida.l4@ucl.ac.uk

Abstract. This research explores the idea of 'integration', which incorporates IL into the HE curriculum. This significance has been emphasized, but lacks of substantial theorization in relation to information literacy (IL), curriculum, and discipline. To address these, I will conduct semi-structured narrative interviews of academic staff, seeking for information on how they implement IL aspects in their module design. As this research suggests, the notion of integration has sought to be conceptualized mainly from academic libraries, which has not accepted from academic staff. Building on and collecting practical knowledge will provide insightful theoretical reconsideration of IL and its relevant concepts, and lead to effective integration.

Keywords: Integration · Curriculum design · New Literacy Studies · Theory-in-use · Schematic model

1 Introduction

This research explores the idea of "integration", which focuses on incorporating in IL (information literacy) in the higher education (HE) curriculum. Academic libraries commonly launch initiatives on how to conduct IL across the institution, considering the linkage to the discipline. Major frameworks of IL are sustaining its practice. For example, one of the influential frameworks of Association of College & Research Libraries's (ACRL's) illustrates the condition and process of components of IL [1]. This seems to affect IL practice in relation to the curriculum. Similarly, the Society of College, National and University Libraries (SCONUL) proposes a "seven pillar's model", defining the core skills of IL and strands from scholarly communication [2]. These frameworks describe the information literate person, who has successfully acquired the given skills. To address such skill acquisition, the emphasis is on conducting IL in relation to the curriculum.

The exploration of 'integration' has been investigated by many researchers. Sauder's work identifies the levels of integration: Course-level collaboration; Program-level collaboration; Institutional-level collaboration; Cross-campus collaboration; and Collaboration at degree levels [3]. Within this scope, IL programs have been intensively developed to have influence on the program. For example, academic libraries successfully design IL concepts within the core courses in their institution [4, 5]. Furthermore, Wang proposes the holistic, integration model of how IL function within the institutions, specifying the relationships of agents among the academy [4].

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Many researchers, then, point out that academic staff have a lack of the understanding of IL. From the academic librarians' standpoint, building the constructive relationship with academic staff is crucial for effective IL education. Leading to its success, the collaboration at the point of teaching is seen as essential form [5]. Bombaro's research looks at the process of how IL becomes a compulsory component in the curriculum [6], uncovering the elements that constrain the effective integration: "planning and assessment". Adding values to the curriculum through IL requires "attractive plans". For assessment, the key is to realize the "genuine commitment to student success" without direct intervention by a librarian. Also, reducing academic staff's burden on IL aspects contributes to successful collaboration [7]. What these suggest is that the academic librarian's willingness to collaborate with the discipline seems to be the challenge to academic staff's ideological domains.

The boundaries between academic staff and academic libraries have also been explored. Derkham, for example, worked on this issue through an intensive literature review, or 'a meta-synthesis' method [8]. Drawing on the discourse of integration, Derkham identifies that academic staff's deficit of conceptualizing IL has been pointed out around: "collaboration", "information literacy skills", "information literacy pedagogy", and "knowledge". However, since Derkeham's research focuses on empirical research, it would make it difficult to capture the real tension of academic staff's experience. As McGuinness indicates, "IL has not yet become a major priority" to academic staff, as IL is self-evident skills among students [9]. For bridging the gap, the model of becoming information literate has been proposed at the level of students' outcome and university [10].

However, I understand that the current IL is practice-based, outcome-based models, describing individual, and specific cases, lacking substantial theorization based on in-depth analysis of the experience of academic staff. The cause of this disjunction from the curriculum would be that IL has been developed with de-contextualised forms. IL should be conceptualized for more discipline-embedded skills. I will reframe IL through New Literacy Studies (NLS) [11]. NLS criticizes such de-contextualised practice through in-depth qualitative research that is situational, contextual and more complex [12]. I employ this theory to conceptualize IL, that has never seen in IL research. In addition, although the notion of the curriculum is always emphasized, its nature has not been specified. Through the qualitative accounts of academic staff's curriculum design [13], this research reveals its characteristic and proposes the theoretical foundation of HE curriculum that will be the basis of IL.

2 Methodology

I employed a case study methodology in a single social science institution in the UK. Semi-structured narrative interviews were conducted with academic staff involved in teaching a core undergraduate course to see how they implement IL in the core course and also other disciplinary curricula. The participants were recruited by snowball sampling. Five academic staff were interviewed (all from the field of social science). Table 1 summarizes the participants' attributes.

Table 1. Participants' attributes

Participants (Pseudo name)	Gender	Teaching level	Appointment
Kevin	Male	Undergraduate/Postgraduate	Lecturer
Marcia	Female	Postgraduate/(former)	Professor
Susan	Female	Undergraduate	Programme convener at some department
Julia	Female	Postgraduate only	Curriculum designer
Naomi	Female	Undergraduate only	Lecturer

The interviews were audio-recorded and lasted for about 30–45 min. The interviews were transcribed and analyzed thematically with themes emerging from the close reading of transcripts. This study received institutional ethical clearance and followed approved procedures for informed consent, including guarantees of anonymity and confidentiality. In this research, participants' names will be pseudonyms.

3 Finding

Through close reading of the transcripts, I identified three themes in relation to this research: The scale of curriculum design; recognized disjunction; and academics attitudes toward IL. I will elaborate on each of these aspects. For the analysis, I will focus on the academic staff teaching undergraduate and postgraduate courses.

3.1 The Scale of Curriculum Design

This section addresses how curriculum design has been conducted. These are the typical accounts that are observed in both undergraduate and postgraduate courses. For example, the curriculum across the undergraduate course to the first-year stage has been developed based on regular team meetings:

> we have a weekly meeting to run through the classes that we organize teaching in the coming week. We meet every Monday for an hour and we talk through the aims of the class […]. We discuss potential problems and challenges that may come. (Julia)

Regular meetings are the place to discuss and develop their curriculum and pedagogy. This is a rigidly organized programme, so the competence of recruited staff is evaluated:

> And we ask them questions about experience of delivering particular kind of teaching, working in teams. (Julia)

For postgraduate courses, some academic staff tend to design the curriculum at individual levels; others do so at the department level. Kevin's account centers on the development of reading list to be distributed, for example, while Susan pays attention to shared frameworks.

> I gave the students orientation to kinds of materials they are likely to read. That's pretty much hard put reading list together, thinking about the topic of overall argument of your course. (Kevin)

> We really try common framework and critical understanding of information (Susan)

As these accounts illustrate, a common tendency found with both undergraduate and postgraduate teaching is that curriculum development has been conducted within their discipline. What is interesting in postgraduate courses is that two trajectories have been identified. As Kevin's account shows, the contents of the module seem to be devised at individual level. By contrast, Susan's account identifies that, as curriculum convener, she focuses on a common framework to manage information with her colleagues.

3.2 Recognized Disjunction

This section focuses on how academic staff recognize the disjunction between their curriculum and academic libraries.

For the undergraduate course, Naomi talks about the possible contribution of academic libraries to the course.

> We've been having conversation about how we can better use the library to get. (Naomi)

This kind of comment, which was echoed by most participants, suggests that they recognise the potential of academic libraries, but, actually, academic libraries are not invited to the courses. What is also implied is that no concrete strategy to integrate academic libraries is mentioned. My interpretation is that academic staff, to some extent, are at a loss as to how to collaborate with them.

For postgraduate courses, Kevin speaks to the experience of inviting academic librarians.

> I felt it good to ask [subject] liaison librarian to come and give a presentation about the resources in the library. (Kevin)

For Susan, although she acknowledges the important role of academic librarians, she confesses some tension:

> But more in terms of formatting, how to make available, what works best in the setting of this particular course. That is definitely something that we worked with librarians. (Susan)

> Not specifically to participating in the teaching. But I have a lot of actions with the librarians to think about how the way we teach; the materials for teaching can be integrated into the classroom […]. And I've also worked closely with library team in terms of thinking of how some of the tools like new reference system and can be adjusted to make it pedagogically as well as technically useful to the students. (Susan)

Consistently, Susan attempts to integrate the academic library's sessions into her disciplinary curriculum. What I interpret from the second account is that she is not satisfied with the current condition, as she has a long discussion with academic libraries in terms of "formatting". These have yet to lead to an improvement in her pedagogy.

These accounts illustrate that the significance of academic libraries is recognised both in undergraduate and postgraduate programmes. Academic staff describes the experience of collaborating with academic libraries, but in what seemed to be a one-shot form. The experience has been influenced by academic staff's appointed roles. Interestingly, Susan explicitly shows her identity as a director who has the responsibility for curriculum design.

3.3 Academic Staff's Attitude Toward IL

This section will attempt to shed light on how academic staff's attitude towards IL has been contested in their accounts. Overall, most of the academic staff did recognize the significance of implementing IL in the module. What should be noted is how this aspect is explicitly illustrated in their accounts.

In this research, the participant who is in charge of undergraduate compulsory programme refers to the trajectory of designing the strategy of implementing IL. As the undergraduate course employs project-based learning around social science issues, she intends to design the module that will lead to IL competence. In this line, Julia argues the possibility of collaboration with academic librarians:

> I think by collaborating more closely with academic librarians as we've been discussing doing. We would have, I think it would open up the doors we have even considered in terms of really making informing the way we do assessment and the kinds of the projects giving students. (Julia)

As indicated above, her intention seems to be the realization of integration of IL through collaborating with academic librarians. Similarly, Marcia's in-depth account below reveals how academic librarians contributed in her module.

> I think information literacy is absolutely fundamental for social sciences. I think academic librarians have huge part playing that. Once I've worked for undergraduate, I'm very impressed by them. They can also, they have a real role in opening up subject. (Marcia)

What I found in these two accounts is that academic librarians have been considered as helpful from academic staff: to "open up the doors" (Julia) and in "opening up the subject" (Marcia).

Then, the focus is on how academic staff in the postgraduate course address the aspect of IL. Kevin's account explicitly speaks of the competence of IL components:

> I don't actually teach them how to access information in part because Moodle, this electronic interface and library webpage, now gives students instant access to many of the readings that are included on certain of all the required readings and many of the further readings as well. (Kevin)

As this and similar accounts from other participants suggest, IL has been taught in the discipline. The first account focuses on how to encourage critical reading, but what this reveals is that he does not specifically show students the way to do it. The second one explores students' shifting information behavior. These accounts indicate 'access to information' is not the primary concern, as the infrastructure of distribution has been developed. Although not stated, what could be suggested is the importance of critical reading of information, as Kevin illustrates.

In addition, Susan's account definitely elaborates how IL has been enacted in the specific discipline. She maintains that:

> Students have supervisors and we have meeting with us among the course. We talk to them about, how do you talk to students about things like information literacy, data gathering. […] They quite serve you ready but there's certain aspect of this. So we make sure that they are integrated into the supervision process throughout the year. (Susan)

As described above, the trajectory of curriculum development and its assoicated decision-making is carefully considered. The infusing of IL into a discipline has been discussed, shared, and shaped based on their recognized problems. Such context-dependent curriculum development is an important feature of academic staff's experience.

4 Discussion

This section discusses three emergent issues through the data analysis.

First, the scale or process of development in disciplinary curriculum has been contested. As Julia's account indicates, a "weekly meeting" is regularly organized to discuss the given curriculum. This is the evidence of how the HE curriculum is developed. As Becher & Trowler suggests, this is one aspect of "academic tribes" [13] is its iterative process of development is deeply embedded in the academic culture. However, this internal process leads to the "super-complex' of the HE curriculum [14] as it allows the flexible forms of curriculum based on their needs. For effective integration of IL, the clues to address the HE curriculum would be necessary. I will propose Barnett and Coate's "schematic theory", for it underpins the foundations of the complex HE curriculum through: "Knowing", "Acting", and "Being" [15]. Although this model focuses on the students' experience, it will be applicable to academic staff's experience. For Knowing, academic staff's knowing matter will be captured in the discipline. For Acting, the process of enacting disciplinary curriculum can be conceptualized. For Being, their identity around discipline will be the focus. Recently, the notion of "Ways of thinking and practicing" has been proposed to provoke the thought about the "all key dimensions of curriculum design and development" [16]. Identifying the nature of the HE curriculum will contribute to shaping the notion of it in relation to the integration.

Secondly, the disjunction of the concept in IL has been observed. In the previous chapter, both Kevin and Susan acknowledge the significance of academic libraries in 3.2, but their purpose of contacting academic libraries seem to be around technical issues, not IL issues. This explicitly uncovers the different recognition of IL between academic staff and academic librarians. As confirmed in Ivey's research [5], effective collaborate on succeeded in linking to disciplinary teaching. Given this situation, IL has been enacted within the community of practice, which is "theory-in-use" of IL theory [17]. Thus, performance-based IL in the major frameworks will not be fully questioned. I suggest that the concept of IL should be shifting toward a situational, context-embedded skill of IL that NLS fundamentally proposes.

Lastly, the academic staff's identity is critical to enhance the integration. The accounts in 3.3 mostly speak of detailed experience of curriculum design in the discipline. For Kevin' account, he refers to the technology use in personal curriculum design. For Susan's experience as convener, the process of implementing IL aspect is elaborated. As these suggest, most of the IL teaching is dependent on tutorial, even though its significance is shared among the academic staff. In other words, academic staff's identity in the discipline should be taken into account around curriculum and pedagogy [18]. Although outcome is contested as top-down level, actual practice is critically elaborated in the individual level.

5 Conclusion

This research confirms the tendency that curriculum development has been conducted within the discipline without going beyond its predefined boundary. For the effectiveness of IL, the concept of IL needs to shift toward "disciplenary-embedded skill", as NLS suggests. For the complex HE curriculum, its foreground elements, "Knowing", "Acting", and "Being" of academic staff will underspin academic librarians' practice. As these theoretical orientations, both academic staff and academic librarians will share the common grounds of IL, that will, then, lead to building a common understanding. This is the aspect of advancing the understanding of the "integration".

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Changing Roles for Research and Information Skills Development: Librarians as Teachers, Researchers as Learners

Tatiana Sanches[1,2(✉)]

[1] Instituto de Educação, Universidade de Lisboa, Lisbon, Portugal
tsanches@fpie.ulisboa.pt
[2] ISPA, Instituto de Psicologia Aplicada, APPsy Center, Lisbon, Portugal

Abstract. University libraries have been dealing with the training needs of their users for a long time. Today, this need continues to be pressing with day to day immersion in print and digital information and the transformations of the tools for its access. Librarians play a fundamental pedagogical role for teachers and researchers who are urged by the Open Science movement to acquire new information skills. They develop information literacy training adapted to these needs. The paper presents a case study that explains three pedagogical paths: tutorial support for teachers and researchers in their daily lives; the provision of electronic resources and training for its proper use; and the development and dissemination of an online publication that seeks to improve their knowledge and practice skills related to Open Science. The actions that librarians can develop are vital because they are the basis for the creation and application of cross-curricular skills in lifelong learning, so necessary for teachers and researchers who need to quickly adapt to new information contexts.

Keywords: Information literacy training · University libraries · Teachers · Researchers · Open Science · Information skills · Higher education

1 Introduction

The pedagogic roles of librarians are becoming more and more important in daily life. With the digital age, new opportunities arise for librarians to act as protagonists, advocates, and pioneers of a new way of handling information, overcoming the traditional roles of keepers and carers of collections [1]. Researchers, on the other hand, as stated by the Working Group on Education and Skills under Open Science [2], need to prepare themselves for the Open Science movement by acquiring new skills.

The commitment of higher education libraries to support research and science has been pursued through several ways: digital data management, institutional repository maintenance, close linkage between technology services and library services, and digital archiving of content aggregators that allow interaction and interoperability between databases [3, 4]. However, this support should also be given through more direct actions that encourage the acquisition and development of skills by researchers and the good use of tools that improve their day to day [5].

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Based on a literature review that underpins a case study, the study seeks to contribute to this reflection, explaining training strategies aimed at researchers, particularly with regard to tools and skills that can contribute to the research, organization, and presentation of information. The case study describes how an academic library responds every day to the challenges of Open Science, taking three paths: providing tutorial support to teachers and researchers; investing in electronic resources and training for their proper use; and developing and disseminating an online publication that seeks to improve their skills in both knowledge and practices relating to Open Science. The library thus seeks to advocate for Open Science, giving the teachers and researchers greater confidence by promoting transversal competences, which facilitate greater participation in the global dissemination of scientific knowledge.

The conclusion shows that these are fundamental partnerships [6, 7] and that the actions librarians can develop at this level are vital, for they are the basis for the creation and sustainable development of transversal skills in lifelong learning, particularly in the changing landscape of higher education.

2 Librarians as Teachers

2.1 The Pedagogic Role of the Academic Library

More than ever, it is urgent that libraries assume their pedagogic role. This is not a new topic, particularly in university libraries, and has been widely discussed in the last decades. As early as 1957, Harvard-Williams [8] had already reflected upon the place and function of the university library, suggesting that, given its growing complexity and the proliferation of books and journals, the most efficient process to make good use of a big library is to consider its pedagogic role [8]. Kemp [9] lists the benefits for librarians related to developing pedagogic skills: learning to interact with students; increasing sensitivity to students' concerns and needs, administrative requirements and teaching faculty overload; changing priorities for developing library collection; enhancing library status and feeling "equal" to other faculty; enjoying intellectual stimulation due to teaching activities; and the academic librarian's self-improvement, which benefits the whole academic community.

The pedagogic role of librarians becomes more pressing as teaching itself focuses on search methods and on constructivist learning, of which research techniques and information literacy are fundamental elements [10]. The essential idea is that the efficient and productive use of information sources and resources, received through good pedagogic strategies, will bring tangible benefits to users, in that they can connect resources and research in a more fluid, intelligent manner. These are practical results for students who want to have a successful academic career and for teachers and researchers whose action and professional development may find a sound partnership in libraries. Indeed, as repositories and places of access to information, libraries are a vital key of the chain of intellectual production and scientific advancement, precisely because they also identify with the same mission of teaching, research, and dissemination of knowledge as the universities where they belong. While not all librarians feel comfortable in the role of teacher [11], the pedagogic role of academic libraries is recognized as an essential feature of the organizational mission and must move from emergent practice to best practice [12].

2.2 Librarians, Teachers and Researchers Partnerships

To implement its pedagogic role, libraries have taken paths that, one way or another, lead them to the development of partnerships with teachers and researchers. In 1993, Grimes [13] already mentioned the importance of these synergies, calling for librarians to develop pedagogic skills and the faculty to develop research skills, with a view to equalizing both roles in their shared contribution towards students' learning.

Among other advantages, the positive impact of good relations, shared values, and focus on communication are pointed out as boosters of commitment and trust between faculty and librarians [14]. Partnerships are also recognised as generating value in libraries and it is recommended librarians invest in the development of their teaching skills, show confidence in the field of their abilities and librarianship skills, and invest in communication [15]. This is why several studies [5, 7, 16–18] point in the same direction: a successful collaboration between librarians and teachers seems like a win-win deal, with obvious gains for students and researchers, who reach their academic goals with greater efficacy, are more up-to-date in their study topics and expand their study and research skills. As Dillon states [19, p. 57], "Augmenting the learning and research processes will require a deeper understanding of the underlying psychology and culture of these creative acts and experiences, coupled with an ability to experiment with and evaluate the effects of new tools. Libraries are not alone in this effort, and partnering with faculty in exploring new practices is necessary for real progress to occur."

In Portugal, there are already reports of successful experiences [20, 21] in the framework of partnerships between teachers and librarians, particularly in the context of the construction of training in information literacy. This is seen in examples to follow.

2.3 Training Teachers and Researchers in Information Literacy

As mentioned at the beginning, in a vastly changing informational context, it is clear that information literacy continues to be relevant and contemporary in the academic community, especially to meet the needs of researchers and teachers. Thus, the training of these professionals should also be a priority for librarians [22]. We should deal naturally with the fact that teachers and researchers are not as updated in terms of information management, digital data, or virtual profiles, though all these tasks are closely related to their daily activity. To respond to these demands, the flexibility and scope of information literacy are strengths to be taken advantage of. Due to the specific needs of faculty, contents, formats, and evaluation must be tailored to each specific situation, as they already are for students [23, 24], and based on effective communication between the recipients of the actions and those providing them. In fact, there are already national and supranational concerns seeking to ensure an appropriate coverage of information skills and competencies training and skills development programmes for researchers [25, 26]. But these concerns should be applied to the concrete everyday situations of our libraries, particularly considering the context of Open Science and what its concepts and practices imply for teachers and researchers.

3 Researchers as Learners

3.1 Open Science and New Needs

Open Science [27, 28] represents a new approach to the scientific process, based on cooperative work and new ways of distributing knowledge by using digital technologies and new collaborative tools. It also represents the transitions under way concerning how research is carried out, how researchers collaborate, how knowledge is shared, and how science is organised. In practice, Open Science can make science more credible, trustworthy, efficient and respondent to societal challenges [29, 30]. So it is only right to bet on its dissemination, promoting its benefits and supporting researchers to participate and enjoy these advantages. But this can only be achieved with information and training.

In the United Kingdom, United States, and some Northern European countries, concerns with the development of research skills supported by librarians seem to have more emphasis [22, 30–32]. Actually, it is widely recognised that university libraries have supported science and research [33]. They do so through several means:

- through providing information resources such as offering search engines for searching information and acquiring the necessary resources;
- in its conservation and access, providing the means to keep, preserve and safeguard materials; and,
- in supporting and facilitating teaching activities and research processes through which they help undergraduate students develop research, critical analysis, and skills in information literacy.

The Ministry of Science and Higher Education in Portugal created opportunities for a national debate, involving the different players in the construction of a common commitment towards the democratisation of access to knowledge through making recommendations concerning Open Access [34]. These are based on European guidelines and focus on the definition of an agenda for science and innovation, grounded in the concepts of *Open Science, Open Innovation,* and *Openness to the World*. Focused mainly on a change of paradigm regarding research operated by these concepts, these concerns [35, 36] are also emerging in Portugal. This is seen as an interweaving of the *modus operandi* of research in the context of Open Science with the resources and tools available in the digital environment, especially through libraries [37] and by developing skills in information literacy [38].

3.2 Information Skills Development

Transversal skills, that go beyond the disciplinary spectrum of researchers' fields of interest, add greater capacity for intervention, because they not only benefit their role of information promoters but they also allow them to develop the ways in which they search, learn, and are updated [39, 40]. So which new skills should researchers develop? The challenge of demands set by more data, more information, more scientific

production, more national results that can be used in rankings, impact factors, and other metrics, is compelling. In an in-depth study about the use of libraries by researchers [31], the authors concluded that researchers and librarians have different perceptions regarding researchers' needs. The various aspects where common work is the priority were listed and include

- funding needs to acquire documentation and fostering a sense of belonging to the library;
- improvement of behaviour towards information;
- new ways of working – collaborative and interdisciplinary;
- new ways of supporting researchers through counselling and training;
- visibility, dissemination, and openness supporting open access;
- the need to promote library services; and,
- ensuring communication channels.

These are important clues to define the skills that must be worked on by librarians, so that they respond adequately to researchers' needs. It also confirms, as stated almost a decade ago, the librarians' growing and expansive role as educators, as higher education responds to an ever-changing world [40].

4 A Case Study

The Instituto de Educação [Institute of Education] (IE) is an organic unit of the University of Lisbon, designed for research, training, and intervention in the realm of Education and Training. The Faculdade de Psicologia [Faculty of Psychology] (FP) is also part of the University of Lisbon and is dedicated to forming future psychologists and to intervening in individual and collective behaviour. The library that is the object of this study serves both institutions simultaneously. For this purpose it has a team of seven people. In total, the library serves an academic community of 2,250 students, teachers, and researchers. The support given by university libraries to teachers and researchers is neither new nor is it exclusive of this case in particular. This library has supported teachers and researchers for some years already, albeit in different formats, and has been the object of study at several times [41, 42].

The present study intends to explore the way researchers can take advantage of the context of Open Science to prepare specifically for dealing with information and to show the responses of the librarians sustained in information literacy. The aim is to clarify that by knowing how to search, select, organise, evaluate, and present information in an ethical and legal manner, they will have better conditions to investigate, produce new knowledge, and spread it. This study thus seeks to show the support of higher education libraries, indicating tools and good practices to train and inform, as an answer to this aspiration.

4.1 Preparing, Organizing and Projecting Research

Although there are more detailed proposals [43] regarding the research cycle associated with the support of libraries, in the case in question we chose to provide training that takes into account the information and capacity-building needs regarding the researchers' actions, on three levels:

(a) Preparing the investigation

- Supporting the purchase of documentation
- Supporting the search for information
- Advanced search in specific databases and search engines

(b) Organising and developing the investigation

- Supporting the organisation of information
- Quoting and referencing
- Electronic management of bibliographic references

(c) Designing and disseminating the investigation

- Checking self-archive rights
- Managing the repository
- Supporting self-archive and validation of data
- Impact factors
- Creation and management of researcher profiles
- Supporting choice of publications for publishing
- Supporting the preparation of Powerpoint and oral presentations
- Highlighting the investigation's publications/results

For all these needs, four concerted strategies are organised that imply thinking about the investigation globally: (a) tutorial support for researchers, considering various individual requests; (b) investing in electronic resources and tools; (c) providing specific training in two-hour workshops; and (d) developing and disseminating an on-line informative publication to improve researchers' skills both in knowledge and in practices concerning Open Science. Together, these areas ensure that we meet the proposed informative and formative goals, giving researchers' greater confidence by promoting the necessary transversal skills. They also contribute to strengthen their presence in research networks, consequently offering greater participation in the global distribution of scientific knowledge. We know that researchers have different appetites when it comes to information, but it is also known that there are vast common grounds with regard to Open Science, to which we can turn our attention and provide training through various channels.

4.2 Reframing Information Skills for Researchers' Needs and Building Partnerships for Learning

A combination of new roles, new abilities, and new partnerships may help librarians to efficaciously and efficiently extend their services and respond to a wide range of researcher needs [22]. The library in question aims to correspond to this aspiration. Throughout the years, it has developed several actions to support research by:

- Purchasing and making available databases, electronic journals, books, and other that sustain data search and collection and substantiate the scientific investigation;
- Supporting researchers in knowledge production and management through training actions/workshops and tutorial assistance with regard to research resources and to themes such as management of bibliographic references, impact factors, and so on;
- Encouraging research study and dissemination of research findings by creating research profiles as well as its publication in open access, in the institutional repository, and in academic social networks, thus ensuring the scientific production has international impact.

The amount of information currently available requires that researchers have the necessary skills to search, evaluate, select, use, and present information in an ethical, efficient manner. Hence, the importance of transversally following the whole research process. Regarding the impact of information literacy on Open Science, Basili [44] states that it is important to promote skills that enhance the capacity to critically confront contents, self-sufficiency, and control over the learning/research process. Generally speaking, researchers manage their investigation and have skills concerning information search strategies, evaluation of search results, creation of alerts, reference management, and the publication of results. With Open Science, permanent updates of skills are required. That is why new ways of approaching researchers that contribute to their information and training are not negligible. This case study has described how a university library responded strategically to the challenges of Open Science, in a simple manner but in line with the digital environment where the investigation is carried out.

5 Conclusions

Librarians have an extra responsibility because they have deep knowledge of information, its organisation, management, and access. They should disseminate this specific knowledge through training and informative actions. Researchers base much of their activity on information resources so they need to understand, access, evaluate, use, and manage a wide range of documents. That is why it is important to devote some time to learning new information organisation and management tools. As institutions dedicated to supporting learning and research, university libraries should pay close attention to the changes that technologies bring to the field of information, namely the Open Science movement.

The experience of the Library of the Faculdade de Psicologia and of the Instituto de Educação is just one example of how this adaptation has taken place. In the context in question, we sought to show how important it is to acknowledge the role of librarians as promoters of Open Science and trainers of teachers and researchers in these matters.

For this purpose a specialised tutorial action was designed, as well as refresher training in thematic workshops and a digital informative sheet sent by email. These resources support continuity in the investment and update in electronic resources and the provision of refreshed information. All these strategies serve to describe and explain access, organisation, and sharing of information, building capacities in individuals for the Open Science movement. This capacity-building should be based mostly on the dialogue between these two professionals – librarians and researchers – so that both can converge towards common goals, aligning their interests and efforts.

The actions that librarians can develop at this level are essential, for they are the basis for the creation and development of transversal skills in which researchers are indispensable partners. A case study always implies the intrinsic limitations in that it is a circumscribed reality that is not always reproducible. In this case, in particular, it was not possible to deepen the context. Nevertheless, we believe that the ideas conveyed can be inspiring for other libraries that are faced with the task of teaching of information skills to teachers and researchers. In the future it would be important to follow the example of the international panorama and carry out in-depth studies consolidating the existing knowledge about researchers and their needs that would allow for a wider scope and impact of information literacy applied to Open Science.

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Information Literacy and Aspects of Education

Four Passages to Information Use Related Phenomena in Bachelor Theses at the Finnish Universities of Applied Sciences

Juha Kämäräinen[1(✉)], Ilkka Mönkkönen[2], and Jarmo Saarti[3]

[1] Marjamäenkatu 23 C 5, 05820 Hyvinkää, Finland
juha.t.kamarainen@gmail.com
[2] University of Helsinki, P.O. Box 3, 00014 Helsinki, Finland
ilkka.monkkonen@helsinki.fi
[3] University of Eastern Finland Library, P.O. Box 1627, 70211 Kuopio, Finland
jarmo.saarti@uef.fi

Abstract. Information seeking and use activities play an important role in completing the mandatory theses at Finnish Universities of Applied Sciences (UASs). The institution encounters issues related to value judgements between theoretical and practical knowledge. In this paper it is discussed how Bachelor theses are built at Finnish UASs in terms of information use events and related structures and processes. A qualitative multiple case study is reported. Data driven conceptualizations are supported by applying categories related to foundational system assumptions. The findings discussed are grouped into four themes. Some students expect predefined norms for using literary sources. Some encounter feelings of being alone with their topic, in other words, "finding" research gaps that do not exist. Insufficient knowledge about genre conventions and other situational factors can lead students to create textual solutions of their own. Different support and guidance approaches are required for each group. Information processes in theses and related problems can be based on different systemic assumptions. We suggest that these findings should be worked up as part of the efforts that are necessary in the Finnish Universities of Applied Sciences to articulate their assumptions, concepts and values related to information and knowledge use.

Keywords: Information literacy · Academic libraries · Bachelor theses · Higher education · Finland

1 Introduction

The purpose of this paper is to report on a qualitative multiple case approach study that aimed to find out how bachelor theses are built in terms of information use events and related structures. The study was conducted to fulfill the requirements of the Ph.D. thesis of the first author of this paper [1] under supervision by the third author.

The purpose was achieved by analyzing 23 cases, four containing, in addition to each thesis, also either a diary or a blog reflecting the student-author's articulation process of thesis-making. The cases were made anonymous. Thus, the contexts

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(institutions, degrees, the names of the author, and instructor) of the cases are not disclosed. The approach has been selected to ensure that the research remains as independent of the UASs' institutional goals as possible.

The bachelor thesis which is a mandatory part of all degree programs at the Finnish Universities of Applied Sciences (UAS, Finnish 'ammattikorkeakoulu') is a final showcase of a student's learning during the studies. The number of theses completed in each UAS is also one of the performance criteria for financing the Finnish UASs set by the Ministry of Education and Culture.

The motivations for the project were based on the first author's experiences as an information specialist in a Finnish UAS as well as his discussions with the co-authors and other colleagues.

The project remained independent from Finnish UASs as well as their mutual networks. The data, except for the blogs and diaries, were obtained from the full text database Theseus containing most theses accepted in Finnish UASs. The database has been operational since 2005.

Funding for the first author's doctoral thesis process was obtained from the Jenny and Antti Wihuri Foundation.

2 Background

The features of data-driven qualitative approaches that distinguish them from their theory-driven counterparts are related to surfacing the implicit theories-in-use that characterize the informants' ways to handle the relevant issues currently at hand. In grounded theory, focused views on literature can be seen as a special kind of data that offer additional views and critique toward other sources of data instead of offering predetermined concepts or theories to be tested. In other words, especially in the so called "Glaserian" view on grounded theory research the possibilities for post-coordinating literature to findings made from data are emphasized instead of conventional pre-coordinating roles of the literature review [2, pp. 419–421].

These characterizations do not underestimate the significance of literature in the grounded theory research but to repose some of its functions [3]. From this point of view, we applied a literature review in the background section of the paper to introduce some points that may help our readers to orient themselves to our methodology and findings.

In addition to the contextual categories that appear in more direct ways from the data, the grounded theory process can utilize so called formal categories that appear in the later phases of the research and are aimed to connect the findings to the context of relevant research. When introduced too early, there are risks that the role of formal categories increases and they begin to narrow and steer the researchers' thinking toward current mainstream and to mute her theoretical sensitivity, in other words, the awareness of the nuances and biases in the data. On the other hand, the formal categories are also relevant means in structuring the findings during the reporting phase [4].

In the present study, the so-called systemic assumptions are used as formal categories to structure the overarching research task especially during the final analysis and reporting phases. Porra introduces three basic types of systemic assumptions present in the use of information systems, namely (1) mechanistic, (2) human system, and

(3) colony-based ones. Type (1) is characterized for example by clearly defined borders and external control, whereas in (2) the unique character of human being-in-the-world is emphasized for example in terms of autonomic setting of goals and the significance of individuals' personal histories involved. The goal-setting ability and consciousness about one's own history lack from (1). Type (3), the colony, is used to characterize the combination of (1) and (2) in the dynamics of their simultaneous development mostly on the macro level. The status of a colony can vary between a stable status and a rapid "paradigmatic" change [5]. The colony dynamics are used in our study, for example, to discuss how the students may either follow or strictly question the current information practices related to the use of sources.

The grounded theory research orientation leads to certain openness in the definition and formulation of the research task. Instead of a focused research question, a broader research task, problem or theme may be introduced. The research task of this study is framed by the tensions related to the features of bachelor thesis projects that raise from the position of the UAS as a successor of earlier institutions in technical, commercial, and nursing education in Finland and the requirements to upgrade their practices nearer to the university level.

The research is thus aimed to conceptualize the students' efforts in applied research tasks that have both practical goals and requirements to indicate skills to seek and apply relevant research methods and results, in other words, "theory". The theses that are available through the Theseus database are seen here as data concerning information use rather than as evidence on information seeking, because the general requirements for the bachelor theses do not demand the students to report how they have formulated and performed the information searches during their thesis process.

Another source of tensions come from the different roles of teachers and library staff in supporting the students when they build the knowledge basis for their theses. For example, Sevón has reported tensions related to different roles of librarians or information specialists at Finnish UASs [6]. Kämäräinen and Saarti has discussed this theme under the label, "the principle of noninterference." That refers to the issue of whether the library professionals should consider the subject matter related questions during their dialogue with customers, especially students, or whether they should only focus on information seeking issues instead of the use and the meanings the users give to the sources found and leave the latter issues to the teachers [7].

3 Methodology and Data

This study is focused on building data-based conceptualizations that might help actors in the Finnish UASs communities to identify orientations and related problems present in information use around students' thesis projects. This study is aimed at creating theories rather than testing them. The aim is especially associated with the grounded theory (GT) approaches. As Charmaz puts it, GT can be used to build middle-range theories inductively by analyzing data and developing concepts on multiple levels [8, p. 507].

The main functional elements of a qualitative multiple case study appear as follows: theoretical sampling; use of triangulation to improve the internal validity of the research; the analytical strategy selected; and the analytical generalization approach [9].

Triangulation is operationalized here as mutual comparison of the cases and in comparing the cases and the current version of the theory in the spirit of constant comparative method of the grounded theory approach.

In her doctoral dissertation Vuorijärvi focused on the microstructures of discussion parts in bachelor theses from one Finnish UAS [10]. There is no overlap between Vuorijärvi's data and the research discussed here.

The definition of structural analysis units ("moves") utilized in the detailed analysis is based on Vuorijärvi's (ibid.) application guidelines from Dudley-Evans' genre modelling for the "English for special purposes" (ESP) related writing and teaching contexts [11]. The moves are defined here as structural-functional units of source texts in which instances of information use can be found and isolated.

The main data set of this study consists of 23 bachelor theses or analogous cases from Finnish UASs or vocational teacher education colleges. The data set is a result of theoretical sampling [4, p. 194]: additional cases were sought purposefully to test and extend the model under construction. The cases were grouped into six sets of four cases (one case appeared exceptionally in two sets, the opening set and the one including cases with diaries or blogs, thus representing two criteria of selection). Relevant pieces of literature (like student guides for thesis writing) were also used as data.

4 Results

Four passages, in other words, orientations towards information use were identified in the study. These findings can be summarized as follows: The students may (1) expect and seek objective norms about sources; (2) feel alone with their topics and experience difficulties to find and identify relevant sources; (3) both utilize and redefine the conventional structures related to the genre features of bachelor theses; and/or (4) try to find substitutes for laborious theories to form conceptual frameworks for their theses.

These orientations are, in turn, based on different systemic views concerning the epistemic nature of theses made at Finnish UASs. The orientation (1) follows an objectivist view, whereas the orientation (2) concerns ideas about each thesis project appearing unique and is thus based on a subjectivist view. The orientations (3) and (4) approach an intersubjectivist viewpoint, treating theses through memberships in several conventions, that is, information practices that are either to be followed or to be challenged by the students in their thesis projects.

Passage 1: Expectations on Objective Norms About Sources

The number of references required in an essay or theses appears to be an issue that a student cannot get out of her mind. Finnish students seeking peer help for the issue on several popular Finnish Internet forums like Suomi24.fi and Demi.fi or on Google. One student in our sample mentioned in her blog that she consulted a local UAS study guidebook and sent e-mails to her teacher about the issue. However, she did not report any results, which may suggest that no criteria for an exact number of references required was available.

The assumption that a fixed (minimum) number of references might even determine the essence or quality of a bachelor thesis, for example, indicates that a thesis can be considered a system having structural properties of a machine. In this orientation, the thesis project is a task of building a predetermined textual product (in other words, an eligible representation of the Finnish bachelor thesis genre) from certain information blocks. A certain number of references used as well as an established form of disposition are among the means of achieving this goal.

Especially in one of our cases, but also to some extent in some others, the students resorted to use "well-known small classics", which refer to a few textbooks that are frequently being used at Finnish UASs to handle some repetitive but tedious issues, like the selection of main orientation between theory and practice in one's thesis. The open full-text database called Theseus offers the Finnish UASs community a reserve of this kind of model cases. The use of small classics is ethically acceptable, but questions appear concerning how widely and deeply the students familiarize themselves with the central sources in their fields of study.

Passage 2: Feeling Alone with One's Topic

Pankl and Coleman reported students may sometimes fail in finding any relevant sources by themselves [12]. Library staff frequently met anxious and distressed students. A student in our dataset kept describing her feelings related to lack of useful sources in her diary. She had no previous experience about the topic that she selected from a list of alternatives.

In close reading of the diary and several versions of her thesis, it appeared that the student was accommodating herself to a pessimistic theory-in-use relating to the idea that she had to survive without enough relevant sources. She began supporting the model by herself and probably succeeded in "infecting" that view to her teacher as well as partners involved. She reported that the information searches her teacher made to help her were also unsuccessful. However, when one of the authors of this article (JK) made a few test searches, it quickly became clear that the working hypothesis of lacking research was false. However, no accounts on consultations with library staff were shown in the diary.

Another instance of being alone with one's thesis project can also be found in our data. A student focused her thesis on creating a learning material package. She decided to rely on her own memory instead of written sources and she mentioned it explicitly. Her argumentation was quite complicated and wordy but also very informative: (1) She mentioned that her priority would have been to improve the existing material instead of making new documents if any suitable source was available. (2) The topic was so broad that it was not covered by any single source. (3) One should utilize dozens of books to fulfill the gap. (4) Since she considered herself a member of the target group (her peers) she assumed that she could adopt the subject better by using her experience instead of written sources.

Passage 3: Utilizing and Redefining Textual and Content Structures

The conventional means to accommodate oneself to the bachelor thesis as genre are as follows: (1) leafing through theses that one finds by browsing the shelves in the library; (2) closer reading of a few examples while participating in seminars and acting as a

peer opponent; (3) finding relevant examples through Internet searches; and, (4) specific searches in institutional full-text databases of theses (like the Theseus database in Finnish UASs).

During the preliminary study, a case was found interesting because of its scanty and mixed set of references. In a closer examination, the overall disposition of the case was found unconventional (or innovative on the other hand). The structural model the student had applied was not a conventional thesis disposition (like IMRD), but rather a sequence of slides used in lectures to cover a theme or topic.

For this unconventional case, it seems obvious that these means had no significant role when the author familiarized herself with the writing task at hand. Her task was to create learning material for her peers about a topic with which she was already quite familiar. In a conventional setting the result would have been written in two parts: (1) the learning material itself; and, (2) a report concerning reflections on the process of creating it. In our case, the author wove these products together.

In a recommendations document about the quality of theses at Finnish UASs, a suggestion was made concerning a zipper-like thesis structure, in which the "theory" and "practice" components would be interspersed in the text [13]. However, this ought to be a conscious decision and would demand quite advanced writing skills. It has also been suggested that the UASs should contribute in developing new textual genres, such as interventionist writing [14].

Passage 4: Finding Substitutes for Laborious Theories

Divisions and gaps between theoretical and practical orientations and related views on knowledge are frequently present in thesis writing environments at Finnish UASs. Practical orientations are often realized as projects. Theses seen as projects or made in the context of projects are also supported by the regulations given to UASs by the Ministry of Education and Culture. An alternative for the development project approach may be to follow and apply traditions related to the Finnish academic master's (pro gradu) thesis. By leaning to problems reported in this tradition it was suggested as early as in 1990s that Finnish UASs should not follow these traditions in straight-forward ways [15].

However, most teachers in the Finnish UASs have the traditional academic background, that typically includes a master thesis, or a thesis required for a diploma. Principal lecturers are usually required to have a doctoral or licentiate degree. In other words, they often must guide thesis processes related to genres of which they do not have personal experiences as authors.

It has been noted, for example by Julkunen, that the genre of bachelor thesis included in engineering education in UAS can be based on laboratory work reports [16]. In nursing education, certain traditions on seminar presentations and related reports have been present since early 1950s [17, p. 266].

A search for relevant theories and their application in meaningful ways in one's thesis may lead some students and their supervisors to troublesome issues and discussions: What kind of objects or tools are the theories in general? What kind of conceptual construct suffices as a theory? In some cases, students resort to various constructs, in other words, devices that Krogerus and Tschäppeler call "models for strategic thinking" [18]. The SWOT analysis and Johari Window are some examples of them.

The ways of using conceptual devices like the SWOT or Johari are diverse. The authors can refer to several sources to anchor the devices to the application at hand or they can take the technique for granted and rely on the assumption that the assumed readers are familiar with the selected one.

The essential point is the role of the device as a substitute of any "full-scale" theoretical framework. The means like the SWOT or Johari are used as bridges to pass the gap between the practical context, in other words, the student's case or project and the need to show some relevant use of a compact conceptual package, "a theory".

5 Discussion

The multi-case study discussed here was aimed to seek and characterize the information use phenomena present in theses made at Finnish Universities of Applied Sciences. A typology of the systemic assumptions was utilized to identify more abstracted categories placed conceptually above the substantial findings, in other words, the information use related phenomena.

We suggest that the Finnish UASs ought to articulate their views on professional cultures of information use in the ways that are as transparent as possible. This applies to the observers and partners outside the institution, as well as understandable and applicable enough for the students, when they seek and build their own paths to expertise. The library staff could also have an active role in this effort.

The themes concerning different professional cultures and values of information use appear especially relevant in the context of the special roles and mutual divisions of labor between Finnish Universities and Universities of applied sciences if their collaboration deepens and if the consolidations of the institutions become more apparent. Some Finnish universities and UASs already share, for example, the library and its services.

One can also see the emerging new ways of information use that are already applied. The 'web-savvy' students that have been using the Internet and its tools and applications have started to use information in new ways that do not comply with the manners the traditional, paper-based science incorporated. From both educational and information use perspectives this raises new questions to be analyzed and solved in practice: one can even ask whether the rules of ethical conduct of the information apply in an open information sharing environment where the authority has a completely new meaning.

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Collaboration Building Between Teaching Faculty and Librarians: Based on a Case Study on Field Librarians at the University of Michigan

Tayo Nagasawa(✉)

DHIER/Research Development Office of University Library,
Mie University, Tsu, Japan
nagasawa.tayo@mie-u.ac.jp

Abstract. This paper investigates collaboration building between teaching faculty and librarians in university settings, and specifically the question: "What are the librarians' main approaches to teaching faculty to build collaborations with teaching faculty?" In order to answer this question, a qualitative case study of field librarians at the University of Michigan was conducted. An analysis of thematic coding revealed "interacting with the community members", "as a member of the community", "customised to individual needs" and "staying in touch" as categories of librarians' strategic approaches to teaching faculty. The results indicated field librarians' approaches were focused on relationship marketing. While these approaches were similar approaches in the Earlham model, these developing processes were different.

Keyword: Faculty-librarian relationship · Collaboration · Information literacy instruction · Field librarian · Embedded librarian · Qualitative case study · University of Michigan

1 Introduction

As a result of recent higher educational reforms, universities have included information literacy among their attributes for graduates in order to help undergraduates build a foundation of information literacy in everyday life for their future. In this context, building relationships between teaching faculty and librarians has been recognised as an important factor contributing to the success of information literacy instruction (ILI), and helping to enhance information literacy learning outcomes for students [1, 2].

In order to build successful collaborations between teaching faculty and librarians, novel models of university librarians, such as embedded librarians, have been proposed and introduced into university settings. The purpose of this paper is to gain some indications to consider about the successful collaboration building both in practical and theoretical perspectives based on investigating the collaboration building between teaching faculty and embedded librarians in university settings.

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2 Literature Review

Based on a review of the literature on embedded librarians, Schulte revealed common activities of embedded librarians such as those embedded in course management systems and physical co-location with patrons. In conclusion, Schulte indicated a formal and systematic process to quantify outcomes, and demonstrated that the impact of embedded librarians was insufficient; no study evaluated embedded librarians in terms of physical and cultural integration into an academic or business unit [3]. There have been several other studies on embedded librarians [4–9], but their main focus was not on building collaboration between teaching faculty and embedded librarians, even though some studies mentioned it [4]. Thus, a research which focused on the collaboration building should be conducted.

Based on a review of the literature on building collaboration between teaching faculty and librarians in higher education, previous studies have offered two main research perspectives. One was librarians' strategic approaches to teaching faculty in order to build collaboration. The other was library, institutional and social contexts which promoted collaboration building [10]. Out of these two perspectives, this paper engaged in investigating embedded librarians' strategic approaches to teaching faculty which embedded librarians used to build collaboration with teaching faculty.

3 Methodology

The research question was "What are the librarians' main approaches to teaching faculty to build collaborations with teaching faculty?" In order to answer this question, a qualitative case study of field librarians at the University of Michigan was conducted. Based on purposeful sampling, in particular, maximum variation sampling, the University of Michigan was selected. The sampling criteria were: (1) institutions at which librarians provided ILI in collaboration with teaching faculty, (2) institutions at which librarians provided instructional support for teaching faculty, and (3) institutions at which librarians provided ILI or instructional support in collaboration with other campus units.

In January 2002, the library started a field librarian project and hired three field librarians in Women's Studies Programme, the School of Arts and Design and the Department of Classical Studies. These field librarians did not work in library buildings but worked most hours in offices located in the school, department and programme (hereafter referred to as departments) that each of them served. Their main mission was to provide learning, instructional and research support both to students and teaching faculty in their respective departments. The field librarians were part of the university library system and worked some hours, typically reference desk hours, in the main libraries [11–13].

The data was collected from semi-structured interviews with field librarians, library administrators and teaching faculty and from observations of physical artifacts, and analysed by thematic coding based on grounded theory coding [14] (Tables 1 and 2).

Table 1. List of informants (*Group interviews)

Code	Informants (Academic backgrounds)	Time (mins)	Dates	Sex
A	**Library Manager** (Associate University Librarian for Public Services)	48	05/12/2007	F
B	**Field Librarian** (Women's Studies Programme)	33	13/05/2004*	F
		82	29/06/2004	
C	**Field Librarian** (School of Art and Design)	33	13/05/2004*	F
		75	22/06/2004	
		105	26/9/2012	
D	**Field Librarian** (Department of Classical Studies)	33	13/05/2004*	M
		95	22/06/2004	
		120	05/12/2007	
		60	27/09/2012	
		80	28/09/2012	
E	**Teaching Faculty** (School of Art & Desing)	42	09/11/2006	F
F	**Teaching Faculty** (School of Art & Design)	40	14/11/2006	M
G	**Teaching Faculty** (Faculty of Classical Studies)	34	06/12/2007	M
H	**Teaching Faculty** (Faculty of German Studies)	34	06/12/2007	M
I	**Field Librarian** (Department of Screen Arts & Cultures)	70	27/09/2012	M

Table 2. Questions to informants

Questions to Field Librarians
- What kinds of information literacy instruction do field librarians provide for students?
- What kinds of instructional/research support services do field librarians provide for teaching faculty?
- How do field librarians work with teaching faculty in students' learning?
- How do field librarians work with other campus units?
- How do field librarians communicate with other librarians, teaching faculty and staff on campus, formally and informally?
- How do field librarians develop their competencies?

Questions to Library Managers
- Why did the Library decide to introduce field librarians into departments?
- How did the library manager ask the university and departments about introducing field librarians?
- How did the library manager select the departments to which field librarians were assigned?
- What competencies did the library manager expect of field librarians?

Questions to Teaching Faculty
- How do teaching faculty work with field librarians?
- How do teaching faculty communicate with field librarians formally and informally?
- What are teaching faculty's attitudes towards field librarians and libraries?

4 Results

4.1 Outline of the Results

As a result of the analysis, several categories were extracted: "Pressure on innovation" was one on causal condition, "discussing non-traditional library services of groundbreaking" was one on context, and "embedding librarians into departments" was on phenomenon. Owing to changing the broader academic environment, academic units had to negotiate competing needs and budget with limited economic resources [12]. Under such an environment, the library manager, an associate university librarian for public services, and her colleagues discussed new plans for how the library could do a better job of getting librarians integrated into the teaching and scholarly environment because there was no bridge between departments and libraries [A, 8]. Based on investigating collaboration practices between teaching faculty and librarians at other institutions, the concept emerged of field librarians being physically located in departments [A].

As categories of librarians' strategic approaches to teaching faculty, "interacting with the community members", "as a member of the community", "customised to individual needs" and "staying in touch" were discovered (Table 3). Similarly, "leadership of library managers" and "librarians' competencies and personalities" were discovered to be categories of intervening conditions in library contexts, and "small community", "operational support by departments" and "financial support by a university administrator" were discovered in institutional contexts. As consequences, field librarians acted as "bridges between departments and libraries".

The following sections examine categories of librarians' strategic approaches to teaching faculty.

Table 3. Properties and dimensions

Framework	Categories	Properties	Dimensional extent	Dimension
Causal Conditions	Pressure on innovation	strength	nothing --- week --- strong	strong
		budget	reduction --- still --- increase	reduction
		Environment	collaborative --- competitive	competitive
Context	Discussing non-traditional library services of groundbreaking	Services	abolishment --- reduction --- stay --- new	new
		type	traditional --- non-traditional	non-traditional
		Proposer	library users --- librarians --- library administrators	library administrator
		relationship with departments	no --- weak --- strong	no
Phenomenon	Embedding librarians into departments	number	nothing --- a few --- most --- all	a few departments
		belonging	libraries --- departments --- university	libraries
		workplace	libraries --- departments --- university	Departments
		office location	libraries --- departments --- university	Departments
		supervision	libraries --- departments --- university	libraries
Action/ Interaction Strategies	Interacting with the community members	Purpose of the initial meeting	Icebreaking --- grasping potential needs --- selling library services	Icebreaking/grasping potential needs
		means	e-mail --- telephone --- face to face	e-mail/telephone/ face to face
		frequency	nothing --- sometimes --- often --- always	most of every day
	As a member of the community	settings	Informal --- formal	Informal/formal
		relationship	they --- you --- we	we
	Customised to individual needs	topics	general --- specific	specific
		timing	begging of the term --- end of the term	when had a topic
	Staying in touch	frequency	nothing --- sometimes --- often --- always	often
		means	e-mail --- telephone --- face to face	e-mail/telephone/ face to face

4.2 Interacting with the Community Members

Field librarians emphasised interaction with teaching faculty and students in the departments. Building interpersonal relationships were considered to promote not only an understanding of the potential needs of individual teaching faculty and departments but also to establish channels to future collaboration with teaching faculty in educational and research settings.

Field librarians met with individual teaching faculty in the departments when field librarians arrived in the departments. In the meetings, field librarians casually talked with teaching faculty about their research interests. At this stage, field librarians usually did not mention library services because icebreaking and grasping potential needs were considered more important than selling library services [B, C, D]. After the icebreaking meetings, field librarians had a number of opportunities to interact with teaching faculty in the departments. A field librarian explained this situation as follows:

> In a typical day I have a great deal of interaction with students, faculty, and staff…I am constantly communicating with people either face to face, over the telephone or via e-mail…the interaction gives me a broader perspective about what is happening and how the library and the school interrelate [11, p. 18].

Based on daily communications, field librarians got to know individual teaching faculty including their interests more and more, and gained and renewed the outline of their future involvement in the departments.

4.3 As a Member of the Community

Field librarians were involved in various formal and informal settings in the departments. Like teaching faculty, field librarians frequently attended faculty meetings and met prospective teaching faculty in the departments [B].

Attending departmental meetings gave opportunities for field librarians to deliver library services to teaching faculty and staff in the departments. At the monthly faculty meetings, field librarians usually shared the current topics on library services with teaching faculty. A field librarian proposed to integrate ILI into honours programmes when teaching faculty discussed the quality of submitted theses on the departmental curriculum committee [D]. Field librarians were able to propose appropriate services to the occasion because they were familiar with current topics in the departments. A field librarian explained "I am much better able to judge what will be needed. I know the curriculum better from being part of faculty meetings and student discussions" [11].

Field librarians were also involved in various academic and social events in the departments. One field librarian held an exhibition on art books in collaboration with a teaching faculty in the department [C], while another arranged a book exhibition at an international academic conference hosted by the department [D]. In addition,

field librarians joined in social events such as going on picnics, watching baseball games and going bowling with teaching faculty and staff in the departments [D, 11]. A field librarian mentioned the situation as follows:

> To demonstrate how much they have accepted me, last year I was able to serve on the School's staff retreat planning committee. I am warmly invited to, and accepted at, all types of social gatherings – show openings, holiday parties, birthday celebrations, and even staff bowling night. I try to take as many opportunities as I can to get to know the people with whom I am working [11, p. 19].

On a picnic and at a baseball stadium, a field librarian received questions on information search from teaching faculty, and gave quick answers on the spot [D].

Each field librarian was deeply involved in everyday life of each department. Such involvement helped field librarians not only to understand current situations in each department but also to be recognised as colleagues and to maintain the collegiality.

4.4 Customised to Individual Needs

Field librarians designed ILI customised to each course. Some teaching faculty had told field librarians about their students' frustration with doing library work and their own hesitation in developing assignments. Based on these individual needs, field librarians designed ILI. A field librarian explained "I could tailor my instruction to their needs… I decided what I would show them in the library based on what the professor had decided to have the students do" [C].

Field librarians designed topics of information resources and timing of the session appropriate for each course. Concerning topics of information resources, a field librarian explained "I usually propose a specific topic that I might use as an example if I was in their class… so that students have an idea from different kinds of information" [12]. In order to understand these topics, field librarians asked if teaching faculty could send their syllabi to the field librarian, and, when necessary, asked them further questions in conversations and e-mails [C]. Concerning the timing of the session, field librarians realised that there was a specific timing at which students could actually start their own work. Based on the experience of providing ILI in the first class, a field librarian recognised "students do not want to listen to me, if students wait too long" [B]. Field librarians understood that students had to have a topic that they were thinking about when students learned about finding information resources [B, C].

The library manager explained that field librarians should consider the specific needs of the community as follows:

> …the library drafted a basic job description that included…We put a strong focus on individual faculty needs in the specific context of their disciplines…each field librarian was able to articulate their role within the individual context of their discipline, departmental culture, politics, and academic directions… [12, p. 40].

Field librarians customised not only ILI but various services to individual needs in the departments. One field librarian emphasised collection development because teaching faculty and graduate students in the department wanted to enrich their book collection. The field librarian assigned nearly seventy percent of their time to develop collection [D].

4.5 Staying in Touch

Field librarians believed that their continued presence kept the library alive in minds of teaching faculty and their students [11]. In departmental meetings, e-mails and face to face communication, field librarians stayed in touch with teaching faculty and students in the departments and kept them informed of library issues.

In monthly departmental meetings, one field librarian shared something new about libraries with teaching faculty [D]. Another field librarian contacted the deans whenever needed [C]. These presence helped teaching faculty to realise that the field librarian worked for the department, and what their field librarian could do for them. Field librarians routinely sent e-mails to update teaching faculty of their activities. One field librarian sent out e-mail messages each term to teaching faculty in the department to remind them that their field librarian could provide ILI for their classes [C]. Another field librarian frequently sent out e-mails to all teaching faculty and graduate students about information on required resources, services, workshops, new matters in the library and things that teaching faculty should have known. The more field librarians knew individuals, the less structured and more informal these communications became [B].

In daily communication, field librarians frequently heard such expressions as "Oh, librarians can do that", and thus casually tried to make community members aware not only by sending e-mails but also by working around offices and asking them to go for a cup of coffee [B]. Field librarians advertised their services more than e-mails and daily communications. One field librarian put his profile and contact information on the bulletin board of the department as a member of the community [D]. Another field librarian put a sign of her availability on the office window facing a busy corridor [C].

In class sessions and in orientations for students and new teaching faculty, field librarians emphasised that teaching faculty and students could feel free to ask field librarians questions whenever needed [C, 12]. Field librarians asked if ILI could be introduced in their classes when teaching faculty realised that their students were not always as prepared for research assignments as they had thought. Some teaching faculty did not wish to give up their class time for a field librarian, and then the field librarian asked the teaching faculty to include her contact information on the syllabus [B].

In order that teaching faculty and their students could recognise that field librarians were available whenever needed, field librarians kept informing them of their services.

5 Discussion

Based on a case study of field librarians at the University of Michigan, "interacting with the community members", "as a member of the community", "customised to individual needs" and "staying in touch" were discovered as categories of librarians' strategic approaches to teaching faculty. These categories indicated that field librarians' main approach was to build good relationships with the community members including teaching faculty. Field librarians firstly approached individual teaching faculty by ice-breaking meetings, which were one-way approaches from field librarians. In parallel with interacting with individual teaching faculty based on the icebreaking meetings and the following daily communications, field librarians have been building interpersonal

relationships with the community members and increasing opportunities to be asked to join in various departmental events, such as meeting with prospective teaching faculty and joining in picnics and bowling games. Thus the interactions became two-way approaches between the community members and field librarians, and the level of interaction proceeded from low to high. The two-way interaction helped field librarians design and provide library services including ILI customised to individual teaching faculty and each specific situation. The higher the interaction became, the more familiar the librarians became with the specific contexts. As a result, field librarians were able to design approprate customised services, and teaching faculty and their students were satisfied with their services and asked field librarians further questions [F]. In order to maintain the interaction, field librarians provided "staying in touch" approaches so that teaching faculty could keep in mind that field librarians were available whenever needed.

Such field librarians' relationship-based approaches were located in relationship marketing. Relationship marketing was marketing and management based on "forming long-term relationships with customers. Rather than trying to encourage a one-time sale, relationship marketing tries to foster customer loyalty by providing exemplary products and services" [15]. Grönroos proposed key relationship-based characteristics: (1) the service provider and customer engaged in long-term business contact; (2) the relationship required that the service provider gained insight into the customer's everyday process; and (3) the goal of the relationship was mutual value creation [16, p. 3]. Field librarians engaged in long-term contact with teaching faculty in the departments through continuous approaches including icebreak meetings, e-mails and daily face to face communications. Moreover, they were involved in various departmental events, not only faculty meetings but also social events. Based on being deeply involved in the everyday life of the departments, field librarians gained insights into specific needs of individual teaching faculty and the departments. These insights helped field librarians design and provide exemplary services customised to individuals and individual situations. It resulted in fulfilling teaching faculty's needs such as enhancing learning outcomes in their classes and solving problems with information searches in their instructional and research process. It also resulted in fulfilling the library's functions to integrate library services into teaching and scholarly environments. Teaching faculty actively used library services provided by the library via the field librarian in the department. Field librarians filled in a role of bridges between the departments including teaching faculty and the library, and created value both for the department and for the library.

Previously, based on a case study of Earlham College in the United States, the Earlham model was constructed as a model of building collaboration between teaching faculty and librarians in education. The main strategic approaches were "customised ILI", "instructional support for teaching faculty" and "interpersonal communications", which were recognised as a similar set of approaches of field librarians at the University of Michigan [17]. While the outlines of these approaches were parallelled to each other, these developing processes were different.

At Earlham College, the initial approach was to individual teaching faculty asking if librarians could provide ILI in their classes in order to solve the problems that students did not know how to find information and librarians had to answer same basic questions at the reference desk repeatedly [18]. In the process of providing ILI,

librarians realised that ILI should be customised to each course so that students could listen to librarians seriously. Librarians also realised that building interpersonal relationships with teaching faculty could become infrastructure of successful ILI, and extended approaches such as "instructional support for teaching faculty" and "interpersonal communications" [19]. Thus, "customised ILI" was located as the core approach, and "instructional support for teaching faculty" and "interpersonal communications" with teaching faculty were located as the supplemental approaches in order to promote successful "customised ILI".

At the University of Michigan the initial approach was "interacting with the community members". Based on interpersonal relationships with individual teaching faculty, field librarians gained the outline of their future services "customised to individual needs". This "customised to individual needs" approach covered with various services including ILI. Therefore, building interpersonal relationships with teaching faculty based on "interacting with the community members" and "as a member of the community" were located as core approaches, and led to designing services "customised to individual needs". It showed the developing process of designing customised services and building interpersonal relationships were opposite to the Earlham model, and field librarians were involved in more diversified services in the departments.

6 Conclusion

This paper investigated librarians' strategic approaches to teaching faculty which librarians could promote to build collaboration between teaching faculty and librarians. Based on a qualitative case study of field librarians at the University of Michigan, "interacting with the community members", "as a member of the community", "customised to individual needs" and "staying in touch" were discovered as categories of librarians' strategic approaches to teaching faculty. These categories showed field librarians' main approach was to build good relationships with teaching faculty and was located in relationship marketing. While these approaches were similar approaches with the Earlham model, the developing processes and core approaches were different.

Future research concerning the following two points will be required. One is to interpret categories of intervening conditions in library, institutional and social contexts based on a case study of field librarians at the University of Michigan, and complete a conceptual framework of building collaboration between teaching faculty and librarians in university settings. The other is to analyse conceptual frameworks developed from multiple case studies including this case study through a thematic coding approach.

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Teachers' Resistance to Mobile Learning in Turkey and Spain: What Similarities? What Differences?

Cristina Aliagas[1(✉)] and Tugba Mutlu[2]

[1] Universitat Pompeu Fabra, Barcelona, Spain
cristina.aliagas@upf.edu
[2] Gumushane University, Gumushane, Turkey
tugbamutlu@gumushane.edu.tr

Abstract. The aim of this paper is to present the data on secondary school teachers' resistant attitudes towards integrating digital technologies and literacies into their classrooms. The data was gathered through qualitative interviews in the frame of two distinct one-to-one technology programs that took place in distant socio-cultural and educational contexts: the FATIH Project of Turkey and the Escuela 2.0/EduCAT1x1 of Catalonia/Spain. This comparative analysis shows that teachers mainly resist educational change and the government, although they slightly differ in the underlying assumptions supporting their resistance. Their discourses on technology in schools have settled into "discourses of uncertainty" where negative attitudes are compensated with slightly positive comments about digital artefacts and literacies as tools for learning. Findings also indicate that teachers, regardless of the educational context they work in, have assumed the "discourse of inevitability" that dominates viewpoints concerning technology and digital literacy in education.

Keywords: Digital literacies · Teacher's resistance to technology · Technology-driven educational reforms

1 Introduction

During the last decades, governments around the world have been increasingly investing in learning technologies through national technology programmes, with the belief that teachers and students will eventually benefit from them. However, these investments have not yet resulted as desired, neither with the speed nor direction expected [1]. Although there are multiple factors that may explain this undesired complex situation, it seems that teachers' beliefs and negative attitude comprise one of the key barriers in integrating technology [2] and acknowledging digital literacies as valid resources for learning. Therefore, understanding the motives behind resistance is a crucial factor for technology acceptance. Teacher resistance has been studied from the psychological stance and through quantitative methodologies based on statistical analysis, cognition, beliefs or personality tests [e.g. 2, 3]. However, in this paper we attempt to tackle the topic through the data we obtained from qualitative interviews,

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where we delved into the intricacy of teachers' viewpoints on technology and digital literacies in education, grounded in multilayered beliefs, practices, experiences and educational trends. By looking at the teachers' perspectives, we claim that their opinions, reasonings and personal feelings need to be placed in the centre of the debate on the digitalization of education, since their actions and decisions have a crucial influence on educational change. This is because, following the views of Priestley, Biesta and Robinson [4], we see teachers as agents of the curriculum change that seeks to move from the 1.0 mindset to the 2.0 mindset [5].

The aim of this paper is to present and compare the data on teachers' resistance gathered through interviews in the frame of two distinct studies on the implementation of one-to-one technology programs in distant socio-cultural and educational contexts, in Turkey [6] and in Catalonia, North-West Spain [7]. Although the studies were designed separately, they shared a common goal: to understand what teachers as the agents of education really thought about the process of digitalization of the learning/teaching process, and how they make sense of this new educative reality where every child has a device, either a laptop or a tablet, connected to the Internet. In both cases, interviews were conducted with teachers who positioned themselves as resistant to the use of technology and digital literacies in education. In Turkey, tablets were introduced to secondary schools through the Movement of Enhancing Opportunities and Improving Technology (FATIH Project) as a part of the national program, while in Catalonia, small laptops were introduced in secondary education through the national program Escuela 2.0, locally named EduCAT1x1.

2 Teacher Resistance to Technology in Education

Since the successful integration of technology has become an important goal in education, teacher technology adoption has emerged as an important aspect to be carefully analysed. VanWyck [8], states that teacher resistance is the single most important factor that directly affects the fate of any innovation. Today, almost 40 years later, researchers still seek an answer to teacher resistance.

Several studies offer more detailed views of "resistance." Bohn [9] breaks it down into four main groups: resisting the administration, resisting out of lack of confidence, resisting change, and resisting out of apathy. Others describe it as resisting change in pedagogical beliefs, lack of knowledge, time or self-efficacy [10, 11]. On the other hand, Ertmer [12] takes on a more integrated approach to the issue and rather than naming the reasons, her Barrier to Technology Integration Model names definite barriers (first-order and second-order) obstructing technology integration that potentially create teacher resistance. First-order barriers are those that are external to the teacher, including resources (access to hardware and software), training (preparation in Initial Teacher Education and professional development programs with few applied examples) and school-wide administrative support (availability of technical support, lacking a unified vision for classroom technology integration in the school environment). Second-order barriers are intrinsic to teachers and comprise knowledge and skills (usage of specific devices and programs, evaluation and selection of digital resources, designing student activities with technology), and also attitudes and beliefs about the

role of technology in teaching. In this vein, Ertmer [12] identified the pattern that teachers with a strong constructivist pedagogical belief are more likely to make efforts for integration technology in classroom praxis. In another recent study, Vongkulluksn, Xie and Bowman [13] found that teachers that perceive technological tools as relevant and useful for achieving their instructional goals are more likely to restructure classroom routine in order to integrate these tools in the learning tasks.

3 Research Goals and Methodological Approach

3.1 Goals of this Comparative Study and Study Questions

This paper reports on two research projects on technology adoption in which teacher resistance to technology and digital literacies were prominent issues at the forefront of technological implementation. Thus, this paper aims to offer an explanation of underlying assumptions teachers hold to rationalise their resistance towards the educational uses of screen devices. It cross-culturally compares the characterisation of teacher resistance in a sample of interviews extracted from both studies, with the aim of identifying the differences and similarities in the discourses of teachers living in far away sociocultural realities and teaching in different educational contexts. The study questions enabling the comparison were the following:

1. How do teachers explain their resistance to the use of technology and integration of digital literacies for learning in formal education?
2. What are the common aspects (i.e. beliefs, assumptions, experiences) shared by teachers in Turkey and Spain regarding their resistant discourses towards technology use and integration of digital literacies in education?
3. What are the differences in teachers' resistant discourses towards technology and digital literacies in Turkey and Spain?

3.2 Methodological Approaches and Procedures for Enabling the Comparison

Methodologically, both studies relied primarily on qualitative data, mainly gathered through interviews. The first study [6], was conducted in 2014 and published as a PhD thesis under the sponsorship of the Turkish Ministry of National Education. The study took place in 3 participating secondary schools in Ankara - the second largest city in Turkey - where the FATIH project was ongoing as a government effort to improve the quality of secondary education by providing one tablet per student and teacher. Ankara was chosen due to its role as the capital of the country, which enabled access to schools that had taken part in the project longer than any other cities. This was one of the selection criteria in order to avoid the initial excitement during implementation and understand teachers' actual attitudes towards tablets. Within the scope of the study, teachers were interviewed in order to understand their attitude towards the implementation of tablets into classrooms and to explore the motives behind these attitudes, resulting in almost 12 h of recorded data. Interviews were semi-structured with initial questions to prepare the setting for conversation. All of the participating teachers turned

out to be against tablets, though slightly differed in their level of resistance. Also, classroom observations were conducted in order to monitor teachers' nonverbal-communication with the technology in their teaching. Thematic analysis was chosen to analyse the interview data due to its advantages in this particular context as it is a powerful way of "capturing the complexities of meaning within a textual dataset" [14, p. 11]. Teachers' discourses were categorised under main themes depending on the "emerging behaviours, meanings, states, relationships, conditions and so on" [6, p. 185]. After discussions and review of the literature, themes were re-organized into main categories depending on their relation. Later observation data were taken into account to interpret the main themes.

The second study [7, p. 15–17] developed as a multi-sited ethnography [18], was conducted during three years (2012–2015) in 18 schools in Catalonia, the second most densely populated autonomous regions in Spain out of 17, with 7.5 million inhabitants. One of its particularities is that two official main languages coexist, Catalan and Spanish, with Catalan as the vehicular language in the school system. This research study, funded by the Spanish Government, and with the participation of GRAEL's research group members, coordinated by Dr. Cassany, was aimed at understanding how the educative agents (headmasters, teachers, students and families) were dealing with the Escuela 2.0 national programme, locally named in Catalonia as EduCAT1x1, a digitally-focused educational reform which consisted of providing small laptops to secondary school students by giving vouchers to the families. Within the scope of the study, 72 teachers with a range of language, science and artistic areas were interviewed [see previous studies 15–17]. Here, we focus the analysis on a sample of 12 (those interviewed by the co-author of this paper) working in six different secondary schools, which amounts to almost 10 h. Interviews were semi-structured and had a predetermined agenda to focus on key aspects (i.e. personal and institutional positioning, personal beliefs, experiences in and out of the classroom). Data analysis developed in different stages. First, teachers were analysed individually and a summary of their trajectories and viewpoints was written for each one. Then, teachers were assembled in three main groups according to their attitudes toward the one-to-one initiative: enthusiastic (3), hesitant (5) and resistant (4). Second, a cross group analysis was developed through the coding of key aspects (i.e. arguments, counterarguments, beliefs, teaching practices).

Overall, both researchers were engaged in conversations about ICT and technology-based educational reforms with secondary school teachers. At a theoretical level, both studies built on a sociocultural understanding of education, literacy and technology. Moreover, both studies recognise the importance of understanding teachers' resistances in order to advance in the integration of technology in education.

In order to enable comparison, we have defined a list of main aspects that, according to the literature on teachers' barriers, obstruct the use of technology in classroom. We have based the comparison on Ertmer's [12] Barrier to Technology Integration Model using it as an analytical tool to guide us. Our main arguments are shaped around the issues of:

- understanding the rationale behind the implementation–need, usefulness
- hardware and software–access, complexity of the devices, usage of specific devices and software

- learning materials–digital textbooks, other resources for teaching
- issues with training and support–infrastructure, school-wide administrative and technical support, continuing teacher training
- teachers' identity formation
- personal beliefs about technology use in education–pedagogical beliefs
- personal techno-skills in digital literacy and information literacy.

Each researcher has analysed each point in its own sample as a previous step to identify common points and differences. A comparative grid has facilitated the comparison and oriented the analysis. Comparison of data took place after reading the already published works of each author and then deep discussions on the prominent points in each data set. Later discussions on the socio-cultural factors and understandings in each concept helped us pinpoint the similarities and differences.

3.3 Historical Background of the Educational Sites Being Researched

In order to add meaning to the comparison, brief sociocultural and historical details of both countries and educational systems are important. Even though both countries are located in the Mediterranean area, culturally they do not share much in common. Turkey is predominantly a secular Muslim country where Turkish is spoken as the official language. Spain, on the other hand, is a secular country, chiefly Catholic, where Spanish is the official language, along with some co-official languages such as Catalan in Catalonia or Galician in Galicia. These cultural differences play a major role in shaping everyday life, including education.

When looking at the history of ICT in education in both countries, it is interesting that they share the working lines and priorities of the investment from their governments. In Turkey, efforts to implement technology in classrooms first started in 1984 with the introduction of computers to schools. These efforts have been continuing through different projects and programs at various scopes. The Computer Experimental Schools (CES) Project (1992–1997) and the Basic Education Project (1994) were some of the projects that took place [19]. In 2010, the Turkish Ministry of National Education launched a countrywide ICT program called the "Movement of Enhancing Opportunities and Improving Technology", also known as the FATIH Project. The project included LCD Smartboards for classrooms and a tablet for each child and teacher. The project is still an ongoing effort to improve the quality of education and provide equal opportunities for every child.

Regarding Catalonia, according to Bosco, Sánchez-Valero and Sancho-Gil [20], the first political actions of the Catalan Ministry of Education goes back to 1986 with the Informatics Educational Program (PIE), to introduce informatics in primary and secondary schools. Later on, in 1992, the recognition of the concept of 'information technology' in the new law of the education system of Spain (LOGSE) led to the integration of ICT into the regulatory curriculum, and so teaching about technology became relevant. During the decade of 2000, the concept of 'digital competence' served to rethink the regulatory curriculum into a more competency-based one. However, recent studies claim that the role of technology in Initial Teacher Education has become an urgent need [21]. The one-to-one programme arrived in Catalonia in

2009, when The Catalan Government agreed to co-finance the national project Escuela 2.0. In Catalonia the programme, locally named EduCAT1x1, was aimed at providing infrastructure to the schools (interactive whiteboards, Internet Connection, development of the educative digital platform), homogeneously, without considering the sociocultural context nor the particular needs that may be relevant to secondary schools of all types. Globally, "the policies have focused much more on supplying technological equipment and its instrumental use than on the educational (learning) dimension of ICT" [20, p. 213].

4 Results

Here, we present the results from both studies and in doing so we seek to answer the research questions which had led us to compare two distinct educational contexts. As explained earlier, both studies were designed separately and conducted in different contexts, yet the basis for both studies was similar in nature. After comparing the findings of these two studies, we have extracted six main similarities which were categorised under different names in each study but essentially imply the same underlying reason for teacher resistance.

4.1 Similar Aspects in the Samples of Both Studies

Teachers' Skeptical Views of the Reasons Behind Implementation. The first point that came up from the comparative analysis is teachers' skeptical opinions of both one-to-one programs. In both contexts, resistant teachers were not sure that the main reason behind this expensive implementation was to improve the quality of education. In the case of Catalonia, teachers believed that the local government had taken a hurried decision in order to use the available fund from the Spanish Government while it was available and in doing so, they were not given enough time to digest the transformation.

> *I don't know if the 1x1 was a pedagogical project or a commercial pressure. It was a hasty and sudden decision. Money came from Madrid and it was a priority to use them. (…) I think a more progressive implementation was needed, giving more time to digest the change and entering slowly in the classroom and in our lives* (Pere, Teacher of Natural Sciences in Catalonia)

Likewise, teachers in Turkey had doubts that it was a real educational move. The general belief among Turkish teachers was that the distribution of tablets were used as a part of political propaganda before the upcoming elections.

> *I believe tablets only serve politicians. If, during the election campaign, the prime minister had said they improved the infrastructure and placed smartboards in classrooms, the public wouldn't have really cared much, but when he said they were going to distribute tablets to every student it suddenly became a big deal* (Kerem, Physics teacher in Turkey)

Issues with Training. Another mutual point articulated by the teachers was the lack or insufficiency of proper training. In both cases, the implementation of digital technologies took place before giving teachers enough time and training to prepare both mentally and pedagogically, and thus make sense of the change in their classroom.

Added to this, the scarce training put the emphasis on theories and basic common knowledge, and not on applied case examples for the distinct courses. Teachers in Catalonia mentioned the hardship of having to use tools, resources and digital textbooks with which they had not had time to explore. They also complained about being pushed to enroll in courses outside of their workweek.

> *We did not receive an appropriate training. Good training needs time and money. Training was quick and condensed, loading teachers' free time. A slow training during the course was needed.* (Marga, Teacher of History in Catalonia)

On the other hand, while facing the very same problems as their Catalan counterparts, Turkish teachers reported that their ICT skills fall behind that of students due to the low quality of trainings provided.

> *Training sessions are insufficient; teachers' ICT skills fall behind that of students* (Efe, Vice principal in Turkey)

> *Trainers recruited by the ministry are unqualified. I think the ministry underestimates us; they grab a random person from the street and send him/her as a trainer. My colleagues and I learned to use this technology on our own.* (Taha, teacher of History in Turkey)

Thus, lack of professional development in technological competence of teachers was fueling a technoskill gap in the classroom, relegating technology adoption to each teacher's decision and willingness.

Technical and Infrastructural Failure. Technical and infrastructure failure is not new to the literature on teacher resistance, as it has shown to be one of the main barriers to a successful transition from a traditional classroom to digitized one. In this regard, Ferneding [22] argues that poor infrastructure and inadequate training are not the ingredients of an educational revolution. In both contexts, teachers were frustrated with the fact that the technology in their classrooms did not function as effectively as they were advertised. They were tired of constantly changing conditions and having to think about backplans. Teachers in Catalonia frequently mentioned the constant technical problems with the devices or the poor wireless connection.

> *It was so distressing because every day you entered in the classroom and you didn't know what you would find, whether (the internet) worked or not. It was a daily lottery…if a child would be able or not to enter the (digital) platform.* (Pere, teacher of life sciences in Catalonia)

On the other hand, teachers in Turkey faced a different kind of problem. Their main complaint was about the overzealous internet filters imposed by the ministry, and the national ban on YouTube (which has since been lifted). Many teachers relied on YouTube or other external websites to use as resources in the classroom, however the majority of these sites were not accessible from the school network.

> *In the simplest case, I choose a picture related to the topic, click on it and it says 'access denied'. Students try to search information like Euclid Theorem for maths or another topic related to philosophy, but it is all blocked, so we can't use the Internet as a resource.* (Funda, IT teacher in Turkey)

In both cases, regardless of the kind of failure, access or technical-related failure left teachers feeling helpless.

Teachers' Identity and Issues with Authority in the Classroom. The fourth common point in both analyses has to do with teachers' identities in the classroom and the need to preserve control over their students. The fact that every student has a personal device has changed the traditional functioning of the lessons, and in a way threatened the teachers' authority in the classroom since they are no longer able to control what every student is doing. Catalan teachers reported problems getting students' attention from screens to the lectures and articulated their concerns for the students not being responsible enough to control technology.

You have to monitor constantly; it is exhausting (Jordi, Teacher of Biology i n Catalonia)

About 15% or 20% of the students in the classroom aren't where they have to be: they are on Facebook. (…) It's impossible to fight against the screen (Pere, Teacher of Natural Sciences in Catalonia)

While facing the very same problem, Turkish teachers took action to 'normalize' the classroom environment and collected tablets before each lessons began. However, this created a power struggle in the classroom as some students argued against this action and claimed that the tablets were given by the government, cannot be taken away by teachers.

Smartboards are under our control but each one of them (students) owns a tablet. It is impossible to control them (Hande, teacher of Turkish Literature in Turkey)

We are unable to control all tablets, so we placed boxes in each classroom. Teachers collect the tablets into the boxes before each class begins (Ayla, IT teacher in Turkey)

Tablets have caused problems between me and the students (…) If I ever try to collect the tablets, the students say that they were given by the government and I can't take them (Esma, teacher of Music in Turkey)

Materiality and Authenticity of Learning Materials. Teachers in both contexts explicitly mentioned their views of how 'learning' should take place. For them, existence of physical artifacts - *pen and paper* - is the prerequisite for learning to happen: digitized forms of literacy were not acknowledged as authentic.

Everything is digitized, teaching and learning happens with teacher-student-pen and paper. (Taha, teacher of History in Turkey)

A Turkish teacher, used the words above while another teacher, Hakan, mentioned his view of digital resources as:

... students should touch, feel and smell their books. You can't do these with a tablet… (Hakan, teacher of English Language in Turkey)

On the other hand, teachers in Catalonia claimed that not only themselves but also their best students tend to resist technology and prefer pen-and-paper instead.

The best students are more resistant to technology. Good students do a lot of handwriting. (Marga, teacher of History in Catalonia)

Regardless of their cultural backgrounds and differences, teachers in both educational contexts articulated the need for material artifacts, which could be held and felt, in order for learning to take place. Since digital note-taking tools are not *material,* they are in a way perceived to be the abstracted 'imitations' of the 'original' resources [23], thus not classified as *Authentic.*

Inevitability of and Uncertainty About Technology. This sixth point of comparison in both contexts was rather latent. Teachers, by the way of their articulation, displayed mixed emotions towards the existence of technology in their classrooms. In both cases, although they talked critically about the usage of technology for learning and gave definite reasons, situated their views in a larger frame where they felt that technology is a driving force in society that will inevitability change social practices including learning. In the context of Catalonia, even resistant teachers acknowledge the 'inevitability' of avoiding technology while their Turkish counterparts uttered 'uncertain' ideas about the existence of digital tools in classrooms. None of them claimed that technology was needlessness, but rather, they try to rationalise their resistance. The expression "I'm not against technology but …" came up in almost every interview in both set of interviews.

> *I'm not against technology, I believe it is important that we keep up with the world, but it is too early for tablets, we are not ready* (Hande, teacher of Turkish Literature)

> *I'm not against technology but this shirt (tablets) is too big for us* (Kerem, Physics teacher in Turkey)

> *I think we are wrong in the focus. I think that the computer is a good tool and we can't deny it: it is the future. But everything should be at its place: we need lectures and paperwork because previous experiences in Europe have pointed at the needed of combining screens and papers.* (Pere, teacher of Natural Sciences)

4.2 Distinct Aspects in the Samples of the Studies Being Compared

Both studies were planned, designed and conducted separately and unaware of each other. However, the similar nature of both studies created the need for us to compare and contrast teacher resistance in these distinct educational contexts. While similarities were fairly easily identified, differences in the findings of both studies were not that obvious. Small differences were more of a question of where the teachers put the stress, while big differences were more transversal aspects that orientated the teachers' discourse. We have identified two different aspects noteworthy to mention here.

In the case of Turkish teachers, when they were asked about tablets their concerns about the toxicity of the Wi-fi connection in their classrooms was a theme that came up differently from the context of Catalonia. They argued that being exposed to the Wi-fi for longer periods of time might lead to health problems. Moreover, Turkish teachers stated concerns over their students' wellbeing due to the longevity of time they spent in the virtual world rather than in the real one.

Moreover, Turkish teachers put the emphasis of their resistance in both educational change and the government while teachers in Catalonia focused their resistance on educational change. Critics of the government were indirect when complaining about the hasty implementation of the program but never explicit in the context of the

interviews with teachers in Catalonia while Turkish teachers openly and explicitly articulated their criticism of the government. In this regard, the conceptualization of the one-to-one program as a discoursal space of ideological confrontation and political struggle is an aspect that distinguishes the resistant discourse of the teachers. This distinct aspect highlights to what extent teachers' resistant discourse towards an educational reform is shaped locally.

Taken together, these differences were mainly rooted in socio-cultural factors. Their cultural, educational, and professional experiences blended with personal beliefs and connections shaped teachers' personal and professional identities. Constant changes in their work environment forced them to negotiate these identities which, in turn, created implicit and explicit tension, called resistance. Contrary to our expectations, cross-cultural differences were found to play a smaller part in teachers' behaviour.

5 Some Final Conclusions

This comparative study is a valuable addition to current knowledge as it offers a deeper understanding of teacher resistance from a socio-cultural point of view. The similarities in these distinct contexts, Turkey and Spain/Catalonia, may demonstrate the extent to which the profession of being a secondary school teacher has been impacted by the forces of globalization [24], or they would simply show the common beliefs or tendencies of teachers around the world. On the contrary, differences in the discourses may point at locally and culturally-shaped viewpoints/ideas.

Comparing two different programs in different countries revealed a larger picture of the nature of teachers' resistance. When the results of both studies regarding teachers' resistance are combined into a single line of argument it tells a larger story about resistances in a globalised world. That is, teachers resist technology because the way technology has been imposed on them, without reflection and scaffolding, made teachers the 'victim' of new implementation rather than including them in the process of transformation giving them more agency. This is reinforced by the interpretation that their resistant discourses, articulated around "first barriers" [12] could be concealing the centrality of "second barriers" dealing with personal skills. Coupled with the technical malfunctionings and pedagogical unreadiness, technology has been marginalized in the eye of teachers. To do their job, teachers draw on their 'funds of knowledge for teaching' or 'ways of teaching' learned during their trajectories and time spent in the classrooms. The eruption of technology puts them in a position where they feel they need to challenge themselves by developing more of these 'funds of knowledge for teaching'.

The old cliché 'teachers teach as they are taught' still seems to hold, especially for technology integration [25]. Teachers appropriate knowledge from their own experiences from a time when technology was not readily available. Those that have accumulated, as persons, digital funds of knowledge, are happier to integrate technology for teaching/learning. However, teachers cope with reforms regularly imposed by the state, which has increasingly put teachers in a position to face challenges in an ever-changing educational system. Thus, their resistant attitudes towards digital tools and the reasons they found to rationalize this resistance are understandable. Piecing the studies together

in this way raises awareness of the larger contexts affording and constraining teachers' work (for instance, the layer upon layer of educational reforms). It also points to the importance of teacher resistance to the use of technology in education, as teachers are gatekeepers of acknowledging that digital literacies and information literacy are valid resources for learning in and out of the classrooms.

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A Critical Praxis in the Information Literacy Education Classroom Using the ACRL Framework for Information Literacy for Higher Education

Shehaamah Mohamed(✉)

Information Literacy, University of the Western Cape, Cape Town, South Africa
shmohamed@uwc.ac.za

Abstract. The University of the Western Cape Library uses the ACRL *Framework for Information Literacy for Higher Education* to introduce an alternative, nuanced approach to information literacy training by transforming librarians' teaching praxis. The Framework presents a new perspective on teaching and learning and is built around six frames, each consisting of a threshold concept which is central to information literacy. To this end, the Library coordinated the Information Literacy Programme for the University's Library and Information Science Department. By using a qualitative approach, this case study describes the integration of the Framework in the Information Literacy Education module to teach prospective librarians to internalise the core concepts of the Framework. The paper discusses how the Framework was operationalised to enhance students' critical thinking through the application of formative and summative assessments and a number of student artifacts.

Keywords: ACRL framework for information literacy for higher education · Critical praxis · Critical thinking · Constructivism · Authentic assessment · Information literacy education

1 Introduction and Background to the Study

Prior to 2016 when the official approval of the ACRL *Framework for Information literacy for Higher Education* [1] (the Framework) occurred, many academic libraries in South Africa had subscribed to the ACRL *Information Literacy Competency Standards for Higher Education* [2] (the Standards). According to the latter, an information literate person is one who is able to "recognise when information is needed and [who has] the ability to locate, evaluate and use effectively the needed information" [2, p. 2]. Librarians thus provided library instruction which teaches students to navigate the set of library tools and resources. However, to be competent and capable in the 21st Century, learners require a completely new set of capabilities.

S. Mohamed—Senior Librarian: Information Literacy

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The discourse of practitioners in the field of information literacy has changed fundamentally in the past few years. According to Hepworth [3], the contention is that the centre of this field has shifted from a predominant concern with technique (navigating databases and locating information) towards critical engagement with information. Unfortunately, library practices which were largely based on the Standards, limited learners' capabilities to become flexible and to take the initiative when necessary when working with various modes of information.

Furthermore, Elmborg [4] claims that the previous ARCL definition of information literacy lacks an element of critical thinking. He argues that librarians should redefine their roles to become educators of critical theory and "coach intellectual growth and critical development" [4, p. 198]. Moreover, there is a consensus amongst LIS specialists that by becoming information literate "one moves beyond knowing how to access information to becoming a critical citizen" [3, p. 31] who questions the validity of all texts and utterances.

Due to its inadequacy in addressing these fundamental elements, the Standards, advocating a rigid set of outcomes and performance indicators, were consequently rescinded and replaced with the Framework. The Framework, on the other hand, regards information literacy as a "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" [1].

To this end, the purpose of this study is to examine how the Framework's threshold concepts may be operationalised for training postgraduate students to internalise them. Hence, this paper will discuss how a postgraduate course was restructured to embed the threshold concepts of the Framework in learning activities and will examine a range of student artifacts that were designed to enhance critical literacies. Fundamentally, the aim of the study is to enhance students' critical thinking skills through the application of the Framework. Apart from Fullard [5] who explored the relevance of the Frames for literacies for higher education, there has been little discussion about its application in information literacy education programmes within a South African higher education context.

2 Theoretical Background

2.1 The Need for Critical Information Literacy

The banking model concept which was first coined by Freire [6] in 1970 describes the education system as a capitalist ideology which deprives learners from exercising their own critical thinking proficiencies. Freire [6] proposes that students should no longer be passive consumers of information but should rather be encouraged to actively shape their own lives through critical consciousness. This implies that students should be taught to "identify and engage significant problems in the world" [4, p. 193] instead of being fed information by "authoritative" figures. Students should thereby exhibit dispositions of being critically and relevantly literate.

Critical information literacy includes the ability to adopt critical perspectives toward text, utterances and other modes of information. Bauder and Rod [7] recommend that librarians should teach students to engage more meaningfully with information. For instance, in addition to showing students how to locate information sources, they should demonstrate ways in which its authority may have been constructed by a scholarly community or how the source fits into a scholarly conversation around the topic [7, p. 262]. This ability to interrogate various modes of information in this manner is indicative of a critical information literacy skill.

Moreover, the Framework reinforces the notions of critical literacy and critical consciousness through some of its knowledge practices and dispositions. When questioning authority for example, students should "understand that many disciplines have acknowledged authorities … and that some scholars would challenge the authority of those sources" [1, p. 4]. By the same token, they should also be taught to question how "some individuals may be underrepresented or systematically marginalised within the systems that produce and disseminate information" [1, p. 6]. Hence, in more ways than one, the Framework may be seen as a model which demystifies Freire's [6] concept of critical consciousness and abandons the banking model of education.

It may therefore be inferred that developing integral questions is a skill which is central to critical information literacy and equally, that librarians should design appropriate assessments and learning activities that would nurture this skill.

2.2 Critical Information Literacy Through Formative and Summative Assessments

Information literacy has become increasingly important in higher education institutions over recent years Anderson [8] and Hepworth [3]. Subsequently, academic librarians have experienced increased pressure to assess the information literate capabilities and higher order thinking skills of learners, Whitlock and Nanavati [9]. Moreover, our rapidly changing information landscape has transformed the ways in which assessments are designed, as most of the types of assessments that were being used over the years have been aimed at supporting the Standards [7].

According to Halbach [10] and Whitlock and Nanavati [9] it is important to differentiate between the categories of assessments: the librarian could evaluate students during the course of the lesson and while the learning activity is taking place (formative), or assess them at the end of the activity (summative). Common forms of assessment are multiple choice tests (objective), testing search strategies or techniques in class (performative) and assessing what students can do in a real-world context (authentic). An examination of various forms of authentic assessment is of significance to this study as it includes presentations, group discussions, reflective writing and peer assessment.

Recent studies show how librarians have designed different assessments that are aligned with the Framework. In their application of the Frame, *Research as Inquiry*, librarians Couture and Ladenson [11] used discussion groups to help students analyse their individually assigned research topics. It was found that participatory environments enhance students' critical literacy and ability to question. Citing Brookfield and Preskill [12], Anderson [8] confirms the value of allowing group discussions in IL training as it

facilitates collaborative learning and helps learners to analyse their own assumptions. Moreover, the advantages of group discussion are associated with the Framework which envisions that students should be able to "contribute to scholarly conversations at an appropriate level" [1, p. 8].

In his article which investigates how social media facilitates teaching and learning, Dominic Chawinga [13] finds that the integration of blogs and Twitter into teaching methods enhances the effectiveness of the teaching praxis. More significantly, he claims that the extended time that the lecturer and learner spent posting comments and feedback means that teaching and learning was taking place beyond the classroom [13, p. 16]. Anderson [8] reinforces this notion by affirming that blogs function well as formative assessments and that they may be seen as user-generated instructional tools [8, p. 8]. Furthermore, sharing critical commentary on blogs develops the understanding of *Scholarship as Conversation* as learners should be able to "critically evaluate contributions made by others in participatory information environments" [1, p. 8].

Online discussion boards, for instance, are commonly used in information literacy training as they allow the learner to reflect on content by way of "individualistic critical thought" [8, p. 6]. Halbach [10] concurs with Anderson [8] by stating that students' reflection often describe their own perception of the course and the issues that they find challenging. The skill of critical reflection is congruent with the Framework's concept of *Authority is Constructed and Contextual* where students should be able to "acknowledge that they are developing their own authoritative voices in a particular area…" [1, p. 4] through questioning and seeking solutions.

To this end, this study aims to examine the following research questions: (1) How does the Information Literacy Education (ILE) module reflect the ACRL Framework? and (2) How do Library and Information Science students develop critical thinking and agency through application of the ACRL Framework in the ILE module?

3 Methodology

3.1 Research Design and Method

This case study explores the ILE module in depth and "within its real-world context" Yin [14, p. 16] in which the researcher aims to provide an in-depth description and analysis of the case. The study therefore examines how the Framework emerged in the module through the pedagogical approach adopted by the researcher, and will analyse the various assessments that students completed.

3.2 Case Study Environment

The case selected for this study is the ILE module (LBS707) that is offered biennially in the Postgraduate Diploma in Library and Information Science (PGDipLIS) Programme at the University of the Western Cape.

The ILE module required a complete restructuring for it to reflect a modified module descriptor with revised learning outcomes and assessments that complement the ACRL Framework. This guided the researcher to adopt a single case study design as this study focuses on the analysis of two academic years within the context of a single case.

The researcher selected two cohorts of students for the years 2015 and 2017 as study participants for the ILE module (LBS707).

The cohorts exemplify broad heterogeneous groups with the following characteristics:

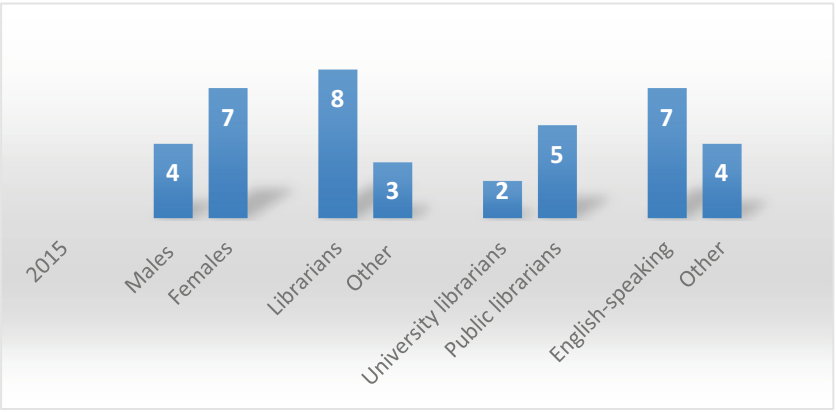

Fig. 1. Study sample for 2015 (LBS707)

The study participants for 2015 consisted of 11 students, 4 of whom were male and 7 who were female. Sixty three percent (n = 8) are employed within the Library Science fraternity with 2 students who are faculty librarians at the University of the Western Cape (UWC) library and 6 students who are public librarians. The remaining participants are not affiliated with the Library Science discipline and have chosen to

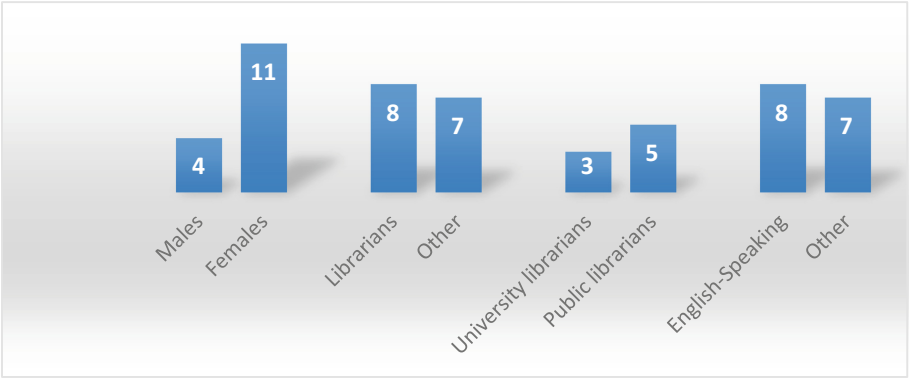

Fig. 2. Study sample for 2017 (LBS707)

obtain a postgraduate diploma in Library and Information Science as an additional qualification for career development. The majority of the LBS707 class were English-speaking (Fig. 2).

The study participants for 2017 consisted of 15 students, 4 of whom were male and 11 who were female. Fifty three percent (n = 8) are employed as librarians with only 3 students who are faculty librarians at a university library and 5 students who are public librarians. The remaining 47 percent (n = 7) participants are employed as social workers (n = 2), teachers (n = 4) and insurance consultants (n = 1) and have indicated that the PGDipLIS will assist them with career advancement. The majority of the LBS707 class were English-speaking.

3.3 Data Collection Techniques and Analysis

Data collection techniques such as observation, interviews and document analysis were used:

Observation. This particular method was used to sample activities in class on a predetermined basis using a prearranged instrument into whose categories the researcher recorded class presentations Gorman and Clayton [15, p. 104]. The researcher used structured participant observation where rubrics were used as data collection instruments. The researcher's perspective of the class presentations were based on the observer-as-participant observation technique where she interacted to some degree with her research subjects during group presentations and poster designs. This was aimed at clarifying certain observations pertaining to the conduct of students as well as their reaction to certain issues.

Interviews. Structured interviews were used to gather data from selected participants for the 2015 and 2017 academic years. Predetermined questions and answer categories were prepared gathering data from 42% (n = 11) of the study subjects. The researcher read out written questions to the interviewees and coded the answers into categories.

The Use of Documentation. The researcher collected data from both physical hard copy documentation as well as online texts. The student weekly reflections, class activities, blog posts including lesson plans, and posters including student feedback were the instruments used to glean a description of the delivered course from the students' perspective. Secondary sources such as journal articles and internet sources were used to compile a theoretical background for this case study. This information was collected and integrated with the data obtained from the study participants in an attempt to clarify the themes and research objectives.

The study adopts a thematic analytical approach and uses a wide range of data sources. This includes notes based on observation, interview transcripts, information written by participants (e.g., reflections), tests, lesson plans, posters, and presentation transcripts (PowerPoint Slides). The data was analysed and codified in the form of specific themes for each research objective. Some memos depicting the researcher's interpretation were added to data sets.

The researcher obtained written permission from all students who were registered for and who attended the ILE classes for the years 2015 and 2017. The students were guaranteed anonymity as their identities are not attached to the data sets and to the feedback that was obtained through interviews.

3.4 Reflective Approach

According to Ferreira [16], "reflecting" on one's practice means "retrieving past activities and situations to open mental space". The lecturer thus spends time after the practice to decipher information in a more analytical manner. Through critical reflection and scrutiny, the researcher is able to provide an analysis of the pedagogy and assessments assigned to her students. Moreover, by using a critical reflective approach, the researcher aims to develop a new understanding of her experiences which might aid her in reformulating her teaching methods. She reflects on her own experiences and thus tries to "unearth different assumptions and interpretations" Fook [17, p. 56].

4 Findings

4.1 How Is the ACRL Framework Reflected in the ILE Module?

This study was the first step in transitioning away from the Standards-based information literacy instruction method for the postgraduate diploma course. The new module was essentially guided by the six threshold concepts namely; *Scholarship as a Conversation*, *Research as Inquiry, Authority as Constructed and Contextual, Information Creation as a Process, Searching as Strategic Exploration, and Information has Value*.

Relevant learning outcomes were crafted for the course where students are expected to:

(a) explain the concept of information literacy and relate it to other literacies and learning theories
(b) understand and apply the core ideas of the ACRL Framework of information literacy in library teaching practices
(c) design and run Information literacy programmes for libraries of all kinds using the ACRL Framework
(d) present effective IL workshops on the Framework in which learning outcomes are identified and assessed
(e) design appropriate lesson plans to enhance understanding of the Framework.

The curriculum followed a continuous assessment plan and incorporated assessments which reflected the Framework. Weekly group discussions embrace the notion that scholarship is a conversation. Designing posters provides the opportunity to understand that information creation is a process. Informal online peer review means that students are able to critically evaluate the contribution of others, and using images and text located on the internet helps them to develop the ethics of sharing information. All class activities were aimed at enhancing an understanding of the Framework's concepts.

4.2 How Can the ACRL Framework Enhance Critical Thinking?

Weekly Group Activities and Tests

Benefits and Limitations of Class Activities: It is proffered that group exercises enable greater collaboration on various interpretations of the Framework and force students to engage with one another Haigh [18]. Such interaction also offers them the opportunity to critically reflect on the knowledge practices and dispositions of the Frames through pertinent examples and activities: "*The discussions helped me to understand the content better…we would discuss different views [of the Frames] and include it in our results*" (Student 2: 2017).

It was also emphasised that weekly tests were easy and beneficial as it assessed work which was "*fresh in one's memory"* and "*if you listened and participated in class the test would be very easy to pass*" (Student 3:2017).

However, one of the interviewees (Student 1:2015) suggested that the group activities should rather have been completed at home where the student would be able to focus in a more comfortable setting without feeling pressured to complete the exercise or test immediately after the lesson: "*A take home test or activity would have been more doable as it allows the student time to revise the work*" (Student 1: 2015).

Through observation, the researcher found that some students performed well with group activities while some of these activities might have been challenging for certain individuals due to their lack of computer literacy skills or due to the fact that some of them may be novice researchers. Upon reflection, the researcher acknowledges that additional assistance in this regard may have been required and intends to incorporate these factors in future planning of her assessments. An example of a class activity is found in Table 1 where students were instructed to match the learning outcomes with appropriate activities for the Frame "Scholarship as a Conversation".

Table 1. Activity for the Frame "Scholarship as a Conversation". Match the learning outcomes with appropriate activities

Learning outcomes	Activities
1. Recognize that a given scholarly work may not represent the only—or even the majority—perspective on the issue at hand	a. Select a topic on which students have some knowledge or experience. Identify a venue (blog, discussion forum, other social media site) in which a scholarly conversation is taking place
2. Critically evaluate contributions made by others in participatory information environments	b. Find 2 articles on the topic, one of which is a rebuttal to the other
3. Students will recognise information sources as conversational and dialogic in nature	c. Create a timeline to track the evolving threads of a continuing scholarly conversation
4. Recognise that they are not just consumers of knowledge but also producers thereof	d. Ask students to discuss and critically respond to this blog post
5. Understand that conversations around topics include both scholarly and non-scholarly pieces of information	e. Discuss your findings on a Facebook page which explores your topic

Online Blog Activities

(i) Lesson plans: Preparing future librarians to teach the Framework

Using a rubric to guide their thinking, students were asked to create weekly lesson plans for each Frame and post these as blog entries. The lesson plans had to comprise learning outcomes, learning activities and an explanation of how these activities would enhance understanding of the threshold concepts, knowledge practices and dispositions. Approximately half of the 2015 cohort (n = 5) and 80 percent (n = 12) of the 2017 cohort produced lesson plans that may foster critical thinking and which portray a fair understanding of some of the knowledge practices of each frame.

The Benefits of Informal Peer Review

As illustrated in Fig 3, the blogger platform also served as a forum for commentary and discussion and the researcher encouraged peers to offer constructive feedback to each other's work. This shows that they possess knowledge and understanding of the Frames as they are able to critique the views of others: "*I wasn't sure how to put [the lesson plan] together…reading and commenting on other lesson plans online and receiving comments from others really helped me to understand*" (Student 2: Cohort 2017) (Fig. 3).

Fig. 3. Critical peer feedback (2015 cohort)

The lecturer's comments on the blog entries allowed opportunity for reflection and modification of the way in which the frames may be taught. As one of the students states "*As a social worker, I was never in the position to teach so I was not sure whether I was doing the right thing and whether it could be applied …would it be workable…so the lecturer's comments helped"* (Student 4: Cohort 2015). This confirms Chawinga's [13] findings that online blog posts ensure that teaching and learning could continue beyond the classroom. As mentioned in this paper, blogs are acceptable means of instructional tools which enable students to construct user-generated sources of information [8].

Preparing IL Lessons Using the Framework

Drafting lesson plans for the various frames also provided students with additional insight into information literacy training and "*prepared them with a basis with which to train students*" (Student 1: Cohort 2015). Some of them also reported that they were using this method in their workplace: "*It [the lesson plans] facilitated my own teaching and practice as a history tutor*" (Student 3: Cohort 2017).

Similarly, this type of authentic assessment enables the student to apply the content within a real-world context. Creating a lesson plan for each frame enabled the history tutor to structure his lessons with specific objectives in mind, for instance: "*The lesson plans were perfect for history because I wanted students to know that there are various types of authorities that exist and that they are often constructed by your lecturer…they should be able to know which source is more authoritative than the next… "*(Student 3: Cohort 2017).

Although a very small percentage of the 15 students in the 2017 cohort are not affiliated with the Library and Information Science discipline and do not work in a library, they have researched the content of each lesson plan very well. (See Fig. 6 in Appendices).

It also became apparent to the researcher that a few lesson plans from the cohorts were replete with grammatical errors and lacked creativity and meticulous planning. This can largely be attributed to the fact that some students do not possess a good command of the English language: "*Afrikaans is my first language. The Framework was difficult to understand…the language made is difficult…*" (Student 10: Cohort 2015 and 2017). Having repeated and passed the module in 2017, this student feels that the technical language is overwhelming and contributed to his failure in the first year. The researcher intends to revisit the Frames and to customise some of the knowledge practices and dispositions to meet the students' needs and level of understanding. These may be rewritten in a simplified manner to create better comprehension.

(ii) Enhancing Metacognition Through Critical Reflective Practices

The researcher encouraged students to reflect on the weekly lessons, their experiences, and challenges and to show further readings and research on the respective Frames by providing external links to other sources. The researcher played a significant role in this exercise and provided useful intermediate comments on the blog entries.

As Halbach [10] postulates, the significance of reflection is to assist the student with making the transition between understanding the lecture content and application thereof in debate and discussions. Furthermore, the Framework reinforces the core ideas of metaliteracy which encompass "metacognition or critical self-reflection" [1, p. 3]. This is evident in the following reflection in Fig. 4 where the student relates how he has operationalised the concept *Scholarship as a Conversation* in his History classes:

(iii) Enhancing Critical Thinking Through Authentic Multimodal Assessments

The University's Charter of Graduate Attributes refers to multimodal literacy as a competency which is required to use different modes of information to convey meaning. Gunther Kress [19] maintains that "there is an enormous increase in the range

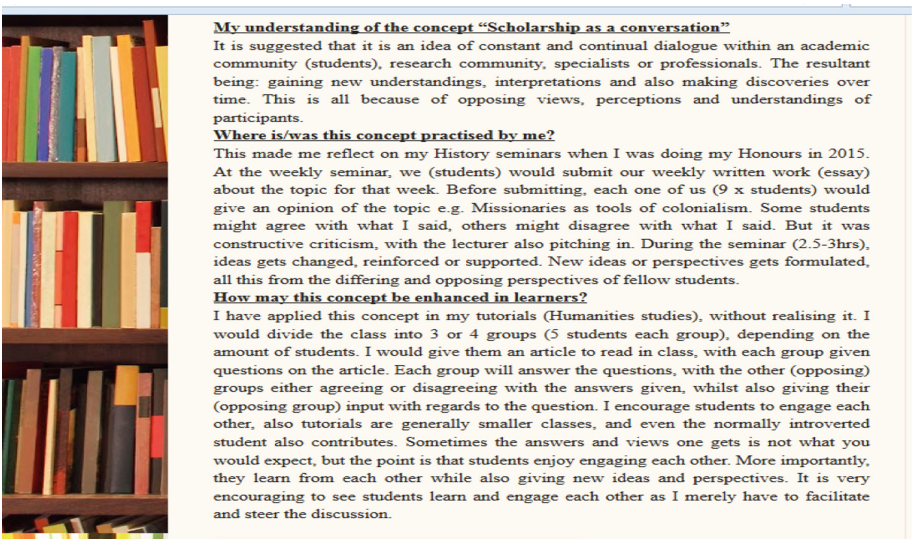

Fig. 4. A reflection by a student in the 2017 cohort

of means for making meaning, as well as in the means for participating in meaning-making… It is now quite simply impossible to ignore the variety of materials available for making meaning… [19, p. 146]. The development of multimodal literacy is suggested in some of the dispositions of the Framework: Students should "*accept that the creation of information may begin initially through communicating in a range of formats or modes*" [1, p. 5].

(i) Posters

Designing a poster provides the student with an opportunity to reflect on the particular processes that are used to create information: "*…it was a light and creative manner to bring across one's ideas and thoughts in a medium that was different…"* (Student 9: Cohort 2017). "*Librarians communicate a lot with patrons using posters or notices…this really helped me with my work as a public librarian*" (Student 10: Cohort 2017).

These are some of the criteria which were used to assess the posters: (a) Ideas about the frame should be fully developed and sustained throughout the poster (b) The Frame should be masterfully integrated into the message and poster. Here the researcher also placed emphasis on the use of aesthetics.

The poster in Fig. 5 below illustrates the Frame *Research as Inquiry* and shows the importance of raising critical questions to shape one's research.

Judging from the few submissions from the 2015 cohort (n = 2), it may be inferred that students were, in general, hesitant to express their interpretations through visuals, text and other modes of information: *"I didn't understand how to create it electronically, it was going to take too much time"* (Student 1: Cohort 2015). More than 60% of the 2017 cohort elected to design posters. Those who preferred to draft a detailed

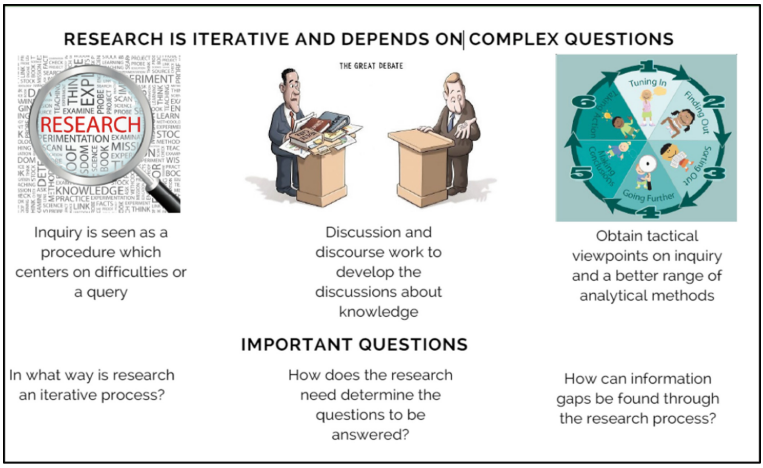

Fig. 5. Poster depicting "Research as Inquiry" (2017 cohort)

teaching scenario attributed their choice to their lack of aesthetic skills: *"I did not choose to do a poster because I am not very artistic – I stick to what I do best as a teacher…doing a lesson plan was better for me to explain the Framework"* (Student 3: Cohort 2017). Figure 7 illustrates a breakdown of responses to this assessment which includes comments about computer literacy and the impact that the activity had on their understanding of the Frames.

Upon reflection, the researcher believes that a mediated learning approach might be needed with the development of posters. "*I prefer that the lecturer shows me how to explain the Frame in a poster …before I am asked to do it on my own…"* (Student 10: Cohort 2015). Despite the fact that she guided her students with creating online posters using a range of software programmes, she considers allowing them to submit drafts of the posters prior to the final due date. In this manner, the student's ability to depict the Framework's elements through multimodality will be sufficiently scaffolded across a series of drafts.

(ii) PowerPoint presentations

One of the main assignments entailed the planning, structuring and coordination of a workshop for members of the LIS community. The researcher instructed the class to collaborate and to work in teams. The students used PowerPoint slides to prepare their illustrations of how they would organise a workshop in the workplace which is aimed at explaining and analysing the Framework: "*I got to learn how to do workshops professionally…now when I run a workshop I know how to plan it properly.* "[Student 6, Cohort 2015].

The researcher observed that lively interaction permeated this activity with constructive feedback from the class. She allowed questions from the audience before she posed her critique to the teams. Given the satisfactory performance of the two cohorts in this regard, the majority of the teams delivered acceptable presentations.

5 Limitations of the Study

The researcher managed to interview only 42% (n = 11) of the total number of study subjects (n = 26) for both academic years and this may have skewed her results. The data obtained thorough this method provided limited insight into students' experiences with regards to some of the authentic assessments. The restricted number of willing interviewees makes it difficult to conclude whether the assessments have maximised the impact of their critical thinking skills.

6 Recommendations

The majority of students claim that the module was saturated with too much content which they were expected to master in a relatively short period of time. It may therefore be suggested that the module should be extended over a year in order for students to gain the maximum benefit from its learning objectives. Moreover, the Framework is aimed at academic librarians whose core function is to teach students and researchers how to navigate the nuances of the 21st Century information landscape. Those who serve in community libraries struggle to plan hypothetical training sessions as they have not been exposed to IL training of this nature: "*The Framework is for mostly for Higher Education…and to ask librarians who work at public or special libraries to use it will confuse them….they might not be allowed to implement the frames in their work as it [the Framework] is meant for higher education"* (Student 2:2017) To alleviate this concern, the researcher recommends that her praxis includes demonstrating ways in which the Framework could be used by public librarians in their IL training of Primary and Secondary school learners.

7 Conclusion

It may be inferred that the Framework's constructivist and inquiry-based learning principles are favourable for fostering autonomous and critical thought. The ACRL Framework provides a nuanced approach to information literacy which enables librarians to evaluate critical thinking through authentic and other assessment types. This study confirms that the Framework presents a new way in which information literacy may be viewed and assessed. It proves that by using formative and summative evaluation techniques, librarians would be able to measure higher order thinking skills and determine the impact that their IL training has on students. More importantly, the study described how the ACRL Framework could be embedded in the ILE module and how it could be operationalised so that prospective librarians are able to internalise the threshold concepts.

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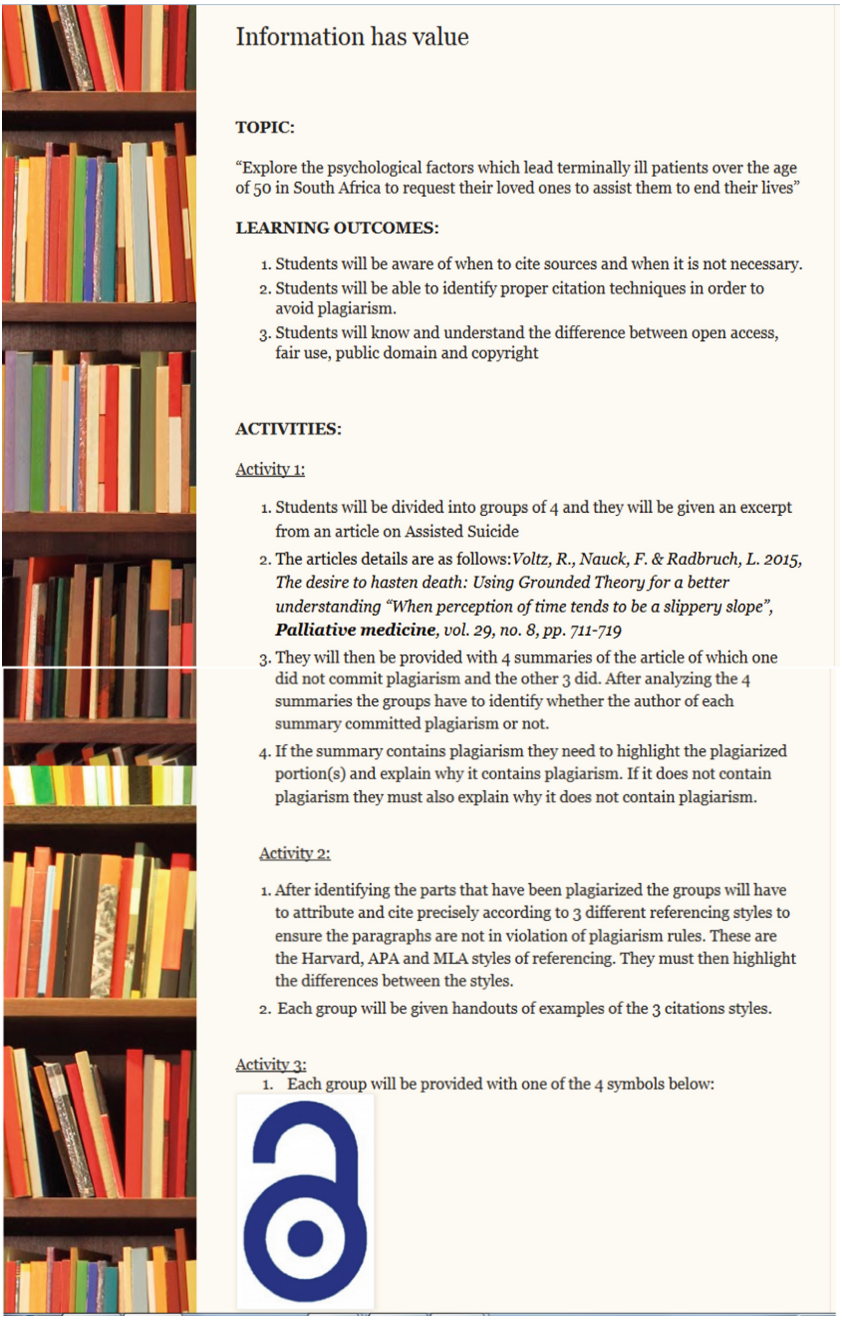
Appendix



Information has value

TOPIC:

"Explore the psychological factors which lead terminally ill patients over the age of 50 in South Africa to request their loved ones to assist them to end their lives"

LEARNING OUTCOMES:

1. Students will be aware of when to cite sources and when it is not necessary.
2. Students will be able to identify proper citation techniques in order to avoid plagiarism.
3. Students will know and understand the difference between open access, fair use, public domain and copyright

ACTIVITIES:

Activity 1:

1. Students will be divided into groups of 4 and they will be given an excerpt from an article on Assisted Suicide
2. The articles details are as follows:*Voltz, R., Nauck, F. & Radbruch, L. 2015, The desire to hasten death: Using Grounded Theory for a better understanding "When perception of time tends to be a slippery slope",* ***Palliative medicine****, vol. 29, no. 8, pp. 711-719*
3. They will then be provided with 4 summaries of the article of which one did not commit plagiarism and the other 3 did. After analyzing the 4 summaries the groups have to identify whether the author of each summary committed plagiarism or not.
4. If the summary contains plagiarism they need to highlight the plagiarized portion(s) and explain why it contains plagiarism. If it does not contain plagiarism they must also explain why it does not contain plagiarism.

Activity 2:

1. After identifying the parts that have been plagiarized the groups will have to attribute and cite precisely according to 3 different referencing styles to ensure the paragraphs are not in violation of plagiarism rules. These are the Harvard, APA and MLA styles of referencing. They must then highlight the differences between the styles.
2. Each group will be given handouts of examples of the 3 citations styles.

Activity 3:

1. Each group will be provided with one of the 4 symbols below:

Fig. 6. A lesson plan depicting the frame "Information has Value"

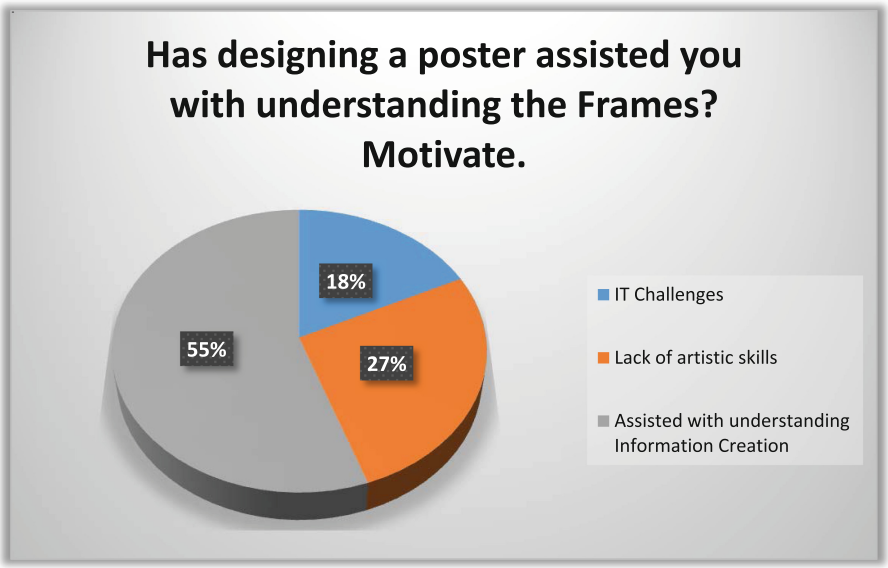


Fig. 7. Student feedback on poster assessment

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Scientific Literacy Education Outside the Classroom: A Study in Acquisition of Knowledge and Skills About Science in Public Libraries in Croatia

Radovan Vrana(✉)

Faculty of Humanities and Social Sciences,
University of Zagreb, Zagreb, Croatia
rvrana@ffzg.hr

Abstract. The importance of science to the future of society is likely to increase as it will offer solutions to many problems society is confronting today. To become fluent in matters of science, one needs to participate in some type of science education. Education in science usually is related to the formal education institutions. The outcome of science education is science literacy, the capacity to understand and apply scientific knowledge in personal and professional life. Science can be also taught outside classrooms in many places including public libraries. The results of the research study presented in this paper show that public libraries in Croatia organize versatile science related activities which attract library user of all ages. Public libraries lack resources to be able to achieve even better results from those presently achieved. They also need a greater recognition for their role in science learning.

Keywords: Science learning · Scientific literacy · Public libraries · Education outside the classroom · Croatia

1 Introduction

Schools and universities have been places of learning on scientific concepts, principles, theories, and models about the world we live in for centuries. Such knowledge is the prerequisite for appropriately coping in a modern world [1]. As the world progresses, knowledge and skills acquired during from formal education are not enough because the changes in society are happening perpetually and demand new approaches to solving problems from knowledgeable citizens. In addition to schools and universities, libraries are also places of learning. The concentration of the written knowledge in libraries and the quality of library services and premises have enabled generations of learners of all ages to enter the realm of knowledge during and after their formal education enabling continuous learning. This is the reason why public libraries are major importance to the general population seeking answers to questions related to different aspects of their lives. Public libraries are popular places for the presentation of versatile scientific achievements because they attract many different and motivated people, both regular library users and occasional library visitors. In addition to being a

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popular place, public libraries have a special role in society. They are open to anyone, regardless of their age, gender, education level, opinion, and affiliation. In the case of education outside the classroom, public libraries are "non-partisan, trusted and accessible community gathering places where people of all ages come to explore and share ideas in an informal educational setting" [2]. To succeed in presenting science related content, public libraries cooperate with individual scientists and scientific institutions to acquire new information about the latest scientific discoveries and also to acquire new knowledge for themselves [3]. The latter is important as "librarians don't always have all the skills needed in order to satisfy the digital learning needs of all groups, but they have the ability to connect people" [4]. The lack of knowledge is just one of several areas in which public libraries need additional support. Other areas include better financing, more employees (librarians) and certainly more library space. In spite of these problems, public libraries are important to their communities which expect new services including those related to the latest scientific discoveries.

2 Science Education in a Changing Environment

The global (formal) system of education is finding itself in the most difficult times. Everything around it is changing and these changes are happening very rapidly. "We don't even know what skills may be needed in the years ahead. That is why we must train our young people in the fundamental fields of knowledge, and equip them to understand and cope with change. That is why we must give them the critical qualities of mind and durable qualities of character that will serve them in circumstances we cannot now even predict" [5]. Yet, the duty of the formal education institutions is to educate individuals and equip them with knowledge and skills which will enable them to become employed, and to advance their knowledge and skills throughout their life. As the focus of this paper is on science education outside the classroom, the attention will be given to public libraries that can provide science related knowledge and skills in areas of interest to the wide public. Although the understanding of science education should be straightforward, there are different views of it. The outcome of science education should be a scientifically literate person. OECD (Organisation for Economic Cooperation and Development) [6] suggested that scientifically literate persons (students) should be able to: explain phenomena scientifically; evaluate and design scientific enquiry and interpret data and evidence scientifically. However, authors like Lee and Roth [1, p. 33] indicated that science educators should not be interested only in the appearance of science literacy and should be interested in "understanding and theorizing ways of participating in science and scientific literacy that do not have boundaries coincident with formal education and life thereafter" and that "ideas of science and scientific literacy that dominate the current literature in science education ought to be imposed on what and how people should know about science once they have left formal education". This why librarians could have more important role in post-formal education taking place in public libraries.

3 Education Outside the Classroom

Education outside the classroom can be defined as "the use of places other than the classroom for teaching and learning" [7]. More broadly, it is "any structured learning experience that takes place beyond the classroom environment during the school day, after school or during the holidays. It can include, amongst other activities, cultural trips, science and geography fieldwork, environmental and countryside education, outdoor and adventurous group activities, learning through outdoor play, and visits to museums and heritage sites" [8, p. i]. Education outside the classroom comprises of three domains [9]: knowledge, attitude and skill. These three domains have the following objectives: "first, to reinforce student understanding of concepts taught in class; second, to provide learning experiences in real-life situations; third, to make learning more meaningful and enjoyable; fourth, to enable students to think and master knowledge though contextualised experiences; fifth, to increase student interest and attitudes to learn; sixth, to expand teamwork and social skills; seventh, to develop skills in the collection, processing and analysis of data and information; and eighth, to cultivate wholesome values among the students themselves" [9, pp. 12–13]. While these clarifications are oriented towards students, education outside the classroom should not necessarily be oriented exclusively on school and university students but also to adults seeking additional education after the completion of formal education. To become more successful in this area, public libraries need partnership and cooperation with the academic community to transform learning into active learning experiences and help students (and other interested individuals) become civically-engaged citizens [10]. The most important point is that education becomes available to everyone with various educational background interested in topics of science in order to become scientifically literate or to advance the acquired literacy. This is where public library comes in.

4 Research Methodology

Scientific literacy is an on-going hot topic which is of interest to all educational institutions. While education in scientific topics is usually related to formal education, other institutions like public libraries are also sometimes included in teaching about science in form of lectures, public presentations of results of scientific discovery, workshops, quizzes and other similar activities. Not much is known about the participation of public libraries in this kind of activities. This was the main motive for carrying out the research with aim to find out the rate of public libraries' participation in activities related to science. The purpose of the research study in this paper was to find out whether public libraries have been active participant in acquisition of scientific literacy [11]. The main hypothesis of the paper is that public libraries (in addition to academic and other institutions in society) carry out a science related activities using all the available resources. The results of the research would help in further popularization of public libraries as places of acquisition of science related knowledge and skills. Online questionnaire with 16 closed type questions was chosen as the principal research method. The data were then analyzed by use of descriptive statistics.

The invitation for participation in the research study was sent to public libraries in Croatia information about which were found at the Portal of libraries in Croatia at http://www.knjiznica.hr. According to the Statistical yearbook of the Republic of Croatia for 2016 [12], in 2013 (the latest available data) there were 269 public libraries in Croatia. However, 219 libraries were listed at the Portal of libraries in Croatia with their official e-mails. 204 mails were delivered without errors on May 7th 2018 with the closing date for participation on May 18th 2018. The total of 95 answer sets collected, which is 35.31% of all public libraries listed in the Statistical yearbook of 2016 and 46. 56% of all the invitations successfully delivered for participation in the research study.

5 Research Findings and Comments

The next section of the paper presents results from the research study in public libraries about carrying out science related activities. The results of questions 3 and 4, and 13, 14, 15 and 16 were presented cumulatively because of the limited space.

5.1 Familiarity with the Term – Scientific Literacy (N = 94)

The term scientific literacy is well known in the sector of education. There are many definitions of scientific literacy and each one developed in time as the technology and society progressed. In this research, public libraries were asked a simple question – were they familiar with the term scientific literacy? 89.1% (N = 82) public libraries were familiar with the term scientific literacy and 10.9% (N = 10) were not familiar with that term. The success of science related activities depends on defining a clear purpose of science related activities and involvement of public libraries and librarians in activities that would result in betterment of society. The segment of adult learning (the interest of adults for science related activities was demonstrated in the previous question) could be further developed, but currently it lacks systematic support in Croatia.

5.2 Number of Librarians Involved in Science Related Activities (N = 94)

As any other library resource, human resources vary greatly from one public library to another, from a single librarian public library (small city public library) to libraries employing several hundred librarians (like Zagreb City Libraries – system with over 40 individual public libraries; in this research they were counted as a single participant). Real life capabilities of public libraries dictate the successful organization of the science related activities. Almost half of the public libraries that participated in this research (46.8% N = 44) had only one person participating in science related activities. 30.9% (N = 29) public libraries had 2–3 librarians, 6.4% (N = 6) public libraries had 4–5 librarians, 6.4% (N = 6) public libraries had more than 5 librarians participating in science related activities. 9.6% (N = 9) public libraries did not participate in science related activities, so they did not dedicate any librarian for this kind of activities.

5.3 Frequency and Types of Science Related Activities Taking Place in Public Libraries (Multiple Answers) (N = 94)

This section presents the results of two questions. One question is related to the frequency of science related activities in the library. It is a strong, but not the only indicator of representation of scientific activities in public libraries. Library holdings containing science information resources are often accompanied by services tailored for different library user groups. Science related activities could be of great interest to the widest public instead of being delivered only to limited groups of participant at universities. The second question is related to types of science related activities taking place in public libraries.

Public libraries participating in this research organized science related activities with different frequency, depending on the available resources. They operate in very different conditions and their resources differ resulting in differences in frequency of organizing science related activities. Public libraries organize science related activities

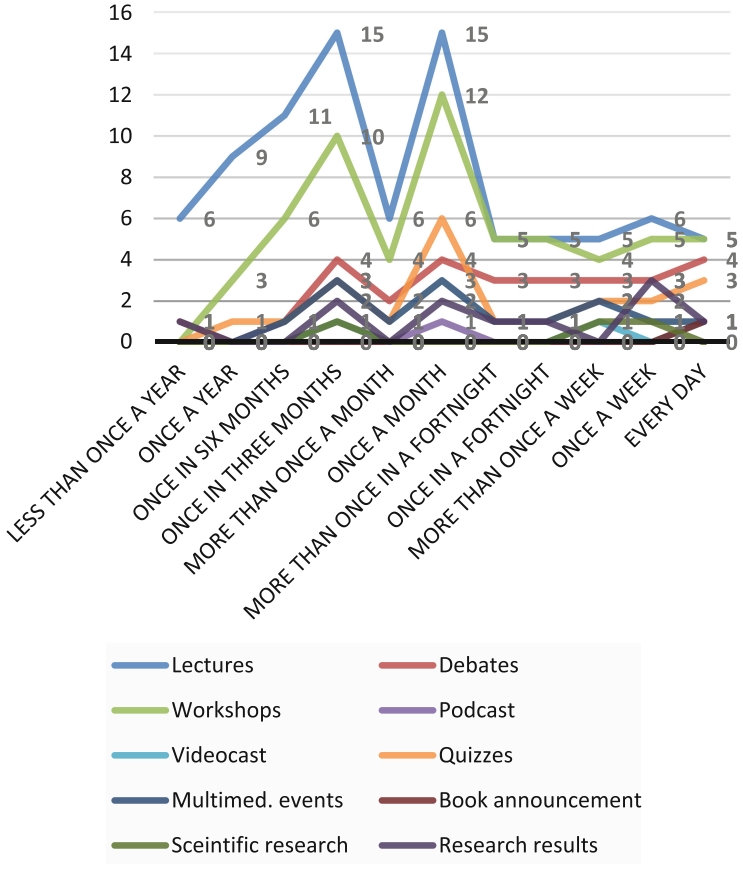

Fig. 1. Frequency and types of science related activities in libraries

on a regular basis, regardless of the type of activity. Most frequently organized activities were lectures, workshops and quizzes. The majority of libraries organized such activities once a month, one in three months or once in six months and very few libraries organized such activities several times a month.

5.4 Library User Categories Demonstrating the Greatest Interest for Science Related Content/Activities in Public Libraries (N = 94)

Public libraries are by definition open to the widest possible range of user categories. Some of them are located near residential areas, schools, universities, major urban traffic points and in centers of cities. As such, they attract many different people by offering versatile services. In this question, the focus was on public library user categories who demonstrated the greatest interest in science related content/activities in the library. The Fig. 1 shows that elementary school students demonstrated the greatest interest in science related content/activities in public libraries. They are followed by university students and high school students but also by adults having different aims when participating in such library activities. We see it is possible that there is a lack of such content for the adult population and that the lifelong learning is not developed (Fig. 2).

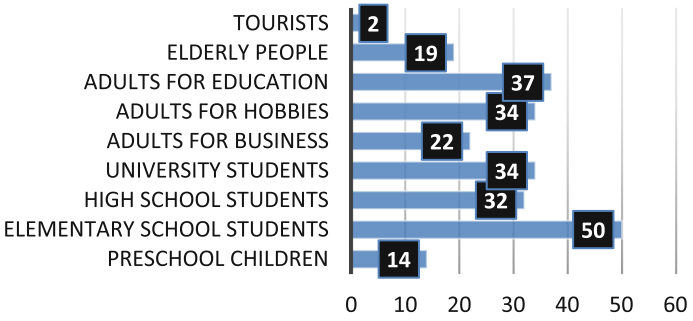

Fig. 2. Public library user categories showing the greatest interest for scientific content/activities in the library

5.5 Resources Needed in Order to Improve Science Related Activities in Public Library (N = 94)

There is probably no public library that has ideal conditions for carrying out its daily activities, especially in countries in which public libraries are closed due to lack of financial resources. In Croatia public libraries are not closing, at least not frequently as in the UK or USA [13], however, they would certainly benefit from improved conditions for their operation. As this research has its focus on science related activities, this question aimed at exploring areas in which public libraries could improve their conditions for carrying out science related activities (Table 1).

Table 1. Resources needed in public libraries in order to improve science related activities

	N	%
More financial resources	67	71.3
More employees	67	71.3
Additional education for librarians wishing to participate in science related activities	49	52.1
More library space	48	51.1
Employees with specific knowledge of certain areas of science	40	42.6
Better IT equipment	35	37.2
Better AV equipment	22	23.4
More science related titles in library holdings	15	16

The results indicate the pressing areas in which librarians feel lack of concrete resources to achieve higher quality in providing science related activities. The first two places indicate limited public library resources limiting the scope and duration of science related activities in public libraries. In addition, half of librarians indicated that they needed additional education to participate in science related activities.

5.6 Frequency of Public Library Users Contacting the Library Asking for Science Related Titles (N = 93)

The respondents could provide answers on scale from 1 (never) to 5 (every day): 2.2% (N = 2) chose value 1, 19.4% (N = 18) chose value 2, 48.4% (N = 45) chose value 3, 14% (N = 13) chose value 4 and 16.1% (N = 15) chose value 5. The approximation librarians made in this question shows that library users seek science related titles from time to time. Since public libraries offer library material of different genres and are not primarily focused on scientific literature, the results indicate stable but not frequent need for this type of library material.

5.7 Frequency of Public Library Users Contacting the Library Asking to Participate in Science Related Activities in the Library (N = 93)

While public library users demonstrated occasional interest in science related library material, they were less interested in participation in science related activities in the library. The respondents could provide their estimation (however, more concrete statistical data would be required for more detailed analysis) answers on scale from 1 (never) to 5 (every day): 9.9% (N = 9) chose value 1, 28% (N = 26) chose value 2, 48.4% (N = 45) chose value 3, 11.8% (N = 11) chose value 4 and 2.2% (N = 2) chose value 5. The results are satisfactory as public libraries offer many versatile activities in their premises and science related activities are just one such activity category.

5.8 Frequency of Cooperation with Members of the Academic Community When Preparing Science Related Activities in the Library (N = 94)

Cooperation with members of the academic community in different areas of public library operation can be very productive for both sides: scientific research, education of librarians, and promotion of results of scientific research. The librarians were given an opportunity to estimate the frequency of cooperation with the academic community. The respondents could provide answers on scale from 1 (never) to 5 (every day): 10.6% (N = 10) didn't cooperate with academic community at all, 29.8% (N = 28) did it very infrequently, 34% (N = 32) did it from time to time, 18.1% (N = 17) frequently and 7.4% (N = 7) did it every day. While it is hard to expect that public libraries will have developed relationships with the academic community needed for cooperation on a daily basis, non-existent and very infrequent cooperation was unexpected.

5.9 Satisfaction with Cooperation of Public Libraries with Members of the Academic Community in Joint Preparation of Science Related Activities in the Library (N = 92)

The respondents were given a scale from 1 – totally dissatisfied, 3 – nor satisfied, nor dissatisfied, 5 – totally satisfied: 5.4% (N = 5) chose value 1, 15.2% (N = 14) chose value 2, 47.8% (N = 44) chose value 3, 20.7% (N = 19) chose value 4 and 10.9% (N = 10) chose value 5. The results show that half of the respondents were not satisfied nor dissatisfied with the existing cooperation. The distribution of the rest of answers is more or less even. There is most certainly space for improvement in the cooperation which could be intensified. The next question will show why this is the case (Table 2).

5.10 Importance of Public Libraries as Places for Learning About Science (N = 94)

The respondents were given a scale from 1 – totally unimportant, 3 – nor important, nor unimportant, 5 – totally important: values 1 and 2 were not chosen. 9.6% (N = 9) chose value 3 while 45.7% (N = 43) chose 4 and 44.7% (N = 42) chose value 5. Public libraries are important places for learning about science. Due to the lack of resources, cooperation with academic community would help them to overcome some shortages and achieve better results in learning about science.

5.11 Opinions of Public Libraries About Their Role in Learning About Science (N = 94)

The respondents were given a scale from 1 – totally disagree, 3 – do not agree nor disagree, 5 – totally agree.

The results in four final questions in the questionnaire suggest significant interest of public libraries for participation in science related activities. The learning about science does not ceases with the completion of formal education and librarians need more science related education to perform science related activities. All the answers clearly show significant interest of public libraries for participation in science related activities.

Table 2. Opinions of public libraries about their role in learning about science

	1	2	3	4	5
Librarians should participate more in science related activities in their libraries	1	2	14	36	41
Public libraries should promote more their science related activities	1	1	16	32	44
Learning is a lifelong activity, formal education is not enough to keep up with novelties in science	0	0	11	12	71
Public librarians need more education about science to perform their science related activities	3	1	15	28	47

6 Conclusion

Learning about science can take different forms and can take place in many different locations. Today, the formal education institutions are not the only locations in which students and adults can acquire knowledge. Public libraries, museums, open spaces are all taking part in this endeavor. Public libraries in Croatia have accepted participation in carrying out science related activities as part of their programs attracting great interest from library users of difference generations from students at all levels of education to adults, thus confirming the hypothesis of the research study. In spite of their enthusiasm which can be seen from the frequency and types of science related activities carried out in their premises, public libraries need additional resources, education for librarians and recognition for their job related to science learning. The results in this research indicate that there are additional opportunities for improvement of conditions in public libraries especially in partnership with academic community. Such collaboration can offer additional education for librarians, joint participation in scientific research, presentation of research results, and publishing of science related material that can be used in science related activities for the purpose of popularization of science. Public libraries have proven to be a very valuable partner in society and this position of public libraries should be used more frequently and more intensively for the betterment of society.

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Data Literacy and Research Data Management

Data Literacy and Research Data Management: The Case at ULSIT

Tania Todorova(✉), Rositza Krasteva, and Elisaveta Tsvetkova

University of Library Studies and Information Technologies, Sofia, Bulgaria
{t.todorova, r.krasteva, e.cvetkova}@unibit.bg

Abstract. In 2017 a team of researchers from the University of Library Studies and Information Technologies (ULSIT) joined an international research group to conduct a scientific survey on Data Literacy and Research Data Management. In the research paper we examine the current state of data literacy, data sharing and reuse perceptions and practices among researchers at ULSIT. The research, which found gaps in understanding of data management best practices, provides recommendations for data literacy training to be provided in the near future. The implementation of the survey was timely, necessary, and useful in light of current amendments to the Act for the Development of the Academic Staff in the Republic of Bulgaria (2018). Analysis of the current levels of awareness and gaps in knowledge among the survey population has resulted in the creation of a *document with recommendations* for changes to the university's data management policy that also includes specific improvements for the university's Quality of Education Management System.

Keywords: Research data management · Data literacy · Open access · Higher education · Training · ULSIT

1 Introduction

Within the frame of the 2016 European Conference on Information Literacy (ECIL), researchers from the United Kingdom, France and Turkey initiated an international research project on Data Literacy (DL) and Research Data Management (RDM) [1]. The core research group developed a questionnaire which aimed to collect data about the data literacy of faculty and doctoral students in higher education institutions. According to Schneider [2] DL or Research Data Literacy (RDL) are dimensions of information literacy that are dedicated to the creation, management, and reuse of research data. RDL is defined as a subfield of RDM, which is concerned with processing of all types of raw or primary data that are created along every research process.

In Bulgaria, the need of implementation of the RDM policy is connected with open data policy implementation, underlined by two national strategies - "National Strategy for Development of Scientific Research in the Republic of Bulgaria 2017–2030: Better Science for Better Bulgaria" (NSDSR) and "Bulgaria National Roadmap for Research Infrastructure, 2017–2023" [3, 4]. This created new demands on researchers, who are faced with a complex of challenges and skills requirements that they have not dealt with previously. These skills are crucial to ensuring data quality, integrity, shareability,

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discoverability, and reuse over time [5]. Convinced that the survey on Data Literacy (DL) and Research Data Management (RDM) was both timely and necessary, a team of researchers from the University of Library Studies and Information Technologies (ULSIT) joined the international scientific group and conducted the research.

2 The Aim and Methodology

The questionnaire survey "Data Literacy Survey" (DLS) contains two groups of questions. The first group collects respondent demographic information, and the second aims to determine competence regarding management of research data and the kind of training that is needed for researchers in the context of RDM. In order to find answers to these questions, an online questionnaire survey was conducted amongst university faculty, research staff, and doctoral students at ULSIT. The implementation of the survey at ULSIT passed through three stages [6]. During the first stage in January 2017, a translation of the questionnaire instruments from English language into Bulgarian was carried out and a list of respondents was created. During the second stage, from February to March 2017, the online survey (LimeSurvey) was disseminated to participants and the data was gathered. The second stage, February–March 2017 includes dissemination of the participation invitation in the online based survey and accumulation of data. The third stage involved analysis of the results, creation of a summary document with conclusions and recommendations for consideration by stakeholders at ULSIT, and the writing of a scientific article. Participation in forums and events in Bulgaria and abroad has been planned that are aimed at continuing conversation on the significant range of problems identified by the authors.

The data obtained were subjected to logical verification and control and then processed through the statistical package SPSS (Statistical Package for the Social Sciences), version 19.0. 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, single-factor dispersion analysis.

3 Findings

In ULSIT, the survey was conducted on the basis of systematic random sampling with stratification of 10% of all professors under basic employment contracts at the university and 10% of matriculating doctoral students. The general aggregation consists of 40 effectively surveyed lecturers and doctoral students, which makes the survey representative for ULSIT. From the target group of 147 researchers, recruited in ULSIT, 27.2% (n = 40) respondents answered to the whole survey.

3.1 Demographics

Survey responses totalled 40: 90% (n = 36) were lecturers and 10% (n = 4) were PhD students. Out of 40 respondents, 80% (n = 32) were female and 20% (n = 8) were

male. Most of the participants were ages 36–45 (42% (n = 17). This is followed by those in the age range of 46–55 and 56–65 (20% respectively, n = 16). 15% (n = 6) were between the age of 26–35 and 3% (n = 1) were over 65 years old. Distribution of the respondents by scientific specialty is the following: 67% (n = 27) were from Social Sciences (mainly Library and Information Sciences) and 33% (n = 13) were from Computer Sciences. Research experience of the respondents were as follows: 5–10 years (27%, n = 11), less than 5 years (25%, n = 10), more than 20 years (18%, n = 7), and between 11–15 and 16–20 years (15% respectively, n = 12).

3.2 Awareness of Data Management Issues

The original online survey includes 24 questions. Respondents were asked to indicate the file type of data that they normally use for their research. Preference for use of non-digital data (e.g., paper, film, slides, artifacts), standard office documents (e.g., text, spreadsheets, presentations) and Internet and web-based data (e.g., webpages, e-mails, blogs, social network data) was expressed by 90% (n = 36), 85.0% (n = 34) and 70% (n = 28) of respondents respectively. A statistically significant difference in the respondents' responses was established in relation to their age difference. The conclusion is that younger researchers of age groups: 26–35 year olds, 36–45 year olds and 46–55 year olds, use a greater variety of data file types than those over the age of 55. This is probably due to the better computer skills of the researchers in the three age groups mentioned.

A statistically significant difference was found between the responses of respondents with different research experience on the question about description of the volume of data that they use and produce from their research. Logical and regular is the observed tendency for researchers with longer experience in the relevant scientific field to use and produce the larger volumes of information. Table 1 illustrates the finding that the volume of data that respondents produced from their research is directly related to the volume of information used in the research process. For example, the average for researchers with less than 5 years of research experience is M (mean) = 1.60, while for researchers with 11–15 years of research experience is M = 1.67, and for those with more than 20 years is M = 1.86. Only scientists with more than 20 years of research experience use and create the largest volume of data – one terabyte.

Table 1. Volume of data generated as a result of the research activities (in units of measurement of information)

Factor (Research experience)	N	M	SD	F	Sig	Min.	Max.
<5 years	10	1,60	0,51	1,50	0,22	1	2
5–10 years	11	1,45	0,52			1	2
11–15 years	6	1,67	0,51			1	2
16–20 years	6	1,77	0,40			1	2
>20 years	7	1,86	0,69			1	3

According to data obtained from the question: *"How do you usually get the data for your research?"*, more than half of the respondents create new research data themselves. 60% (n = 24) and 50% (n = 20) used data from their own research team or scientific group at the university. The percentage of researchers relying on data from their own research network or personal/professional connections is also relatively high. The results suggest that respondents do not limit themselves to a single source but prefer a variety of well-known and reliable sources - 80% (n = 32). Asked *"How do you usually use data that you get from others/outside sources?"* respondents usually gave more than one response from the given options. This suggests that the use of data from others/outside sources depends on the specific situation in which they use the relevant data. Most often, however, respondents prefer to spend a lot of time and effort making data usable for a particular study 85% (n = 34). The survey found that the respondents most often create the following type of data associated with their research: standard office documents 100% (n = 40); images (JPEG, GIF, TIFF, PNG) 55% (n = 22); archived data (ZIP, RAR, ZAR) 45% (n = 18), as well as non-digitalized data (paper, films, slides, artifacts) 45% (n = 18). The lack of use of structured graphics (CAD, CAM, VRML) and Raw (machine-generated) data is probably due to respondents' research areas.

From the results of the question *"Where do you usually store the data you produce from your research?"* it becomes clear that the respondents rely mainly on their own devices 87.5% (n = 35) or tools that reside in the cloud 40.0% (n = 16). Survey results find that most of the researchers apply additional supportive information to their research data: administrative information (e.g., creator, date of creation, file name, access terms/restrictions) 77.5% (n = 31); discovery information (e.g., creator, funding body, project title, project ID, keywords) 62.5% (n = 25); and technical information and description of the data file, both of which undoubtedly help to better organize and make usable the data arrays on both proprietary devices and in repositories 32.5% (n = 13).

Respondents also were asked to indicate their opinion about collaboration with other researchers and sharing of research data. More than half of respondents 62.5% (n = 25) are willing to share data and collaborate with other researchers, both from their own institution and from other scientific organizations. This fact is undoubtedly important for the development of national and international research networks. Nearly half of the respondents 45% (n = 18) are more likely to provide their research data and developments freely. Asked if they have any concerns about sharing data with others, almost half of respondents 45% (n = 18) said that their research data should be freely available to anyone who is interested in it, that is, they have no concern with the public availability of their data. A finding that deserves attention is, however, the concern of more than one-third of the respondents about the lack of appropriate copyright policies and rights protection - 35% (n = 14).

The last group of questions refers to *specific documents and activities for managing research data at the university* and aim to establish the *level of awareness of the respondents*. The analysis of the results shows that the picture of the individual respondents' opinions is quite colorful. The respondents' responses vary across the full spectrum of possibilities. Respondents are not well informed about the existence of the Data Management Plan (DMP) at the university, nor are they aware of the

implementation of the plan. The fact that most of the respondents 65% (n = 26) believe that the DMP effectively helps scientists manage their research data is encouraging. Also encouraging from the perspective of the authors is that respondents believe in the value and importance of metadata training relating to data description. According to 82.5% (n = 33) of the surveyed researchers, such training would be useful for research data management.

In Bulgaria, standards for citing data are well known and used. Since 2011, the international standard ISO 690: 2010 "Information and documentation: Guidelines for bibliographic references and citations to information resources" has been used as the national standard for citing data [7]. In this regard, it is understandable and natural that 92.5% (n = 37) of the respondents believe it important to use a specific standard style for citing and referring to research data.

In the survey questionnaire, participants were asked how often they engage in specific data management practices. Each statement was required to be chosen on a 5-point Likert scale with the following options: *almost always*, *often, sometimes, rarely, never*. Because the academic community is heavily involved in research, respondents were expected to have high level of DL and RDM competencies. Therefore the *satisfactory level* is determined from answers *almost always* and *often*, presented in Table 2.

Table 2. Respondents answers *almost always/often* on responses of the question *"How often do you practice the following?"*

Responses	n	%
Using metadata standard for tagging your data	13	32.5
Use your own/in-house (your research team) tags and metadata	14	35.0
Using datasets that are tagged with standard metadata	12	30.0
Use file naming convention or standard	20	50.0
Having different versions of the same dataset(s)	16	40.0
Using systems/techniques for version control to easily recognize a specific version	13	32.5
Citing research data	27	67.5
Working with data that are generally in the public domain	34	85.0
Working with data that have restricted access	13	32.5

Results of the survey indicate a far from satisfactory level of data management practices, except on the issue of citing research data and using public domain data.

Respondents also were asked to indicate their opinions regarding other DL and RDM statements relating to data sharing. 80% (n = 32) of respondents strongly agree or agree that they are familiar with open access (OA) requirements. Nevertheless, only 1 respondent (2.5% (n = 1) strongly agreed with the statement *'I am comfortable and willing to share my research data with others'*, while 82.5% (n = 33) disagree or strongly disagree with that statement. 37.5% (n = 15) of respondents strongly agree or agree that they foresee no problems with sharing their research data and more than half

of the respondents 62.5% (n = 25) perceive that data ethics could be an issue when research data is shared with others. The high correlation between these last two statements (r = 0.68) indicates that in practice the researchers from ULSIT are reluctant to share their research data due to potential ethical and copyright problems. This is a finding that requires further attention.

As for the statement *'I would like to store my research datasets beyond the lifetime of the project'*, while 67.5% (n = 27) strongly agreed, 27.5% (n = 11) neither agree nor disagree and 5% (n = 2) disagree or strongly disagree. A high majority of respondents 95% (n = 38) agree that every university should have a Data Management Plan, as well as that universities should recommend and use a standard file naming system, 87.5% (n = 35). A slight majority believe that universities should have a prescribed set of metadata elements for uploading data into a repository, 67.5% (n = 27). The survey found that, according to most of the respondents, financial provision should not be the concern of the researchers themselves or of their teams, but rather the responsibility of the university, other research funding bodies, and/or a national authority. Most of the researchers, 67.5% (n = 27), believe that scientific data should be stored at the university or in an external repository for long-term preservation and access and 50% (n = 20) believe it should be provided free of charge.

The last two questions in the questionnaire aim to establish if *formal trainings have been conducted* on the various components of RDM and *whether respondents would like to be involved in future trainings*. From the data presented it becomes clear that trainings on these topics in ULSIT have been conducted, but the respondents themselves have not always participated. More than half of the respondents, 55% (n = 22), have not participated in such trainings so far. The majority of respondents participated in data citation styles training, 32.5% (n = 13). The findings indicate that the respondents show a keen interest in conducting similar trainings in the future. Prevalent among the respondents is the need to have a formal training on: DMP 70% (n = 28), metadata 57.5% (n = 23), version control of data sets 50% (n = 20), consistent file naming 45% (n = 18), and data citation styles 40% (n = 16). Only 3 respondents (7.5%) declared that they are not interested in such training.

4 Overview of the State of Open Access to Research Data in Bulgaria

DL and RDM competency is increasingly important to the academic community in Bulgaria. At a European Union Council meeting on May 27, 2016, EU member states agreed to a goal of making all scientific research papers at state universities within the EU freely available by 2020. Member states and stakeholders were encouraged to set up strategies accordingly and to implement the use of Data Management Plans as a standard scientific practice in their national research programmes. They were invited to contribute to the realization of the Open Science Policy Platform and to the "European Cloud Initiative - Building a competitive data and knowledge economy in Europe" [8].

Bulgaria has a strong background in OA through its participation in the OpenAIRE and OpenAIRE plus projects, each of which provide open access infrastructure to European countries [9]. Since 2005 two associations – National Research Network [10]

and Bulgarian Research and Educational Network [11] – were directed to develop and operate Bulgarian research and educational networks, as well as to facilitate the integration of Bulgarian scientific, educational and cultural resources through a high performance information infrastructure in the global information space.

In spite of these positive steps, Bulgaria is far from achieving the goals set. A range of problems was reported in the "Strategy for Development of Higher Education in the Republic of Bulgaria for the 2014–2020 Period," an analysis of the state of higher education in Bulgaria. Problems reported include:

- difficulties in the quality and compatibility of Bulgarian higher education (HE) in comparison to European HE systems
- weak links between the HE and the needs of business and public institutions
- insufficient links between training and research
- need of improvement in the management system of HE institutions and the HE institutions network
- problems associated with attracting and retaining faculty
- inadequate opportunities for lifelong learning and others [12].

In this context, a serious issue is that due to lack of effective implementation on an national level of RDM policy and regulations – the majority of research data of Bulgarian scientists still are not collected and archived and cannot be accessed.

Nowadays there are six OA Bulgarian repositories, namely:

- Bulgarian OpenAIRE Repository (incl. Bulgarian publications funded by FP7/ERC and EC projects)
- New Bulgarian University Scholar Electronic Repository
- Repository of Institute of Mathematics and Informatics at Bulgarian Academy of Sciences (IMI-BAS)
- Research at Sofia University Repository
- Academic Research Repository of Burgas Free University
- Electronic Repository of the Central Medical Library at Medical University of Sofia.

But, according to "OpenAire in Bulgaria" statistics, in May 2018 there are only 2595 OA publications available from two OpenDOAR repositories: 90 publications from the Bulgarian OpenAIRE Repository and 2507 publications from the Bulgarian Digital Mathematics Library at IMI-BAS [9]. Obviously, there is a need for expansion of efforts in the field of OA and OA to research data in Bulgaria.

Positive developments are expected as a result of three government documents regarding OA and Open Science, accepted in 2017: "National Strategy for Development of Scientific Research in the Republic of Bulgaria 2017–2030: Better Science for Better Bulgaria" (NSDSR), "Bulgaria National Roadmap for Research Infrastructure, 2017–2023", and "Diagnostic Review Mapping of Research Infrastructures and Equipment In Bulgaria" [4, 13, 14]. The first recommendation of the NSDSR is for the Ministry of Education and Science (MES) to establish a policy of OA on the basis of the green model. This should encompass all research institutions that perform and/or disseminate fully or partially state-funded research in order that the results of state-funded research are disseminated to the greatest extent possible.

5 Recommendations for ULSIT Institutional Policy

In this research paper the authors examined the current state of data literacy, data sharing and reuse perceptions and practices among researchers at a single academic institution – University of Library Studies and Information Technologies (ULSIT). Based on the survey results, there are gaps in knowledge that suggest a need for appropriate DL and RDM training at the university. The main findings of the survey, can be summarized as follows: the level of knowledge of respondents regarding DL, RDM awareness and skills are far from satisfactory. The majority of researchers are uncertain about RDM related issues and OA policies and practices. At the same time, the findings indicate a high degree of interest for training on these topics. This interest could be a good basis for planning future learning initiatives. However, one must consider that when planning, organizing and implementing metadata and/or Data Management Plan trainings, trainees cannot be approached as a homogeneous group of knowledge and understanding. The trainings should be selectively offered to different group of learners. Measures should be taken to ensure understanding and implementation of RDM policy in ULSIT.

The analysis of the findings resulted in the creation of a *document with recommendations* to be used as the basis for further reflection on the institutional RDM policy and the improvement of the Quality of Education Management System (QEMS) at ULSIT. Recommendations include the following:

- necessity of implementation of institutional RDM policy connected with open data policy;
- development of institutional repository and research data services for research data storage, analysis and curation as a first step on the Open Access Green Road;
- implementation of DMP in research process, establishment of prescribed metadata set for uploading data into a university repository and of specific guideline for citing data;
- organizing appropriate DL and RDM training, according to international experiences and standards;
- ULSIT must be in collaboration with all stakeholders in Bulgaria involved in the development and management of research networks and with the integration of Bulgarian educational, scientific and cultural resources in the European and world information society.

The strengths of ULSIT in this area are: an established science infrastructure, which includes “John Atanasov” - Digital and 3D national center for science and research in ICT (Living labs, Internet of Things and Smart Cities), LibLab (Laboratory of Library Technologies, Communications and Informing), UNESCO Interfaculty Chair “ICT in Library Studies, Education and Cultural Heritage” and specialized institutes, dedicated to research activities in the field of Bulgarian cultural and historical heritage, working in cooperation with scientific groups from Bulgarian Academy of Science and other organizations. ULSIT strengths also include long-time experienced cooperation with partners from the national system of universities, libraries and museums. ULSIT successfully collaborates with creative and re-creative industries, also.

The systematized conclusions and recommendations from the conducted survey are provided to all individuals and groups responsible for quality standards design at the university. They could be used in the development of a project in the frame of the Operational Programme of EC "Science and Education for Smart Growth 2014–2020" [15]. The implementation of the "Data Literacy Survey" was very useful also in relation to current amendments (May 2018) in the Act for the Development of the Academic Staff in the Republic of Bulgaria [16].

6 Future Plans

Researchers from other universities continue to be interested in the survey. In the period of March–May 2018, the "Data Literacy Survey" was conducted in University of Chemical Technology and Metallurgy in Sofia and in Konstantin Preslavsky University of Shumen. These new sets of data will give authors a chance to make comparisons and to stimulate inter-institutional dialog and collaboration for needed improvements.

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Research Data Literacy Perception and Practices in the Information Environment

Jela Steinerová(✉) and Miriam Ondrišová

Comenius University, Bratislava, Slovakia
{jela.steinerova,miriam.ondrisova}@uniba.sk

Abstract. The paper addresses conceptual contexts of research data, research data literacy and research data perception and practices. The concepts of research data and research data literacy are explained in the context of the information environment. A typology of research data is presented based on a qualitative study among Slovak researchers. Research data types are represented by a concept map. Results of a survey among Slovak scholars are presented as part of a multinational online questionnaire survey on Data Literacy and Research Data Management (257 subjects). Findings confirm positive perception of data management issues among researchers. Majority of them are willing to share their data, but express concerns regarding misuse and misinterpretation of data. Most researchers are interested in research data management trainings. In conclusion, we propose the implications for LIS education with regard to data management, including the courses on data analysis and visualization and for development and maintenance of research data infrastructures in the information environment.

Keywords: Research data literacy perception · Slovak researchers · Research data practices · Research data management · Research data management courses

1 Introduction

The aim of this paper is to address conceptual issues of research data literacy perception and to present results of surveys on research data practices in Slovakia. Research data can be regarded as representations of objects, measured inputs/parameters, and entities used as evidence in the research [1]. Data literacy represents a process of becoming aware of different modalities of how to acquire, process, use, interpret and present data. Research data literacy forms a part of data literacy in the research process. It has been explained by Koltay [2], Schneider [3], Koltay et al. [4], Carlson et al. [5], and Martin [6]. Research data are marked by wide variety. Types of research data can include big data, open data, qualitative and quantitative data, experimental, observational, sensory, cultural, simulated, or referential data [1, 7]. Research data practices emerge in data-intensive sciences and refer to intuitive use of research data. Research data management was explained by Tenopir et al. [8]. In this context we ask the questions: Which typology of research data could help understand research data literacy? What is the perception of research data literacy and research data practices by Slovak researchers?

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2 Research Data and Research Data Literacy

Research data is one of the main topics and trends in information research. The data-intensive paradigm of science and research has been explained as an emerging trend which influences information work [9]. However, the problem of definition of the concept of data is rather complex in contexts of theory of information science. Furner [10] identifies several "lives" of data, including data as gifts, data as metadata, data as evidence, data as attribute-values, data as bits, or data as differences. He concludes that it is important to discern between the computational and the informational interpretation of data. The informational interpretation is based on the names given to concepts. A comprehensive review of the issues of data literacy for researchers and librarians was presented by Koltay [2]. He emphasized that researchers´ behavior is data-intensive, but usually intuitive, they often learn data management on the job. Research data management was determined by Schneider [3] as a method that enables the integration, curation and interoperability of data life-cycle, i.e. the production, access, storage and re-use of data and the use of tools for data processing. Research data literacy is focused on understanding and proper use of data related to research process, it is context-dependent, including different disciplines, institutional or personal contexts.

2.1 Information Environment

Research data are usually integrated into data infrastructures and become components of the information environment. In this perspective the information environment means a complex system of information interactions, including information objects (resources), data, people, tools and services [11]. The variety of data and information objects is a major reason for the need to determine types of research data and develop research data literacy. For the proper use of data and information infrastructures in research disciplines, an expertise of how to use them is needed. In this context we can determine research data literacy as knowledge of a range of data processing activities, from identification through planning, storage, analyses, evaluation, management, provision, to protection [3]. Research data practices are then practical activities of handling research data in different disciplines. This term follows the trend of viewing data literacy as a socio-cultural practice with the use of digital technologies in the information environment, including tool literacy, resource literacy, social literacy, publishing literacy. The growing demand of training in research data management has been presented by Schneider [12], focused on content-oriented and method-oriented aspects of professional training in data competences and skills.

3 Situation in Slovakia

3.1 A Study of Information Behavior of Researchers: Types of Research Data

Research data infrastructure as a component of open science and open access initiatives is a current issue in Slovakia. Several activities have been organized by the Centre of Scientific Information (CVTI SR), including a recent survey on data management.

At the Department of LIS of Comenius University in Bratislava a qualitative study of selected top researcher´s information behavior was carried out in 2015–2017 in the framework of a larger study focusing on information behavior of researchers selected from different disciplines, including sciences, social sciences and humanities with regard to open science [13]. The methodology of semi-structured interviews was applied, and the results were published in a final publication [11]. One part of this study focused on the types of research data. Results of the analyses were visualized in concept maps. One of the concepts maps visualized the research data types, as articulated by researchers. This map is a result of multiple content and qualitative analyses and categorization (Fig. 1). The map separated the contexts of disciplines, sciences, social sciences, humanities, and computer science, and identified types of data which make a difference in these disciplines. Common characteristics of data are also described. The findings suggest that data infrastructures in sciences (physics, chemistry, genetics, medicine) are well established, while the data infrastructures of digital humanities and social sciences need more attention. As examples, we can mention the research data of archaeological studies, digital data of Maya culture studies, digital data of historical research (digital map of memorable sites in Bratislava, PamMap), digital

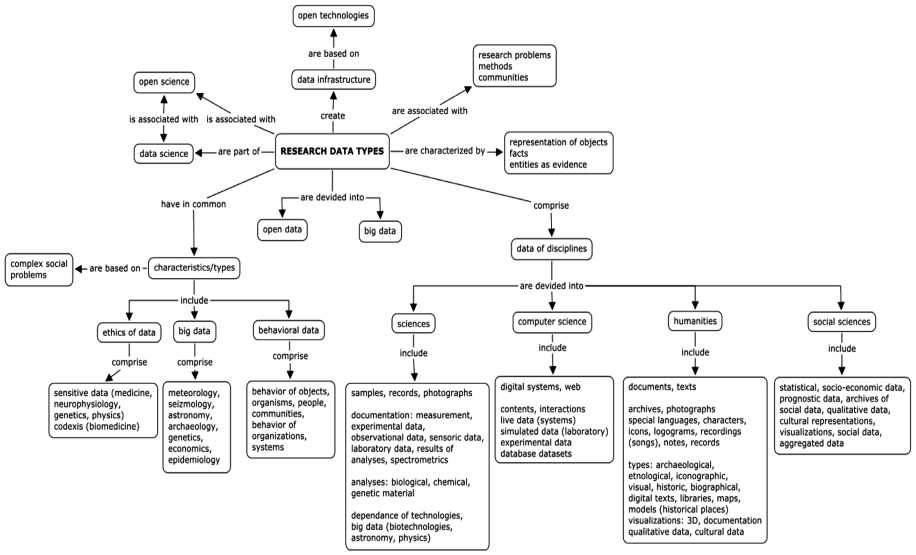

Fig. 1. Conceptual map research data types (Steinerová 2018, p. 64)

data of linguistic research (the atlas of Slavic languages). Qualitative data are typical for social studies and humanities (sociology, politology, ethnology, linguistics, literary science, sinology). Challenges that the digital humanities bring in are the presentation of research stories, integration of digital cultural objects, data sharing, re-use and collaboration, and data access and copyright.

The map illustrates the complexity of contexts of research data with impact on research data literacy and practices in different disciplines following the trends of building information infrastructures for open science. This research data typology was derived from interpretative repertoires of participants of the study and can help understand contexts of research data as embedded in disciplines. Further factors of research data relate to problem statements, methods, cultures of disciplines, data infrastructures, and data ethics.

3.2 An Online Questionnaire Survey of Research Data Literacy

In the context of open science and digital science we were interested in research data practices of researchers in Slovakia. That is why we took part in a multinational online questionnaire survey on Data Literacy and Research Data Management [14]. The aim of the study was to identify research data practices regarding the research data production, use and sharing and attitudes to research data literacy. We distributed 2600 questionnaires among 10 major universities and the Slovak Academy of Sciences via e-mail (December 2017 to January 2018). Out of 486 responses, we analyzed 257 filled in questionnaires. The response rate was 10%. We used the LimeSurvey portal for support of questionnaire distribution designed by a group of international experts (26 questions). The demographics and basic characteristics of our dataset (257 participants) included 182 academic staff subjects (70.82%) and 74 research students (28.79%). The age of participants ranged between 26–35 (41.25%), 36–45 (22.96%) and 46–55 (15.56%). Male subjects included 50.97% and females 47.86%. The range of research experience was from less than 5 years (33.46%), to 5–10 years (16.34%) and 11–15 years (15.95%). As for the disciplines, the participants came from sciences (75%), social sciences (18%) and humanities (7%). Most researchers were from the Slovak Academy of Sciences (n = 94) and Comenius University (n = 48). The main research question is articulated as follows: What is the research data literacy perception and practices with Slovak researchers? The content was focused on the usage and production of data types (digital files), practices of getting, sharing and use of data, institutional practices regarding data management (planning, storage, metadata), and interest in training with regard to data management. Limitations of our results are the low response rate and self-selection of subjects.

3.3 Results: Research Data Management Practices

Preliminary analyses of our dataset point to a positive perception of data practices with researchers' willingness to share and re-use research data (52%). The majority of subjects claimed that their data is available upon request (56.42%). Their concerns were namely with regard to data misuse (40.86%), misinterpretation and data ethics (63%). Differences across disciplines were noted. 73% have never used a data

management plan for their research, about 60% think that universities should have a data management plan. 65% are familiar with metadata standards, but 53.86% of subjects have never used metadata tagging for their data. Most subjects are interested in research data management education.

Figure 2 describes formal types of research data regarding their usage and production. The most often used data types were standard office documents (texts, spreadsheets, presentations) (97.67%), images (85.21%) and internet and web-based data (81.71%) and archived data (75.10%).

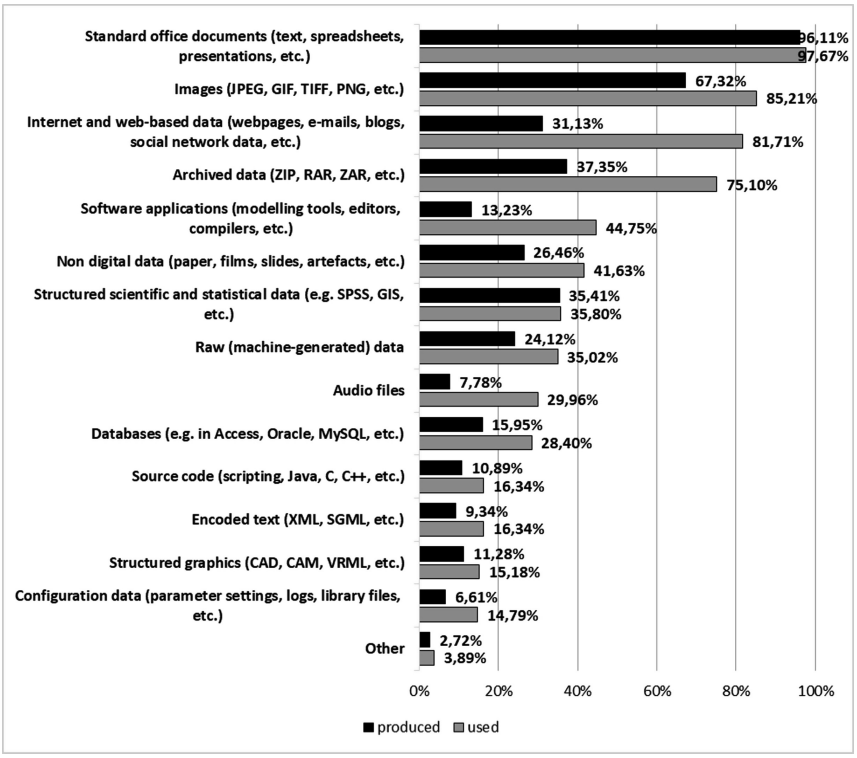

Fig. 2. Comparison between used and produced types of data

Significant differences were noted among disciplines with regard to use of data types. In sciences researchers used raw data (machine-generated), images and structured graphics in a larger scale than researchers in humanities and social sciences. High usage of non-digital data was noted with humanities. Statistical and structured data are preferred especially by social sciences researchers (60%). Researchers produce all types of data, especially standard office documents. Three quarters of participants create new data for their research (74.32%) and almost half of the researchers get their data from multiple known sources (49.03%) and from their research team (47.86%).

Three quarters of scientists use data from outside sources as it is or with only minimum cleaning. Almost all researchers store their data in their own devices (98.83%), only 18% use central servers or repositories.

As for the data sharing, three quarters of researchers collaborate with colleagues in the same team and half of them collaborate with researchers in other institutions. Data of more than 50% of researchers is available openly to their research team or upon request. Sharing of data is represented on Fig. 3.

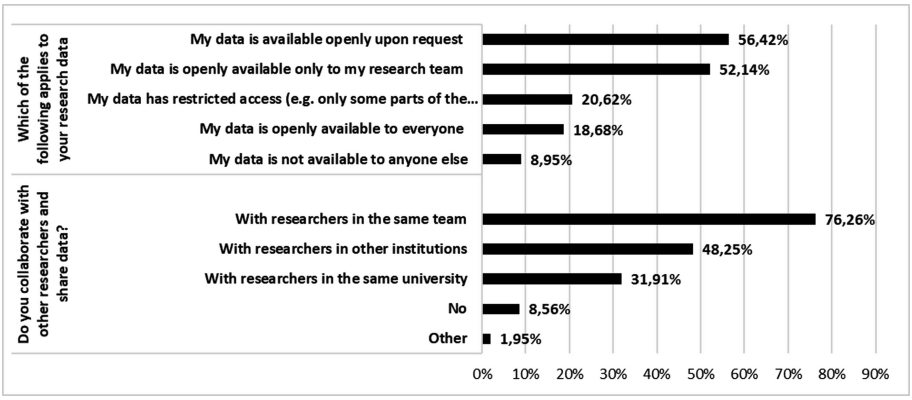

Fig. 3. Sharing of data and collaboration

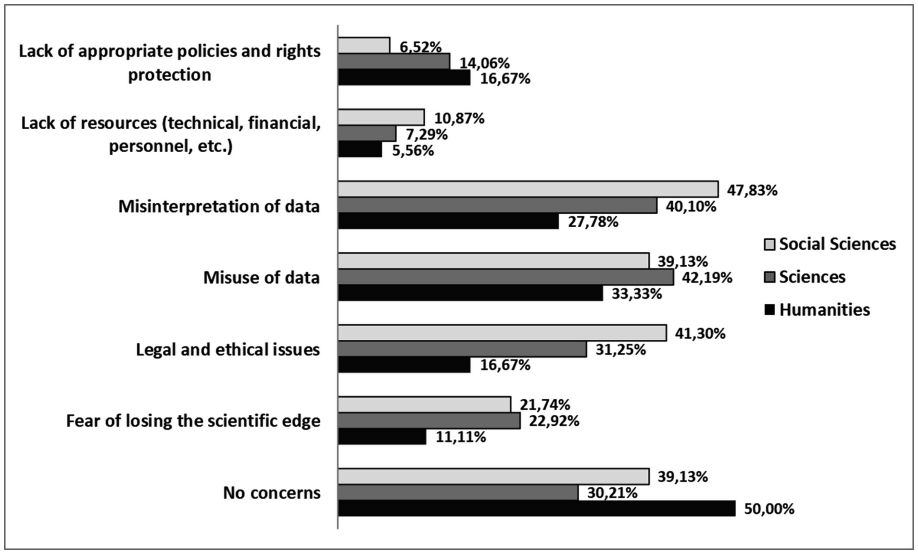

Fig. 4. Differences among disciplines expressing concerns of data sharing

Interesting differences between disciplines were found with regard to concerns for sharing data with others (Fig. 4). One third of researchers had no concerns for sharing data. The most frequent concerns were misuse and misinterpretation of data (48% in social sciences) and the legal and ethical issues. Differences between male and female subjects were noted; women had more concerns than men with sharing data.

As for the institutional policies, three quarters of subjects do not know if their institution has Data Management Plan (DMP) (79%). The majority of subjects had never used a DMP for their research (73.15%), only 6.61% had experience using DMP. Two thirds of them are familiar with the term metadata and 56% think that a formal training on metadata would be useful for research data management. 60% of subjects are familiar with the concept of Digital Object Identifier (DOI), 64% subjects do not know requirements of their institution with regard to data storage. 56% of researchers are familiar with open access requirements (65% from social sciences, only 38% from humanities). 62% of subjects think that data should be stored for long term access at their university, 50% think that data should be stored at unpaid external storage.

The analysis of data regarding the institutional data management policy is illustrated on Fig. 5. Most subjects do not know, if their institution has DMP (79%) and are uncertain if their university has a prescribed metadata set for a repository (81%). Almost half of the researchers (47%) claimed that their university recommended specific guidelines for citing data and 73% used standard style for citing research data.

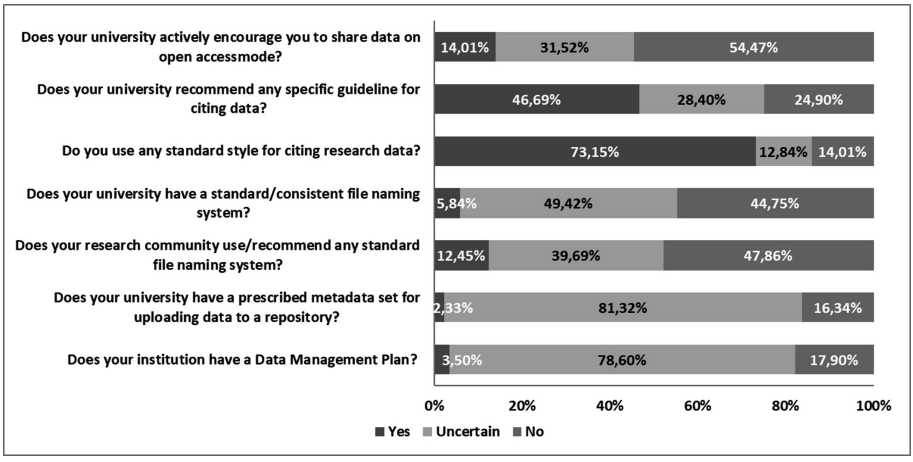

Fig. 5. Institutional data management policy

Most participants of the study had no formal training in data management (82.88%). They have the highest interest in training on Data Management Plan, metadata and data citation styles.

Results of this study confirmed that researchers use more data than they produce. The majority of participants are willing to share their research data (upon request), but also express concerns regarding misinterpretation and misuse of their data. Many participants emphasized concerns regarding legal and ethical issues of data. However,

in our survey the concerns differed from similar surveys, (e.g. [15–17]), in which the legal and ethical concerns were top-ranked concerns as compared to misinterpretation of data in our survey. Tenopir et al. [8] found that concerns of misinterpretation data due to their complexity have increased. In our survey most concerns regarding misinterpretation and ethics of data sharing were expressed by researchers in social sciences. The majority of participants do not use Data Management Plan (DMP) and think that the long-term storage of data should be provided by universities. More than half of the participants are familiar with open access requirements. The majority of the subjects are interested in formal trainings with regard to research data management, emphasizing especially data management planning, metadata and data citation styles. Context-specific differences were noted, especially in variety, volume and types of data. It has been confirmed that researchers´ data practices are rather intuitive and that more systematic approaches and data infrastructure services would be helpful.

Our study contributed to the comparative study of data literacy and data practices in more than 30 countries. Because of low response rate, the results cannot be generalized, but can help understand needs regarding research data literacy and data management. The findings are in line with the study of Tenopir et al. [8], which confirmed the increasing willingness of researchers to share data, dependent on disciplines, institutional support and technological and data infrastructures. Data sharing is a challenge of practices in collaborative communities and common projects based on established trust. These factors are consistent with other studies [17] emphasizing needs of efficient electronic communication in research collaborative projects.

4 Implications for LIS Education and Practice

Results of our studies can be used for planning LIS education of data librarians and young researchers; and for building data infrastructures for open science. Data management tools can improve research data sharing practices. University and research policies should support innovations, research data sharing and experimentation in long-established processes of scholarly communication using both institutional pressure and individual motivation. Quality assurance still remains the main component of scholarly practices, including peer review and research data management. These findings are in line with similar studies by Kim et al. [18] and Carlson et al. [19].

4.1 Research Data Management Courses

Librarians and researchers play an important part in data sharing and data management. That is why they should be aware of new tools, methods and services for efficient use of research data and maintenance of data infrastructure. Following the proposed research data courses, (e.g. [5, 12, 20]), we determined these core data processes: identification, planning, selection, storage and protection, data management, analysis and provision. At the Department of LIS of Comenius University in Bratislava we provide a course on Data Analysis and Visualization for bachelor students of LIS. The course includes the topics of conceptual issues of data (understanding quantitative data, qualitative data, open data, research data), methods, formats and sources, cleaning and

conversion of data, analytical tools, qualitative data analysis, text analyses, visualization and interpretation of data. Information and data ethics are part of a separate course. We propose to design a more general course on research data management for master and doctoral students at the Faculty of Arts of the Comenius University and the Slovak Academy of Sciences.

4.2 Development of Data Infrastructures

Data infrastructures can be determined as holistic ecosystems which link research data management with data sharing and data re-use behavior of researchers. Developing research data infrastructures include institutional data repositories and the tools for research data management. At this level, research data literacy courses are determined for data librarians or digital curators. New emerging professions need skills for linking data management and data infrastructures. These professional courses should focus on skills in maintenance of data infrastructures, metadata and data analyses.

5 Conclusions

We outlined the issues of research data literacy and research data management. The complexity of the topic was proved by results of our studies of researchers´ information behavior in Slovakia. The qualitative study confirmed that research data are embedded in contexts of disciplines. A typology of research data was presented based on practices of disciplines, including examples of digital humanities. The quantitative study was part of a multinational survey on data literacy and proved common practices regarding the types of used and produced data (mainly office documents), data sharing (mainly with researchers´ own teams), concerns of data sharing (misuse and misinterpretation of data), lack of institutional policies and interest in data management trainings, especially data management plans. Although the results are limited to the selected groups of researchers (19 researchers in a qualitative study, 257 researchers in a survey), they point to attitudes of researchers to current research data practices. In conclusion we proposed the content of education of LIS students with regard to research data management, analysis and visualization at levels of master and doctoral studies. Professional courses for data librarians were outlined in relation to data infrastructures and the ecology of the information environment. The connections between information behaviour of researchers, digital environment, data sharing and collaboration and data infrastructures are regarded as challenges of information and research policies.

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Data Sharing in Social Sciences: Case Study on Charles University

Adela Jarolimkova(✉) and Barbora Drobikova

Faculty of Arts, Institute of Information Studies and Librarianship,
Charles University, Prague, Czech Republic
{adela.jarolimkova,barbora.drobikova}@ff.cuni.cz

Abstract. Data sharing is an important building block for data-intensive science, but it is highly dependent on researchers' behavior. According to our recent research, both academics and doctoral students at Charles University are willing to share data, but at the same time they expressed various concerns about data sharing. In our present study, we focus on the group of social science researchers. We use the data from a questionnaire and semi-structured interviews. We collected 1,434 completed questionnaires, from which 279 fall into the social sciences category. It seems that social scientists are less willing to share their data; their data is more often unavailable; and they are more concerned about potential ethical and legal problems. Interviews with select social scientists provided more details on the motivators and inhibitors of data sharing, with data character and content seen as the greatest obstacles to data sharing.

Keywords: Data sharing · Data sharing behavior · Research data · Social sciences

1 Introduction

Data sharing is an important building block for data-intensive science, but it is highly dependent on researchers' behavior [1]. As we have discovered in our recent research, both academics and doctoral students at Charles University are willing to share data, but at the same time they expressed various concerns about data sharing. The most used means of data sharing is direct request, while open access to data is used least often. We have also identified some interdisciplinary differences between social sciences and medicine on one hand and humanities and natural sciences on the other [2, 3]. These findings are in line with previous research [4–6]. We therefore decided to focus our further research on one of the groups: social sciences. Social sciences are also the only discipline in the Czech Republic that has its own national data archive: the Czech Social Science Data Archive that can be used for data sharing. Our current study focuses on the data sharing attitudes and behaviors of individual social science researchers and the factors that affect them.

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2 Literature Review

2.1 History of Data Sharing in Social Sciences

The idea of data sharing is not new in the social sciences. The infrastructure for archiving and sharing data was developed quite early on. For example, an archive for social sciences data was established in Germany in 1960, in the UK in 1967, in Italy in 1970 and other countries followed [7]. As for the actual state of data sharing, this has also been a topic of discussion since the 1960s. In the field of psychology, archiving raw data for what might be called sharing was first investigated by Wolins in 1962, when he asked contributors to APA journals for their data. He asked 37 authors for their data, from whom he received only 9 sets of usable data [8]. The same topic interested Craig and Reese, when it appeared that psychologists were saving and sharing data [9]. When repeating Wolins' experiment in 2006, Wicherts and colleagues achieved a similar response rate, that is, 24% [10], and according to Pienta in 2010 [11], a majority of social science data was not archived publicly, though informal sharing was more common.

2.2 Factors Affecting Data Sharing in Social Sciences

There are two main conceptual frameworks for data sharing in social sciences. The first was proposed by Fecher et al. [12], based on a thorough systematic review and empirically tested by a survey among secondary data users. Jeng et al. designed their framework using two theories supporting digital scholarship, Knowledge Infrastructure and the Theory of Remote Scientific Collaboration, and several current data-practice profiling tools, such as the Community Capability Model Framework and Data Curation Profiles. The resulting set of questions was used in a case study [13]. While Fecher's framework serves to describe the factors that influence data sharing behavior, Jeng's is more oriented toward describing the practices of data sharing. With the help of these two frameworks, we can group the factors into several categories that were also described by other researchers.

Data Donor/Provider. Probably the most important category comprises factors connected with the data provider. Among the individual characteristics mentioned most often are age, professional rank and research activity (both confirmed by Andreoli-Versbach as having a positive influence on data sharing [14]) and technical skills [15–18]. Both Andreoli-Versbach and Kim also validated a positive influence of personal attitude towards open science on data sharing behavior [6, 14]. Intrinsic motivation, altruism and self-interest in the development of the scientific discipline are referred to by Kim and Jeng [13, 19]. As for the extrinsic motivation (such as career benefits including academic rewards, professional and institutional recognition, increased citation rate or career risk), perceived career benefit was found to have a positive effect on data sharing attitudes and behaviors [6, 20], while perceived career risk was seen as an inhibitor to data sharing [20]. The perception of extra time and effort needed to prepare data for sharing is also a negative [20].

Data Recipient/Re-user. Borgman claims that researchers are more willing to share data with other researchers from the same discipline than with the general public [16]. This could be related to the presumed adverse use on the side of the data recipient, which consists of different kinds of misuse, and misinterpretation due either to insufficient documentation or to unfamiliarity with research methods [16, 17, 21, 22]. There are even concerns about damage to the data donor's scientific reputation potentially caused by errors found in the data [12].

Data Characteristics. Quite a lot of obstacles to data sharing are connected to the nature of the data itself. Gomez et al. examined data and metadata in social sciences data repositories and concluded that data in social sciences take many forms and formats and not all of them are collected digitally [23]. Apart from not having data in a transferable form, some data cannot be shared for ethical reasons [16]. In the social sciences, the greatest difference is probably between quantitative and qualitative data. While quantitative data has been shared for over 50 years [24], qualitative data is still rarely shared [25] because of many potential complications. Among the most important are concerns about potential harm to human participants due to personal or sensitive information contained in the data [4, 26–28]. The context of any given research is not easily describable, and sharing qualitative data requires more time and effort [21]. Finally, there are types of qualitative data that are not suitable for sharing even after a lot of adjustment [29].

Research Community. The data sharing culture that predominates in certain disciplines seems to be one of the most influential factors [12, 17, 18]. Kim [6] and Harper [20] confirmed its positive influence on the data sharing behavior of individual researchers. Smioski [30] and Martone [22] also introduced the aspect of trust in the community.

Research Organization. By research organization we mean not only the data donor's institution, but the organization of research in certain disciplines. This includes funding agencies, professional societies, journals, standards and norms. The positive influence of funding agencies' and journals' data sharing policies is doubtful, as was confirmed by Andreoli-Versbach in economics and management [14]. This was not supported, however, by the findings of Kim who studied social sciences as a whole [6].

Data Infrastructure. It has already been said that a data sharing infrastructure for social sciences, at least for some kinds of data, has been available for quite a long time. However, it does not seem to have influenced data sharing. This claim is supported by Kim [6]. Nevertheless, the existence and characteristics of the data infrastructure have been steadily mentioned throughout recent literature as an important factor [4, 6, 12, 18, 30, 31]. Of course, repository usability and architecture are important, but because of prevailing concerns about data misuse, the degree of a researcher's control over his/her data and the possibility to determine conditions for use and re-use rank among the top user requirements [4, 12, 30].

3 Methods

3.1 Questionnaire

The research was carried out using a Czech version of the Data Literacy Multinational Study questionnaire that has already been described in previous publications [2, 32]. It focused on three main topics: production and use of data, attitudes toward data sharing and data sharing behavior, and awareness of data management issues. The questionnaire was distributed by e-mail to all academics and doctoral students of Charles University during January 2017. We used the "census" polling method because of the heterogeneity of the target group, which comprised 10 500 people.

3.2 Interviews

In the next phase, we decided to use semi-structured interviews with representatives of different social sciences affiliated with Charles University. We used typical case sampling for selection of the interviewees. The interviews focused on gaining a more in-depth view into factors that affect data sharing, both in positive and negative ways. The questions also addressed data characteristics, the data sharing practices of the interviewed researcher and her/his community, and use of other researchers' data. We analyzed the interviews using the grounded theory approach of Strauss and Corbin [33] with the help of Atlas.TI software.

4 Results

4.1 Questionnaire Results

We collected 1,434 completed questionnaires (the response rate was approximately 11%). 279 of them came from respondents working in social sciences. Overall, the respondents were grouped into four main disciplines: humanities (n = 277), medicine (n = 259), natural sciences (n = 607) and social sciences (n = 279). Twelve respondents from the fields of engineering and agriculture were excluded from the interdisciplinary analysis.

We found out that 72% (n = 279) of social science researchers share data in some way: most usually within their own team. 33% (n = 279) of social science researchers share data with researchers from other institutions. Only 15% (n = 279) share their data openly, which is quite similar to other disciplines. 63% (n = 279) are willing to share their data.

We used a Pearson chi-square test to examine relationships for data sharing, open access to data, willingness to share data and concerns about data sharing. Discipline, age and research experience within the social sciences were used as distinguishing factors (see Table 1). There are statistically significant differences between disciplines in data sharing (generally, not only open access). Within the social sciences, the results show possible connections in open access to data. Younger researchers and those with less research experience share their data openly less frequently than older or more experienced researchers.

Table 1. Null hypotheses concerning differences in data sharing

There are no differences in current data sharing practices between social sciences and other disciplines – not supported	**p < 0,001**
There are no differences in open data sharing between social sciences and other disciplines – supported	p = 0,59
There are no differences in data sharing between age groups - supported	p = 0,37
There are no differences in data sharing between groups according to length of research experience – supported	p = 0,39
In social sciences, there are no differences in open data sharing between age groups – not supported	**p = 0,01**
In social sciences, there are no differences in open data sharing between groups according to length of research experience – not supported	**p < 0,001**
There are no differences in willingness to share data between social sciences and other disciplines - supported	p = 0,84
In social sciences, there are no differences in willingness to share data between age groups – supported	p = 0,49
In social sciences, there are no differences in willingness to share data between groups according to length of research experience – supported	p = 0,40

Social science researchers are more often concerned about ethical and legal problems connected to data sharing, altogether 43% (n = 279) of respondents, while in natural sciences the figure is 21% (n = 607)); 26% have concerns about misuse of data, but in this case, there are no significant differences; 40% fear misinterpretation of data. Only 26% (n = 279) have no concerns about data sharing (the same as in medicine) compared to 42% (n = 607) in natural sciences.

We also focused on researchers as creators and users of shared data. New data is created by 74% (n = 279) of social science researchers. That is less than in medicine (81%, n = 259) and natural sciences (89%, n = 607), but more than in humanities (56%, n = 277). External data is not used by 14% (n = 279) of social science researchers.

4.2 Interview Results

We carried out six semi-structured interviews with representatives of the fields of sociology, social work, information science and education. Each of the interviews provided a slightly different view on the topic: mainly because of different types of data used by the researchers. For example, this included data from large surveys in the field of sociology, qualitative data from information science research and mixed research methods in education. Nevertheless, essential topics did recur. We grouped these into the following basic categories:

- current data sharing practices
- motivation for data sharing and its benefits
- barriers to data sharing and their negative consequences
- conditions for data sharing
- secondary use of data.

From the common description of current data sharing practices, we can deduce that a vast amount of data is collected, but it often "*ends in the researcher's drawer*". Its existence remains "*insider knowledge*". Data is shared between colleagues, on request or based on personal contacts. This usually occurs via email or shared files; usage of repositories is not very common. This holds true both for sharing one's own data and acquiring/using other people's data.

The overview of factors that interviewees introduced as motivators or inhibitors for data sharing are presented in Table 2. This is done on two levels: namely, the individual level (it is also possible to say intrinsic) connected with a particular researcher, and the external (extrinsic) stimuli level. Collaboration seems to have an important place among motivators: both in cases of internal motivation, that is, attempts to acquire partners for collaboration by sharing data; and external, that is, collaboration, above all else international, is a strong motivator for data sharing. It was apparent that the data sharing culture and the research community's openness (not necessarily valid for the entire field but for a group of researchers centered around certain methods or projects) were also very important.

Table 2. Motivators for and inhibitors to data sharing

	Motivators	Inhibitors
Individual	More publicity/visibility More citations Reciprocity Finding partners for collaboration	Ethical considerations Lack of time Fear of errors being found in the research Fear of theft, plagiarism Fear of losing competitive advantage Holding onto data for use in further publications
External	Data sharing culture and practices of the community or discipline International collaboration	Primary data source conditions Unavailability of a suitable repository

The largest barrier to data sharing that emerged in different forms in all interviews is the concern about harming the rights of research participants. This holds true particularly in cases involving qualitative data that often contains sensitive information. Among sensitive data that was mentioned was information on homelessness or domestic violence. Data concerning workplace environments were another example. Making this data open to the public could cause harm to participants: despite anonymization. Altogether the barriers to data sharing present the most complex relational structure that emerged from the interview analysis (see Fig. 1).

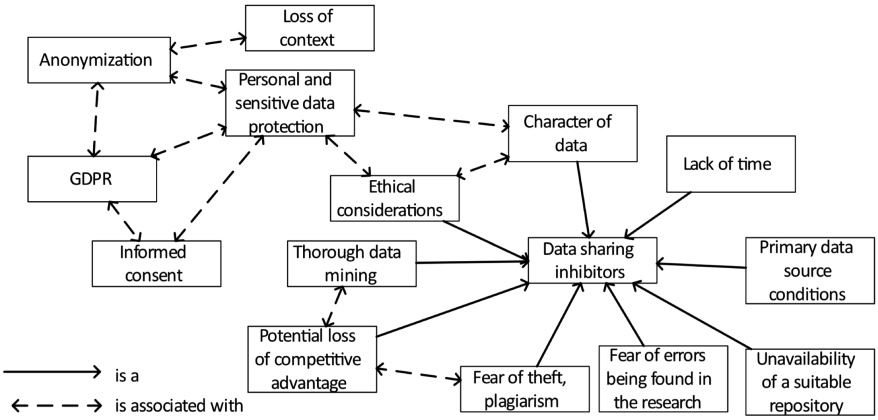

Fig. 1. Data sharing barriers–code structure

Benefits and harm from data sharing represent another aspect of the data sharing topic. The main concepts are presented in Table 3; again considered on two levels. Interestingly, the factors that function as motivators on the individual level are also seen as benefits. It is once more important to mention that gaining partners for collaboration, not only from one's own field, but also from other fields as well, could be one of the main advantages of a university data repository. This view held across the entire group of interviewees. Data sharing stimulates knowledge development, research transparency (*"playing with an open deck of cards"*) and the possibility to use data further for comparison or for new research questions.

Table 3. Benefits and harm from data sharing

	Benefits	Harm
Individual	More publicity/visibility More citations Reciprocity Finding partners for collaboration	Damage to reputation Loss of competitive advantage
External	Knowledge development Possibility to compare data Research transparency Availability of data for secondary analysis Multidisciplinary collaboration Benefits for students	Harming human participants Certain methods will not be used Anonymization will lead to loss of context

Negative consequences were less frequent. Possible damage to the researcher's reputation in case of errors found in the research and loss of competitive advantage (also the possibility of *"complete data-mining"*) were mentioned on the individual level. Emphasis on the fact that opening all types of data could lead to negative impacts on research design was also an issue according to interviewees. On the other hand, strict anonymization could result in *"total voiding of data meaning and loss of context"*.

Data sharing is conditioned by the fact that it is a part of project requirements. So, informed consent, data collection and analysis are therefore adjusted to that. It is also important for interviewees to know the purpose of the secondary use of their data and to have certain control over that use.

In cases where other researchers' data is used, credibility of the data source and thorough data description are fundamental. Credibility of the source implies a quality data collection methodology. Data description should include not only description of the questions, but also the circumstances for the data origin as well. The description can be sometimes substituted by existing publications linked to the data, that make sense of the data. Unknown methodologies make the secondary use of data almost impossible.

5 Discussion

The results from the questionnaire showed some differences between social science researchers and those from other disciplines. This is similar to previous research done in the field [4, 5, 13]. Follow-up interviews enabled us to identify some of the factors that have both a positive and negative influence on data sharing. As in many previous publications [4, 5, 25–28], our analysis also shows great concern among researchers about harming research participants and worries about the protection of personal and sensitive data: mostly in cases of qualitative research. Emphasis on making data publicly available could negatively impact research design. Roche [34] speaks about stagnation in the field, because researchers fear to collect new data. Our respondents spoke about eliminating certain methods and giving preference to those where anonymization is easier.

Interestingly, gaining partners for collaboration is seen both as an important motivation for, and benefit of, data sharing. This factor is rarely mentioned in other research. On the contrary, institutional data sharing policies are completely lacking among the external factors. This can be explained by the fact that neither Czech funding bodies nor Charles University have implemented data sharing policies so far. Datasets are not considered an important research output to be included in research evaluation. Data sharing thus does not have direct impact on financial resources or career development, and data sharing depends on individual researchers' beliefs, attitudes, initiative, and their research community practice.

Limitations of the Study. The study is limited to social sciences. However, even in this field, we did not cover the entire range of disciplines. The results cannot therefore be generalized. It is necessary both to involve representatives of more research communities and to test the emerging framework again using quantitative methods.

6 Conclusion

The situation of data sharing in social sciences at the Charles University does not significantly differ from the state described in previous research. Data sharing is seen as beneficial for knowledge development and research transparency. It is practiced mostly informally: researchers are willing to share data under certain conditions; personal contacts are preferred when sharing. On the other hand, protection of research participants' rights is still an issue of utmost importance. This issue makes researchers uneasy and hinders data sharing in many cases.

Acknowledgements. The publication was supported by Charles University's *Progress Q15* programme: "Life course, lifestyle and quality of life from the perspective of individual adaptation and the relationship of the actors and institutions".

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Copyright Literacy

Copyright Literacy Among Students of Information Science at the University of Iceland

Ágústa Pálsdóttir(✉)

Department of Information Science, University of Iceland,
Gimli v/Sæmundargötu, 101 Reykjavík, Iceland
agustap@hi.is

Abstract. Future librarians and information specialists need to be capable of interpreting copyright law. Recognition of information science students' understanding about copyright matters is necessary for identifying if and where improvements in their education is needed. The study aim was to investigate the knowledge about copyright issues among information science students at the University of Iceland. Data was collected among 54 students. The response rate was 41%. As the study is part of an international research, the same questionnaire was used by all countries. The paper focuses on five questions concerning knowledge about copyright and awareness of where information about it can be found. All questions, except for one, allow multiple answers. Data analysis was descriptive. The results indicate that some improvements are needed in the curricula. Although the students appear to have fairly good knowledge about the national legislation, they are in need of more education about many aspects of copyright and intellectual property.

Keywords: Copyright literacy · Copyright education · Information science · Graduate students · Iceland

1 Introduction

As part of their work, librarians and information specialists often need to deal with copyright issues and act as intermediaries between the consumers and the authors or producers of material. It is therefore important that students of library and information science (LIS) receive education that promotes their competencies and allows them to become copyright literate. An understanding of and respect for intellectual property is, furthermore, underlined as an important aspect of information literacy. A revised version of the information literacy competency standards for higher education, which were adopted by the board of ACRL in 2016, expects an information literate person to be able to use information ethically [1].

It has been suggested that academic libraries should actively work with faculty members and support university students' knowledge about the ethical, legal and social dimensions of scholarly communication [2]. The growth and diversity of digital information, that can be linked together and used in a variety of ways, has complicated the situation. This change in the digital setting has made it more difficult to understand

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the rules of copyright and how its violation can be avoided. In particular, academic libraries are faced with increasing challenges and new demands related to various areas of copyright policies, which calls for competence in matters of intellectual property [3]. It has also been noted that the need for a comprehensive knowledge of copyright is expanding into other areas of academic library services [4].

For LIS students, in particular, it is highly important to get thorough knowledge of copyright issues through their education. Kawooya, Veverka and Lipinski [4] have noted that the role of copyright librarians is becoming essential and LIS education should focus on preparing students for it. This is further emphasised in a multi-nation study among European LIS professionals, which found that there is a need for improvement in their knowledge about copyright matters. It was suggested that both LIS educational programs and programs for continuing education should focus more on learning about intellectual property rights [5]. Similar findings were reported in a study conducted among LIS professionals in the USA. The study concluded that LIS educational programs did not provide enough instruction about copyright issues to prepare the students for the role of giving advice and educating their clients about copyright issues [6]. To meet the demands of the workplace, the need to introduce LIS students to the matters of intellectual property early in their studies and continue with instruction and training throughout their education has been pointed out [7].

The aim of the study is to investigate the knowledge about copyright issues among information science students at a graduate level. This is the first time that this subject is being studied in Iceland and the findings will therefore fill a gap in the knowledge in this area. To do so, answers to the following main research question will be sought: (1) What is the students' opinion and knowledge about copyright issues?

Future librarians and information specialists need to be capable of interpreting copyright law as well as licensing agreements [4]. Recognition of the students' understanding and knowledge about copyright matters is necessary for identifying if and where improvements in their education are needed. The study results may therefore provide important understanding about the current situation and possible advancements of the curricula. The study is particularly important because so far no knowledge has been available about the copyright literacy of students of information science in Iceland.

2 Method

This is an international online survey conducted among all students at the Department of Information Science at the University of Iceland. The department is the only one where students can study information science in the country. This is therefore a census study, with the survey being sent to all members of the population but not confined to a sample of the students.

The same questionnaire, which was translated from English to Icelandic, was used by all participating countries. The measurement instrument consisted of 13 questions in all. A total of nine questions emphasized knowledge about copyright, awareness of where information about it can be found, the students' opinion about copyright issues, what they have learned about copyright and what, in their opinion, they should learn about it. In addition, the questionnaire consisted of four background questions.

The online system Lime Survey, which is an open source software, was used to collect the data. Data collection started in January 2018 and lasted for three weeks, with two reminder e-mails sent out. The Information Science program is exclusively taught at a graduate level and 54 students are enrolled in it. A total of 22 students replied to the survey, a 41% response rate.

As it was not possible within the constraints of this paper to investigate all the questions in the survey, it was decided to focus on five questions that relate to knowledge about copyright and awareness of where information about it can be found. All the questions, except for one, allow multiple answers. The analysis of the data was descriptive.

3 Results

The results about the students' knowledge about copyright issues will be presented first and after that results about the students' own beliefs about their knowledge. Finally, results will be presented about where they would go to seek more information about intellectual property/copyright in relation with the activities of the cultural institutions.

The students were asked which items are under the protection of copyright. The results are presented in Fig. 1.

Figure 1 shows that all of the students considered most of the types of works that were listed, or eight out of 14 items, to be under the protection of copyright. They were, however, more unsure about databases, as over 27% of them replied that they were not protected by copyright law. It is also interesting to note that about 40% of them thought that ideas are under the copyright law. One student did not consider dances, written choreography, pantomime, nor architectural projects, maquettes, environmental design and stage design projects, or caricatures, cartoons, comics, to be protected by copyright law.

As Fig. 2 shows, an overwhelming majority of the students, or over 90%, were aware that the national copyright legislation includes a provision about the duration of copyright protection. In addition, the majority knew that the legislation included exceptions private use, educational, scientific and research purposes, as well as for

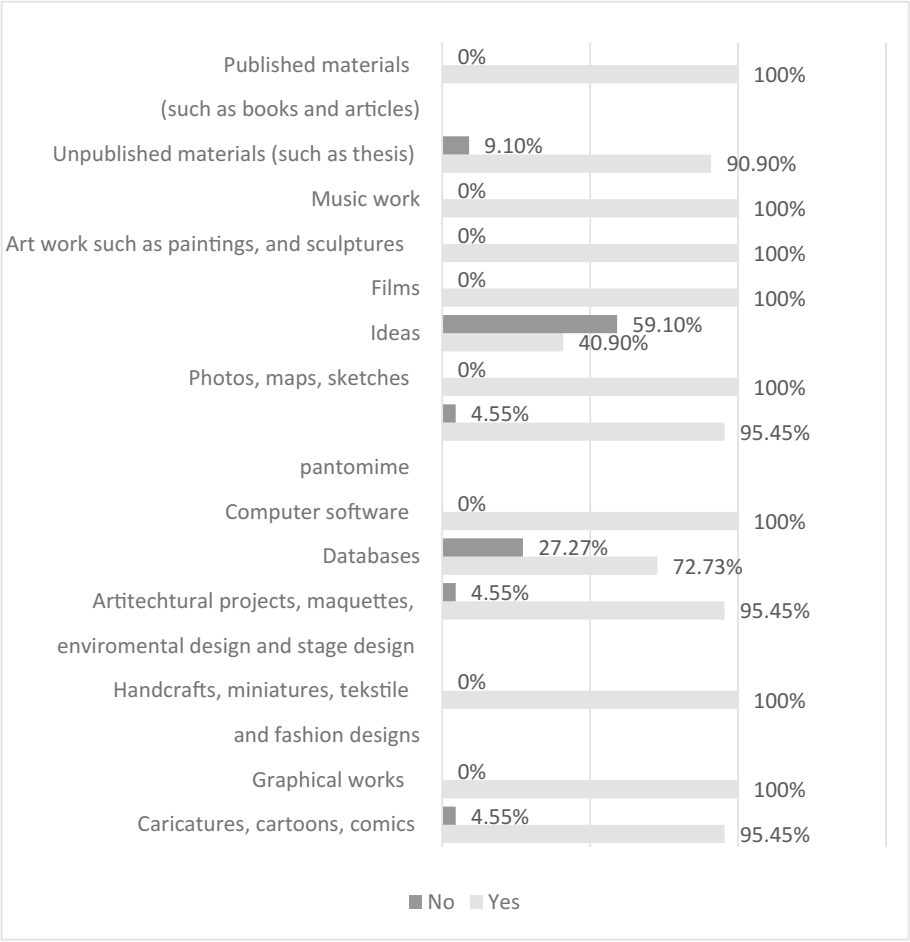

Fig. 1. Which items are under the protection of copyright?

libraries, educational institutions, museums and archives. On the other hand, more than half of them, or over 54%, were not aware that the legislation includes rights for libraries to provide modified copies of work to serve the needs of visual impaired patrons.

The students were, furthermore, asked one question about what is the name of the copyright law in their county. Half of them (50%) replied correctly, 27,27% had a very close guess, while 13,64% said that they did not know it and 9,09% did not reply.

As can be seen from Fig. 3, the majority of the students (72,73%) believed that they are familiar with copyright and related law on a national level. A similar share of them, however, did not consider themselves to be familiar with it at an international level. More than half of the students said that they were familiar with copyright issues about open access and open data, as well as fair use of copyrighted material. Half of them were familiar with creative commons licenses. Regarding other items included in

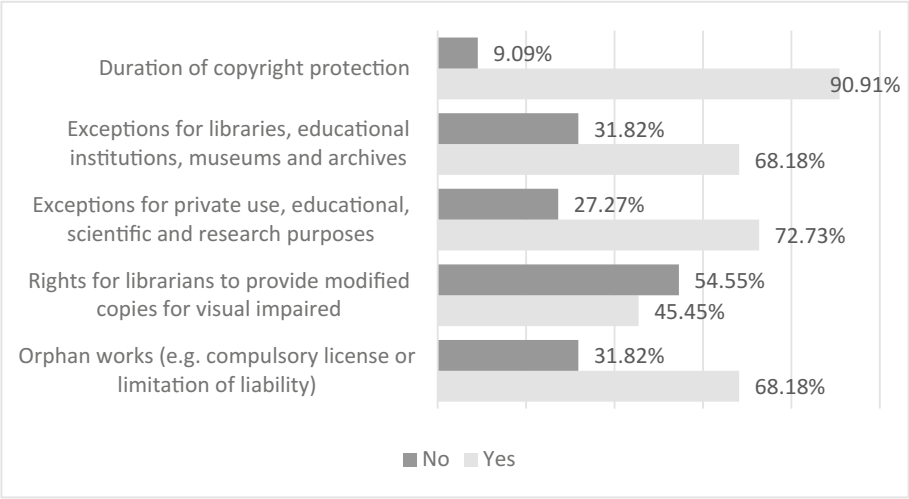

Fig. 2. Which of the following are included in your national copyright legislation?

questions, the majority of the students replied that they were not familiar with them. They were least knowledgeable about copyright issues/solutions regarding virtual services within e-learning practices (95,46%). After that came copyright related institutions at an international level, and copyright issues regarding the development of institutional repositories, as well as issues/solutions regarding out-of-print works, with 81,82% of the students replying that they were not familiar with it.

The students were asked where they would search for information if they wanted to learn more about intellectual property/copyright and its relation with the activities of cultural institutions (libraries, archives, museums). The results in Fig. 4 show that most of them replied that they would go to lawyers and websites. Over 77% of the students claimed that they would prefer lawyers and websites as a source of information. The majority, or over 63% of the students, also considered librarians and books, articles, etc. (e.g. about copyright for librarians) to be a source of information.

The least preferred places to seek information were blogs or wikis, with over 90% answering that they would not go there. This was closely followed by the International Council of Archives (ICA), with over 86% replying that they would not turn there to search for information. In addition, over 81% said that they would not seek information from professional discussion lists and the International Council of Museums) ICOM. Furthermore, it is interesting to note that the majority of the students, or over 63%, replied that they would not seek information from the National Copyright Office (Fig. 4).

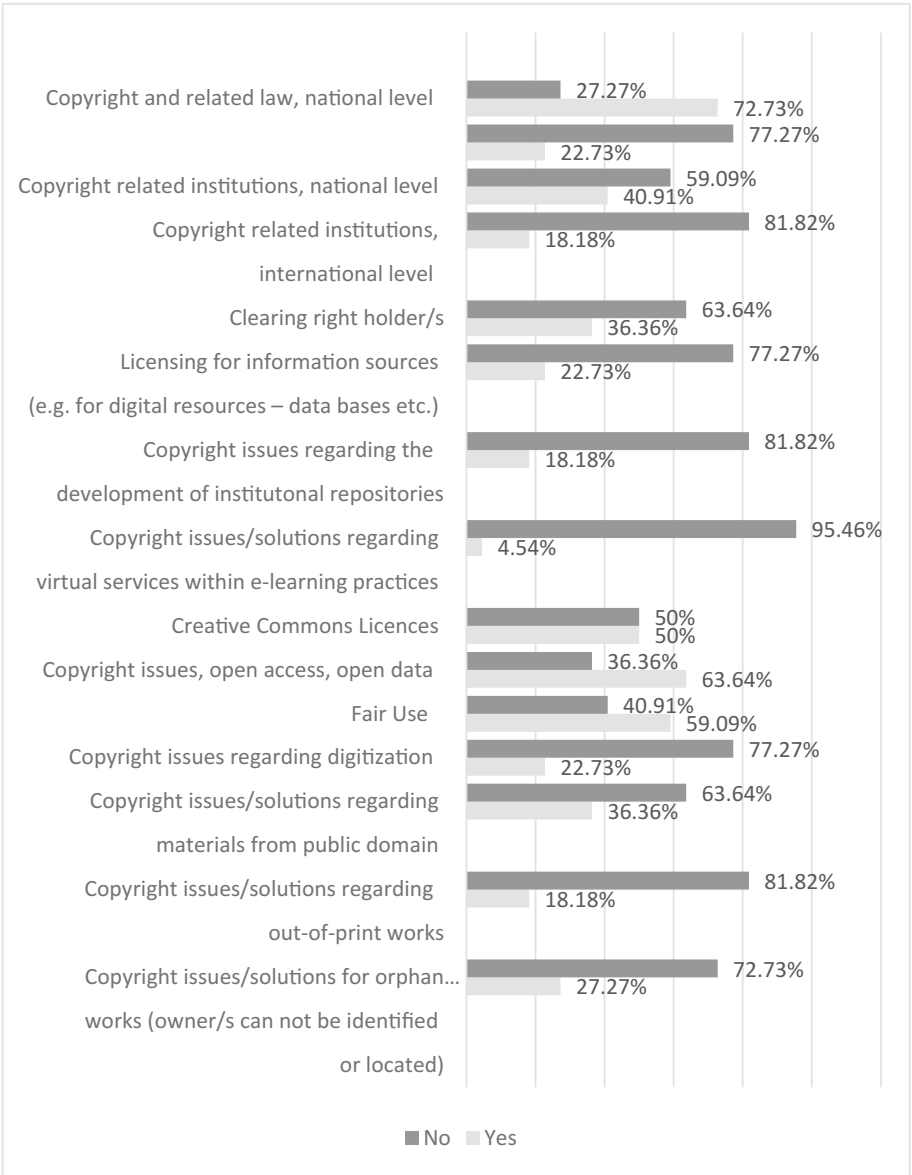

Fig. 3. Student's beliefs about their knowledge about copyright issues

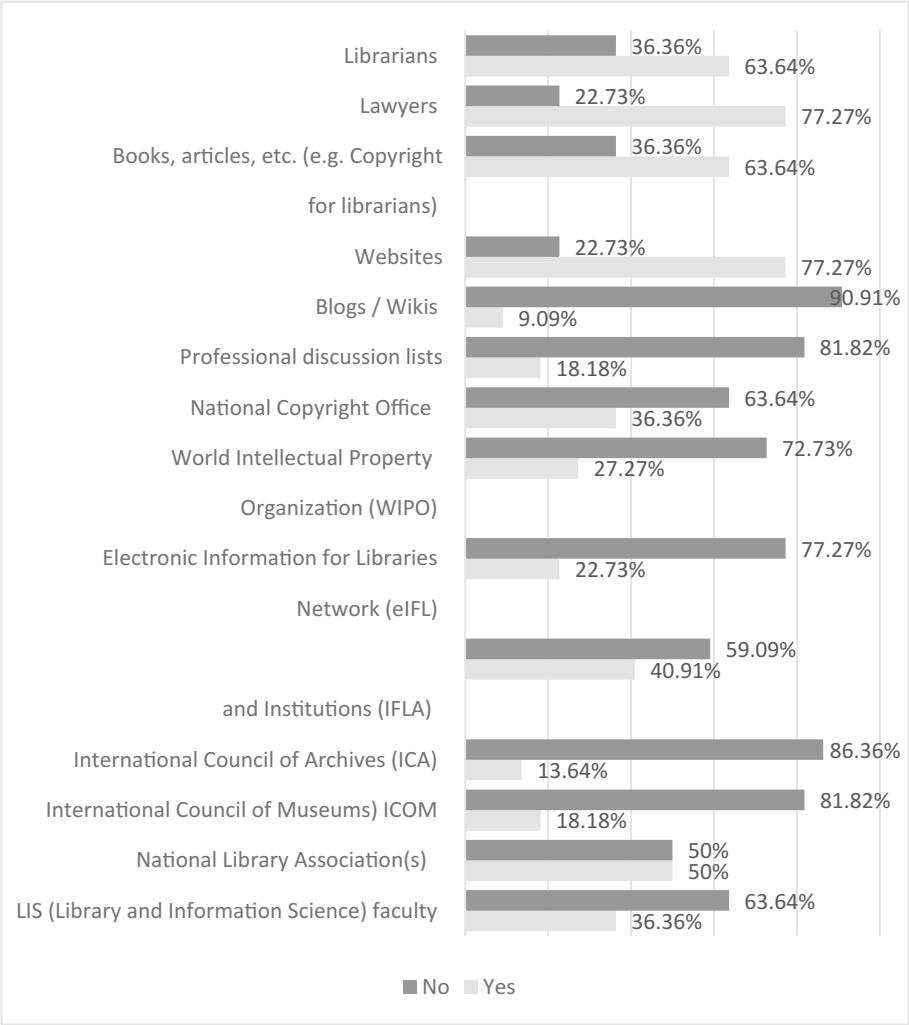

Fig. 4. Where students would turn to search for information about copyright

4 Discussion

It is important that LIS students receive education about copyright legislation and matters of intellectual property. This is essential, both as part of their overall information literacy competence, as well as for preparing them for the role of becoming intermediaries between consumers and copyright holders or producers of the material [6].

It is important to recognize the students' level of knowledge and attitudes towards the issue of copyright. This may be of value for designing relevant educational material and in order to develop a curriculum for their training.

The study provides insight into the copyright literacy of students of information science in Iceland and what improvements are needed in their education. This was done by presenting them with questions about copyright legislation, as well as their own beliefs about their knowledge of copyright issues and where they would turn to seek information if they wanted to learn more about intellectual property/copyright, in relation with cultural institutions' activities.

When the students were asked what issues are included in copyright legislation, the findings revealed that either all of them, or with only one exception, knew about 12 of the 14 items listed. What they were uncertain about is databases. Although databases are in fact protected by copyright law [8], close to one third did not think they were protected. Furthermore, the high rate of students who thought that ideas were under copyright protection is noteworthy.

The students' knowledge was also examined by asking them about five items which are all included in copyright legislation. Of those, the majority of them knew about four items. Knowledge that national copyright legislation includes a provision about the duration of copyright protection was most widespread. What they were least aware of was that the legislation includes rights for libraries to provide modified copies of work to serve the needs of visually impaired patrons.

The study, furthermore, asked about the student's own beliefs about their knowledge of copyright issues. The results show that, in general, they do not consider themselves to be very familiar with the topic. The majority of them replied that they were not aware of 11 out of the 15 items queried. They were least knowledgeable about copyright issues/solutions regarding virtual services within e-learning practices. Thus, there is a clear need for more instruction about this. Furthermore, keeping in mind the rapid changes in the digital environment and how people can communicate, connect information together, and use them in a variety of ways, the curricula should put more emphasis on educating students in this area [3, 4]. In addition, an overwhelming majority replied that they were not familiar with copyright related institutions at an international level, copyright issues regarding the development of institutional repositories, as well as issues/solutions regarding out-of-print works.

What they did, however, regard themselves to have good knowledge about was legislation about copyright and related law on a national level, as well as copyright issues, open access and open data, and fair use of data. On the other hand, the majority of them are not aware of what copyright institutions there are on a national level. Thus, taken together, these results suggest that teaching about copyright issues needs to be included in the curriculum to a greater extent than it has been.

The study is limited by a low response rate, or 41%. Therefore, the results cannot be generalized to all Icelandic students of information science. The findings may, nevertheless, provide important understanding about their copyright knowledge and, in particular, the need for improvements in the curricula.

As part of their future role as information specialists the students may need to provide guidance to others about copyright issues. For that they need to have a thorough knowledge of the legislation, in particular in connection to the activities of cultural institutions. To sum up, the results from the study indicate that some improvements are needed in the curricula. Although the students appear to have fairly good knowledge about national legislation, they are in need of more education about many aspects of copyright and intellectual property.

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Copyright Literacy Skills of LIS Students in Norway

Almuth Gastinger[1(✉)] and Ane Landøy[2]

[1] Norwegian University of Science and Technology, Trondheim, Norway
almuth.gastinger@ntnu.no
[2] University of Bergen, Bergen, Norway
ane.landoy@uib.no

Abstract. This paper presents findings from a study on copyright literacy skills of Library and Information Studies (LIS) students in Norway. It surveyed bachelor, master and PhD students at the Oslo Metropolitan University which is the only Norwegian institution offering LIS education at all levels. This web-based study was conducted in April 2018. It was based on the multi-national survey called "Copyright Literacy of LIS Students (CoLIS)" that intends to gather data about the knowledge and awareness of LIS students regarding copyright related issues in many countries. The survey findings show a gap between the expected level of knowledge and the actual one, and they will be used as a starting point for discussions with the LIS education community.

Keywords: Copyright literacy · LIS students · Information literacy · LIS education · Norway

1 Introduction

The information society and constantly changing digital technologies make high demands for adequate knowledge and skills to meet these changes. Among others, students and staff of higher education institutions are required to have excellent competencies for dealing with copyright issues.

A few years ago, colleagues in Bulgaria initiated the multi-national project/survey "Copyright Policies of Libraries and Other Cultural Institutions" [1]. Norway was among the many countries which conducted this survey, and professionals in archives, museums and libraries identified serious gaps in their knowledge and awareness of copyright laws and issues [2]. This study is now followed by another multi-national study, this time focusing on copyright literacy skills among Library and Information Science (LIS) students, called "Copyright Literacy of LIS Students (CoLIS)" [3].

In Norway, the authors conducted this survey among LIS students of the Oslo Metropolitan University in April 2018, and the survey data were analysed in May 2018.

This paper will present a summary of the key findings of this web-based survey that includes questions about familiarity, knowledge, awareness, and opinions on copyright related issues, but also seeks demographic information on respondents. The findings are intended to be a starting point for the LIS education community to take actions to fill

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possible gaps in copyright skills of library and information science students. The results of the study will also allow further cross-country comparisons when findings from other countries will be available.

2 Methodology

In order to evaluate LIS students' knowledge and awareness level of copyright related issues a web-based survey was developed on the LimeSurvey platform by the CoLIS team [3].

The questionnaire comprises two parts. The first part consists of four questions requiring demographic information like gender and level of studies (i.e. first year, third year, PhD). The second part comprises nine questions about general copyright literacy skills. Students could tick off multiple answers to seven of these questions. One question asked for opinions about various statements and students had to choose between "agree", "neutral" or "disagree" in their answers, while another question wanted to know "What is the name of the copyright law in your country?".

The original survey was created in English. Discussion with LIS teachers at Oslo Metropolitan University led to the decision to translate the survey into both versions of written Norwegian, Bokmål and Nynorsk.

The dissemination of the URL to the survey was carried out by email in April 2018 to 362 LIS students of the Oslo Metropolitan University. All students at Bachelor, Master and PhD levels were recruited at this university only, because there are no other higher education institutions in Norway that offer Library and Information Science studies at all levels. Unfortunately only 46 students completed the survey, even though 359 of the 362 students had opened it. It is not clear to the authors why relatively few students responded, since a reminder was also sent to the students. One possible explanation is that the survey was sent out rather late in the term, at a time when the students were getting closer to their exams. In addition, individual LIS teachers were not asked to promote the survey. Communication about the survey occured between the head of the LIS institute and the authors only.

The gathered data were entered, coded, and analysed using the SPSS statistical package.

3 Findings

3.1 Demographic Information

Out of the 46 respondents there are 34 female, ten male and two who ticked off "I do not want to disclose".

Ten students are in their first year of studying, nine in their second year and 15 students in their third year. Twelve students were on Master level when answering the survey, while none of the PhD students responded.

3.2 Knowledge and Awareness of Copyright Literacy

As already mentioned above, the second part of the study comprises nine questions about general copyright knowledge and awareness. The authors will not show the answers to all nine questions, but only to the six with the most interesting answers.

The second question in the second part of the questionnaire asked "Are you familiar with the following" – followed by 15 possible answers. Students could tick off all answers that apply.

The following table shows the results for seven of these 15 answers (Table 1).

Table 1. Degree of familiarity with copyright related issues (N = 46)

Sub-questions	Yes % (N)	No % (N)
Copyright and related law – national level	89,1 (41)	10,9 (5)
Copyright and related law – international level	45,7 (21)	54,3 (25)
Copyright related institutions – national level	39,1 (18)	60,9 (28)
Copyright related institutions – international level	23,9 (11)	76,1 (35)
Creative Commons Licenses	76,1 (35)	23,9 (11)
Copyright issues regarding virtual services within e-learning practices	26,1 (12)	73,9 (34)
Copyright issues regarding materials from public domain	21,7 (10)	78,3 (36)

When asked where students would search for more information about copyright related issues, 14 answers could be ticked off. Figure 1 shows the results in detail. It is clear that students would mainly choose books, articles or websites to learn more about copyright. They would not use international institutions/organisations like WIPO (World Intellectual Property Organization), eIFL (Electronic Information for Libraries

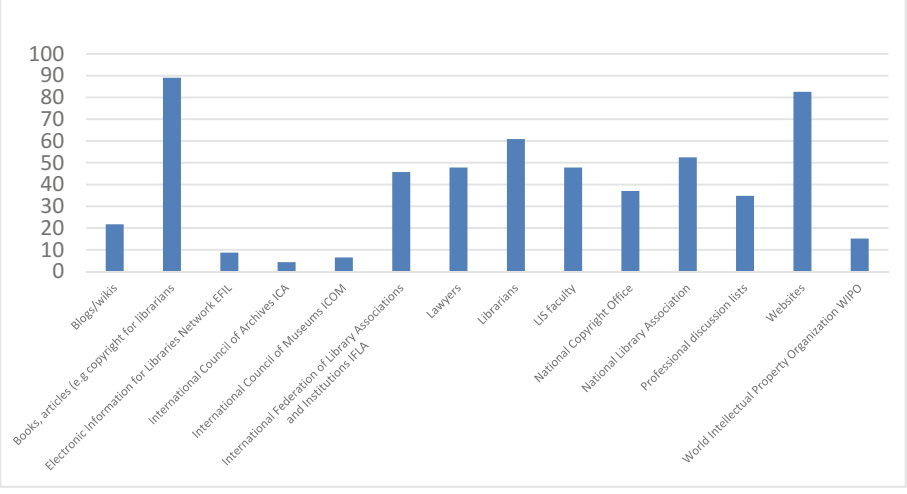

Fig. 1. Percentages responding "yes" to the question "If you want to learn about intellectual property/copyright and its relation with the activities of the cultural institutions (libraries, archives, museums), where will you search for information?" (N = 46)

Network), ICA (International Council of Archives), or ICOM (International Council of Museums) as sources for more information, presumably because most students do not know these organisations.

Students were also asked the following question: "In your opinion within LIS education which of the following levels is appropriate for introducing Intellectual Property issues?"

The majority of the responding students - 93,5% (N = 43) - think that copyright related issues should be introduced at Bachelor level, while eight students suggested that this topic should be taught at Master level. That means, a few students think copyright issues should be part of both Bachelor and Master studies.

The analysis of answers to the question about topics on which students have been educated during their studies showed interesting and surprising results. It emerges that students at all levels have quite different opinions on what they have been educated about regarding copyright issues (see Table 2). But it is difficult to know the reasons for that.

Table 2. Responses to "Please specify the topics/issues you have been educated/trained on in your department?" (N = 46)

Sub-questions	Yes % (N)	No % (N)
Copyright and related law – national level	93,5 (43)	6,5 (3)
Copyright and related law – international level	23,9 (11)	76,1 (35)
Copyright related institutions – national level	39,1 (18)	60,9 (28)
Copyright related institutions – international level	10,9 (5)	89,1 (41)
Copyright related initiatives – national level	19,6 (9)	80,4 (37)
Copyright related initiatives – international level	2,2 (1)	97,8 (45)
Copyright related information sources	43,5 (20)	56,5 (26)
Clearing right holder(s)	23,9 (11)	76,1 (35)
Licensing for information sources (e.g. for digital resources – databases etc.)	54,3 (25)	45,7 (21)
Copyright issues regarding the development of institutional repositories	17,4 (8)	82,6 (38)
Copyright issues regarding virtual services within e-learning practices	21,7 (10)	78,3 (38)
Creative Commons Licenses	63,0 (29)	37,0 (17)
Copyright issues related to open access, open data	71,7 (33)	28,3 (13)
Fair use	47,8 (22)	52,2 (24)
Copyright issues regarding digitization	43,5 (20)	56,5 (26)
Copyright issues regarding materials from public domain	26,1 (12)	73,9 (34)
Copyright issues regarding out-of-print works	15,2 (7)	84,8 (39)
Copyright issues regarding orphan works	10,9 (5)	89,1 (41)
Exceptions and limitations related to copyright	28,3 (13)	71,7 (33)

Responses to "Please specify the topics/issues you think LIS students should learn before they graduate and start working in a cultural heritage institution" were very interesting too, in particular because the students were divided in their opinions about

what knowledge they should have when finishing their studies. For example, most students think they should have skills about copyright law(s) on a national level, licensing for information sources, creative commons licenses, copyright issues related to open access and open data, fair use, copyright issues regarding digitisation, and exceptions and limitations related to copyright when graduating.

However, there are quite a few students who think they do not need knowledge about copyright related institutions (both on a national and international level), clearing right holders, copyright issues regarding the development of institutional repositories and virtual services within e-learning practices, and copyright issues regarding materials from public domain as well as orphan works. See Table 3 for detailed results.

Table 3. Responses to "Please specify the topics/issues you think LIS students should learn before they graduate and start working in a cultural heritage institution?" (N = 46)

Sub-questions	Yes % (N)	No % (N)
Copyright and related law – national level	95,5 (44)	4,5 (2)
Copyright and related law – international level	76,1 (35)	23,9 (11)
Copyright related institutions – national level	60,9 (28)	39,1 (18)
Copyright related institutions – international level	34,8 (16)	65,2 (30)
Copyright related initiatives – national level	41,3 (19)	58,7 (27)
Copyright related initiatives – international level	34,8 (16)	65,2 (30)
Copyright related information sources	69,6 (32)	30,4 (14)
Clearing right holder(s)	45,7 (21)	54,3 (25)
Licensing for information sources (e.g. for digital resources – databases etc.)	84,8 (39)	15,2 (7)
Copyright issues regarding the development of institutional repositories	50,0 (23)	50,0 (23)
Copyright issues regarding virtual services within e-learning practices	67,4 (31)	32,6 (15)
Creative Commons Licenses	80,4 (37)	19,6 (9)
Copyright issues related to open access, open data	91,3 (42)	8,7 (4)
Fair use	80,4 (37)	19,6 (9)
Copyright issues regarding digitization	78,3 (36)	21,7 (10)
Copyright issues regarding materials from public domain	63,0 (29)	37,0 (17)
Copyright issues regarding out-of-print works	69,6 (32)	30,4 (14)
Copyright issues regarding orphan works	60,9 (28)	39,1 (18)
Exceptions and limitations related to copyright	73,9 (34)	26,1 (12)

When comparing the findings in Table 2 ("Please specify the topics/issues you have been educated/trained on in your department") and Table 3 ("Please specify the topics/issues you think LIS students should learn before they graduate and start working in a cultural heritage institution"), one can see that some responses to these two survey questions are concordant while others are not.

For example, 95,5% of the responding students think that "Copyright and related law – national level" is important, and 93,5% agree that they have been educated in this topic. 91,3% of the students think that "Copyright issues related to open access, open

data" is a subject LIS students should learn about during their studies, while 71,7% of the students responded that they have been educated in this.

Likewise, the majority of responding students seem to think that "Copyright related institutions - international level" or "Copyright related initiatives - international level" are less important (65,2%), and 10,9% respectively 2,2% say they have not been taught on these topics.

For other issues there are quite divergent responses. For example, 50% of the responding students think "Copyright issues regarding the development of institutional repositories" should be taught as part of LIS education, but only 17,4% state they have learned about this. Similar answers were given for "Copyright issues regarding materials from public domain". 63% of the responding students think they should have learned about this area before graduating, while only 21,6% say they have been taught the topic during their studies.

The students were also asked about the name of the copyright law in Norway. Since the survey questions were translated into Norwegian, the responses were as well in the Norwegian language. The correct name of the law is "Lov om opphavsrett til åndsverk", and the shortened name (according to the official web page) is "Åndsverkloven" [4]. Seven students do not know or do not remember the name of this law, and five students give the Norwegian copyright law a somewhat different name, while 34 students know the correct name or the official shortened name.

This seems to indicate that most students have some knowledge of the national copyright law, even if knowing the name of the law does not imply knowing the content of the law.

4 Discussions and Conclusions

The main aim of this study on Copyright Literacy was to investigate the knowledge and awareness of copyright issues of LIS students in Norway. The web-based questionnaire was sent to 362 students at Oslo Metropolitan University, and 46 students completed the survey. At that time there were ten students who were at their first year of studies, nine at the second year, 15 at the third year and 12 students at master level. The authors can only guess if the students who responded were the ones most interested in copyright issues, most cooperative, or the ones with time on their hands.

Since only 12,7% of all LIS students at Oslo Metropolitan University completed the survey, it cannot be argued that the results are significant. The authors think however that the survey results are an indication of a gap between the topics students have been educated on, and thus should have knowledge about, and the actual knowledge and awareness the students possess.

It is in particular interesting that students at all levels have quite different opinions about what they have been educated on regarding copyright issues during their studies and what they should learn before graduating. Likewise it is very interesting and surprising that the students would rather ask the National Library Association(s) or IFLA, the International Federation of Library Associations and Institutions, about copyright issues than professional discussion lists, the National Copyright Office

(which in Norway is covered by the National Library and an institution called Kopinor) or their own teachers.

The findings are intended to be a starting point for the LIS education community to take actions to fill the gaps in copyright skills. They will be discussed in detail with teachers of the Department of Archivistics, Library and Information Sciences at the Oslo Metropolitan University. In order to determine the actual copyright knowledge of LIS students in Norway, an appropriate knowledge test should be conducted, as well as face-to-face interviews with students. But that would be another research study.

Earlier studies have already shown that there is a gap in the copyright knowledge of librarians in Norway [2]. However, copyright issues are highly specialised and complicated, and it should not be expected that newly graduated librarians will be "experts" in the field.

The survey also reveals that among other things the students would turn to the national library association(s) for help when needing more information on copyright issues. Therefore, we propose to approach the Norwegian Library Association's subcommittee on copyright and ask for collaboration, together with the National Library of Norway and "Kopinor" (which licences the use of copyright protected works on behalf of authors and publishers). Also the Council for Academic Libraries in Norway, and the Norwegian County Library Association (supporting public libraries and school libraries in their regions) would be good partners in order to start a life-long learning initiative for librarians, which might be online training including two or more modules, one basic and one or two more specialised.

The results of the study will also allow further cross-country comparisons, as soon as the results from other participants in the multi-national survey will be available.

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Copyright Literacy of LIS Students in the Czech Republic

Pavla Kovářová(✉)

Masaryk University, Brno, Czech Republic
kovarova@phil.muni.cz

Abstract. Librarians help university students and staff work with information on different tasks. Copyright is strongly connected with information processing. Therefore, university education in librarianship should include this topic to prepare future librarians for their work. This paper presents research results of copyright literacy of Czech students of library and information studies and their attitudes toward this topic. This national part of international research identified a number of problems in students' knowledge (e.g. copyright and databases or unpublished works) but also their strong belief in the importance of the topic for librarians (89.9%) and its inclusion in the LIS curriculum (61.3%). Students also welcomed the extension of their education about copyright mostly in the international context and practical examples.

Keywords: LIS education · Information literacy · Copyright literacy · Research · Czech Republic

1 Introduction

The basic role of libraries and other cultural heritage institutions is to make information accessible. But at the same time, this information is protected by copyright. Copyright tries to balance the protection and usage of information to help the interests of both authors and users of information. Correct handling of authors' works requires a sufficient level of copyright literacy. It "include[s] identifying copyright-protected materials, navigating fair use and fair dealing, obtaining permissions and licenses where necessary, and recognizing infringement of copyright law" [1]. Expansion of digital technologies has brought new needs which should be reflected in copyright literacy [2]. Knowledge of the rules is important for everyone. Using protected information is an important part of activities of university students and staff. Copyright in a national and international environment includes a lot of rules to be considered in a specific situation. That is often not easy. Librarians should be able to help with this issue, which requires a sufficient level of copyright literacy of librarians. University education in library and information studies (hereinafter LIS) should therefore include this topic and prepare students for this task.

Copyright literacy is already included in LIS education in the Czech Republic. It is part of a mandatory course for LIS program at all four LIS departments in the Czech Republic: for the first year at the Silesian University in Opava (hereinafter SOU) - Information studies with the focus on library science [3], for the second year at the

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Masaryk University [4], for the third year at the Charles University [5] and for the fifth year at the SUO – Library science [6]. Therefore, all LIS students in the Czech Republic should be aware of the copyright, but they are educated in different years of their studies and a different depth. It is important to identify the problems in their copyright literacy as well as their attitude about this topic because they should recognize its importance for their future work. Using research results summarized in this paper will allow revising the LIS curriculum to fit current needs. The Czech research is a part of a multinational survey to strive for a better national and international standardization of the competencies of LIS students and consequently also of the staff in libraries, the cultural heritage sector, and in both commercial and non-commercial information services, as well as cooperation in improving their copyright literacy.

2 Literature Review

Copyright has increasing importance not only in higher education but copyright sometimes decrease a creative potential of knowledge economy because of its difficulty [7–9]. That increase the importance of breaking down prejudices and improvement of copyright literacy of university students and staff. Information technologies support this importance but also change issues which information users need to reflect [2, 10, 11].

Librarians are often in the position of copyright experts at universities. They should help university students and staff stay in compliance with the copyright law [9, 11–15]. This help can take the form of courses, educational materials or direct advice. Librarians included topics such as general copyright principles, responsibilities of information users and protection of one's own creative content in them [11], legal exceptions and Creative Commons licenses are also highlighted [12].

Todorova (Bulgaria) initiated international research CoLis (Copyright Literacy Survey) to map copyright literacy of librarians in 2013. This research identified several gaps in copyright competencies of librarians [14]. Croatia and Hungary were the least familiar with copyright compared to the highest levels of familiarity in Portugal (followed by Mexico, UK, USA, Finland and France). The differences among the countries were also identified in specific topics. The international overview gained worse results (than the national one) in three solved topics (the most problems were observed within the collective rights management organization, followed by the copyright-related institution and the copyright and related law). More concrete national research results can be found in publications listed on CoLis website [16] and the UK Copyright Literacy website [17].

Preparing for a job in library and information services is the goal of LIS departments. Copyright issues should be included in it according to most librarians (92.9% [14]). Therefore, the extended research group based on copyright literacy research of librarians now focuses on LIS students since 2017. The Czech part of this research is presented in this paper. A joint publication with further statistical analysis is planned for publication after the end of 2018.

The necessity of deeper education of LIS students is not a new idea. We can find sources helping future and actual librarians feel more familiar with this topic [e.g., 18–22]. Despite this, LIS departments in the US do not include required courses dedicated to copyright or intellectual property components, though some of them include this topic as a component of a required course, and significantly more offer an elective course on this topic [23]. We can find a lot of syllabi of LIS courses that include copyright topics, but only a few systematic models of education on this topic [24]. The professional community perceives the approach to copyright literacy at LIS departments as an actual problem, which is evident in the focus of IFLA World Library and Information Congress 2017 on Models for Copyright Education in Information Literacy Programs.

3 Methodology

The paper aims to present the results of the survey focused on the knowledge and opinions of LIS students in the Czech Republic, regarding copyright literacy. It is part of the multinational research CoLis initiated by Tania Todorova (see Chapter 2). The narrower research team set the questionnaire form and data collection for the whole international survey. The questions are based on original CoLis research [see 14], but with some changes. For instance, some questions are missing because of focus on an institution practice (irrelevant for students), and some were connected into the matrix. The online questionnaire consisted of 13 questions in the national language (four socio-demographic, one self-evaluation, three testing, two attitude and three about LIS education in copyright).

Data collection took place via an online questionnaire in LimeSurvey between 9th November 2017 and 31st January 2018. We distributed the link for the questionnaire to all LIS students in the Czech Republic via the communication channels of individual LIS departments, where their managers were asked to cooperate on distribution. The population, as well as the research sample, included both students educated and not educated in analyzed topics. We received 199 responses covering all three universities (and all their grades) where LIS is taught in the Czech Republic. We had a 28% response rate. We used descriptive statistics and Chi-Square Tests for comparison results of groups with different socio-demographic characteristics.

4 Research Results

We received 199 responses (68.3% women and 29.1% men; others did not want to answer) from all three universities teaching an LIS program. Table 1 describes a comparison of the research population and the number of respondents. Two departments of the Silesian University in Opava were evaluated together because there were only 16 responses. 62.7% of respondents attended a bachelor's degree, while 33.8% had a master's degree, and 3.5% a doctoral degree, which roughly corresponds to the population.

Table 1. Research population and numbers of responses

	Research population				Number of responses
	Bachelor	Master	Doctoral	Total	
CU	177	136	29	342	92
MU	181	78	0	259	91
SUO - library science	51	31	0	82	16
SUO - information science	7	20	0	27	
Total	416	265	29	710	199

We tested basic knowledge about copyright in national and international contexts. The majority of students (80.5%) knew the name of the copyright law in the Czech Republic; another 7.5% wrote the name inaccurately. 11% did not know or wrote the wrong answer. Respondents often incorrectly chose what is under copyright protection. They selected the works of intellectual property which are under, protection although not copyright (75.4% Handcrafts, miniatures, textile and fashion designs, 26.1% ideas). More than 25% of mistakes also selected dances, written choreography, pantomime, and databases. The last result is important because databases are strongly connected with libraries, compared to other works that receive more incorrect answers.

Even worse results were recorded by topics included in Czech copyright law. The topics ranged from the largest number of mistakes: rights for librarians to provide modified copies of works to serve the needs of visual impaired patrons (56.8%), orphan works (30.7%), exceptions for libraries and other cultural institutions (24.1%), exceptions for private use, educational, scientific and research purposes (16.1%) and duration of copyright protection (8.5%). There were no statistical differences among universities in this question. But we found statistical differences among study years in all these topics except the duration of copyright protection (x2, $p < 0,1$). The results were better in the higher study years. But in all comparison of study years using crosstabs (also in other questions statistically tested in this paper), we found worse results at the master's grade compared to higher years at the bachelor's grade, but not as low as in the first years of bachelor's grade.

Despite these knowledge gaps, respondents were strongly convinced about the connection between copyright and library services (78.9% agree). They thought that libraries and other cultural institutions should get exceptional authorizations in copyright (69.8% agree) but they were not convinced about the necessity of international harmonization in this field (only 49.7% agree, 42.2% have a neutral approach). 89.9% of respondents agreed that librarians must be knowledgeable about copyright issues, but only 61.3% agreed that the topic should be included in the LIS curriculum. There were no statistical differences in the opinion about the importance of the topic for librarians among students in different study years ($x2 = 10.320$, $df = 12$, $p = 0.588$) as well as in the opinion about including copyright into LIS curriculum ($x2 = 16.248$, $df = 12$, $p = 0.180$).

The difference between the importance of knowledge for librarians and inclusion in the LIS curriculum also confirms the ranking of information resources which students would use to learn more about intellectual property or copyright related to activities of

the cultural institution (including libraries). The LIS department was in fifth place among these information resources (43.7%) followed by librarians (42.2%). In the higher place, respondents situated websites (77.4%), books, articles, etc. (52.3%), lawyers (44.7%) and National Copyright Office (43.7%). International institutions got significantly worse results (in the lowest place are ICA, ICOM, eIFL, and IFLA).

If we look at student attitudes to copyright subtopics we see only small differences in their ranking according to different aspects – topics students felt familiar with, topics they had been taught in the LIS department and topics that should be included in the LIS curriculum (see Fig. 1).

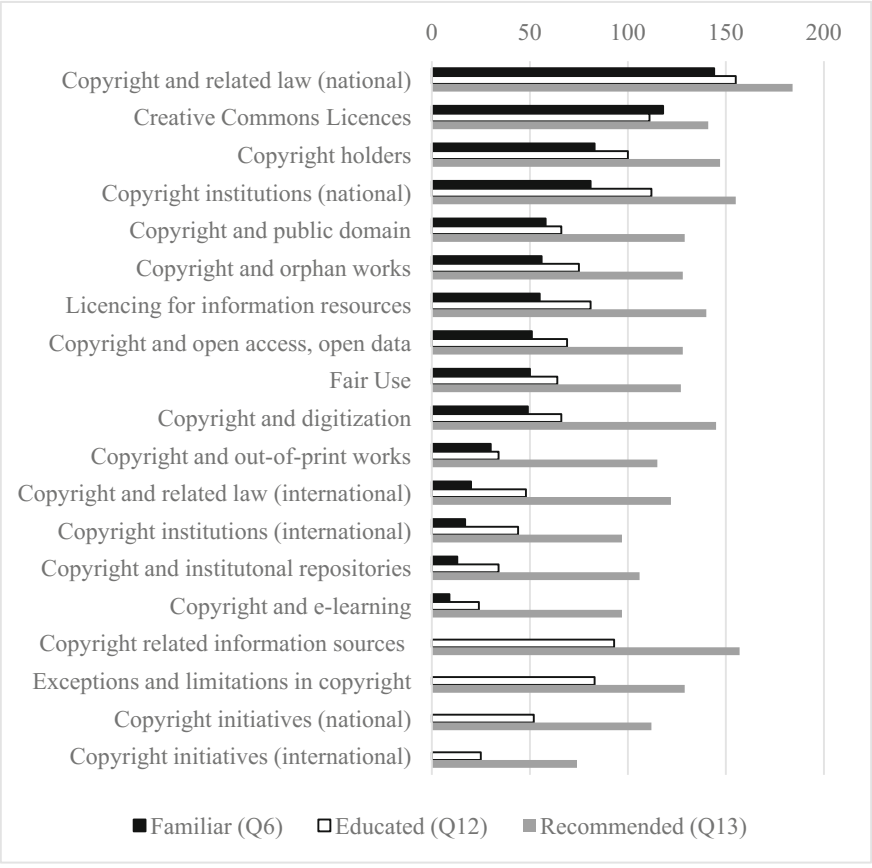

Fig. 1. Copyright topics educated in the LIS department (Q12), familiar to respondents (Q6) and recommended being included into LIS curriculum (Q13)

More respondents felt familiar with Creative Commons licenses than stated they were educated in this topic. More than half of the respondents thought that all mentioned topics should be included in the LIS curriculum except for the international

copyright institutions, the international copyright initiatives, and the copyright issues/solutions regarding virtual services within e-learning practices. But more than three-quarters of respondents stated that they were not educated in six of the 19 topics and more than half of respondents in ten other topics. Not all the respondents already completed a copyright course because they were in a lower year than the one including the course, but still their lack of knowledge should be considered. Students were convinced of the importance of most of the topics addressed. Students would welcome the extension of their education in copyright literacy as opposed to the current state, especially in the international context and more detailed solutions of practical issues (e.g., digitization or e-learning). Only 2% of respondents thought that copyright should not be included in the LIS curriculum. Others recommended that it bed include at a lower grade (77.4% bachelor's, 53.8% master's and 18.1% doctoral).

There were statistically significant differences (x2, $p < 0,1$) among the three universities in how respondents evaluate the importance of some specific copyright topics. Topics more important for SUO students compared to the other two universities were: international copyright initiatives, copyright holders, information resources licensing, copyright and open access and open data, copyright and out-of-print works, copyright and orphan works and exceptions and limitations in copyright. Topics more important for Masaryk University students compared to the other two universities were: Creative Commons licenses, fair use, copyright and digitization and copyright and public domain. All of these topics (excluding international copyright initiatives) had the least sense of importance for students of Charles University compared to the other two universities. Results also showed statistical differences between study years (x2, $p < 0,1$). The importance was higher in higher years in all of these topics: national copyright institutions; information resources licensing; Creative Commons licenses; copyright, open access, and open data; fair use; copyright and public domain; copyright and orphan works; exceptions and limitations in copyright.

5 Discussion

The results in the previous section showed that respondents were well aware of the connection of copyright with libraries. That is in line with librarians according to available research [9, 11–15]. We cannot compare the opinion of students and librarians in the Czech Republic because of the lack of copyright literacy research of Czech librarians. But this comparison should be interesting follow-up research. The agreement about including copyright in the LIS curriculum was not so strong as that expressed by UK librarians [2]. Ranking the LIS department in the fifth place in information resources about copyright could relate to this result. LIS students preferred more electronic and traditional information resources. These resources relate to self-education. For the LIS students, lawyers and the National Copyright Office were also a better resource for advice as compared to librarians, but there were only small differences in preferences among these three resources for students. This contributed to the result that LIS students were aware of the importance of copyright for librarians.

Results showed that LIS students were aware of the importance of mentioned copyright topics because they recommended including them in the LIS curriculum, but they did not feel familiar enough with them. This is a positive result because students felt open to being educated on these topics and it depends only on LIS departments as to whether they will include them in the LIS curriculum. But there were significant differences among universities in perceived importance. Each university has a partly different focus in LIS; therefore, the influence of other courses can cause these differences. Higher perceived importance in higher years may confirm this influence of other courses.

Compared to these attitudes we can discuss knowledge of the students. Because we did not use a scale to measure competencies in specific topics, we could only roughly say that there were some similarities in level of competences of students and librarians – worse knowledge about the international aspects of copyright and specific issues of applying the copyright (in development of institutional repositories or e-learning practices) [2]. Respondents stated worse knowledge in the specific use of works in a traditional environment, such as out-of-print works, public domain or fair use compared to US librarians [25].

The research identified fairly good knowledge and LIS education in Creative Commons licenses, but other topics connected with the digital environment (open access and open data, digitization and especially e-learning) received significantly worse results despite the growing importance of this issue [2, 10, 11]. We received better results in some topics connected with the digital environment (e.g., Creative Commons licenses, open access) compared to UK librarians [2] but not as different compared to US librarians [25]. These differences could appear because of different measuring, research population or country (see [14]). They could also be influenced by students' experience in the digital environment, but not so good experience with library services. It is important to explain why students should be interested not only in topics connected with their actual personal work with information, but also with problems of library users and how librarians can help them.

The question remains as to whether respondents were also aware of specific problems that they should be able to respond to in their library practice. Although they self-evaluated their competences in general copyright issues quite well, test questions identified a lot of problems already in their knowledge about works which are under copyright protection. This problem was also identified in works strongly connected to the library, especially databases. Even worse knowledge was identified in thematic areas within the copyright law, and the more specific, the worse the results were. This suggests that besides general principles, it is necessary to pay attention to the specific practical situations they can encounter in libraries and to which they should be able to respond. Because of the complexity of copyright, LIS departments should consider a course focusing on this topic. Students should be prepared not only in the level of their copyright literacy but also in advising in copyright and creating educational materials and courses [11, 15]. There were no statistical differences among universities, but there were among study years. Better results in higher years, as well as small deterioration in master's degree show the influence of LIS education. The differences among countries will be published in a joint publication of CoLis project.

6 Conclusion

Copyright is an important topic for library practice. Librarians need copyright literacy for different services but also to help library users with their problems when working with information. The Czech LIS students are aware of this role, and they are convinced that LIS departments should help future librarians prepare for this task.

Our research found a positive approach of Czech LIS students to copyright and the inclusion of copyright topics in the LIS curriculum. But these students also had some important gaps in their copyright literacy. They were aware of this regarding some topics. But they evaluated their general knowledge of copyright quite well, although we also found problems in basic facts about copyright, such as what is under copyright protection.

Our results found a potentially good environment to improve copyright literacy of LIS students and a topic on which LIS departments should focus. The results should serve to improve LIS curriculum at the national level. This research is a part of the international study. The international comparison can help to identify national specifics in this field but also help in the harmonization of LIS education internationally.

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Information Literacy and Lifelong Learning

The Attitudes of Teachers-in-Training Towards Information Literacy Skills and the Inclusion of Mobile Devices in the Process of Teacher Education

María Pinto[1], David Caballero-Mariscal[2], Rosaura Fernández-Pascual[1], Dora Sales[3], and David Guerrero-Quesada[1(✉)]

[1] Universidad de Granada, Granada, Spain
{mpinto, rpascual, dguerrero}@ugr.es
[2] CM La Inmaculada, Universidad de Granada, Granada, Spain
davidcaballero@ugr.es
[3] Universidad Jaume I, Castellón, Spain
dsales@uji.es

Abstract. The main focus of this paper is to analyze the relation between information literacy and the use of mobile devices in the process of learning-teaching in university students, specifically, teachers-in-training. For this purpose, a group of students belonging to the last semester of the Education Degree (N = 44) at the University of Granada was selected for a qualitative-descriptive study, based on a focus group, using the techniques of the *thinking aloud* and the semi-structured interviews; and for a brief quantitative questionnaire founded in a Likert-Scale. With these two procedures we tried to measure attitudes towards information literacy and the influence that mobile devices exert on its acquisition. Both results (qualitative and quantitative) were compared in order to check the consistency of the information offered by the students. After we analyzed the data, we conclude the following: 1. There is a generalized use of mobile devices in the process of learning-teaching. The use of digital technologies for communication and learning purposes is obviously a part of the identity of young people and, in particular, of university students. 2. The increase of these devices is related to a change of attitudes, which includes distraction, use of new technologies for other purposes (different to academics) and lack of critical outlook. 3. Age is a relevant factor for the development of attitudes and skills related to critical and independent thinking. Nevertheless, significant differences were not observed as far as the use of mobile and the acquisition of digital information skills were concerned. 4. To a greater or a lesser extent, students demand the use of new technologies combined with a traditional methodology, on the basis of master classes, discussion groups, dialogue and interactions, and practicum. It is also remarkable that an excessive use of mobile devices may hinder or overwhelm the acquisition of literacy skills. 5. Data analysis identified gaps in the information literacy of teachers-in-training despite their constant access to information via mobile devices. Therefore, we propose that appropriate information literacy training is a key priority in teacher education. 6. Concerning the use of mobile technologies in the classroom, this research suggests both a positive impact and also some disadvantages.

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Keywords: Information literacy · Mobile learning · Attitudes · Focus group · Teachers-in-training

1 Introduction

Quantitative research has traditionally been considered as a paradigm in scientific research [1]. Without any shadow of a doubt, this methodology offers many advantages: objectivity, accuracy and the opportunity of implementing achievements and outcomes to many different contexts and situations. Nevertheless, other different methods can contribute to the development of new perspectives in research. İn this regard, qualitative methods, and more specifically instruments as *discussion groups,* can contribute to new approaches and interesting views and interpretations. In this light, Hennik [2] underscores that "the most unique characteristic of focus group research is the interactive discussion through which data are generated, which leads to different type of data non accessible" in the development of individual interviews, either in the case of a closed self-administered questionnaire or an open-ended questionnaire, based on qualitative interpretations and methodologies. *Discussion groups* are becoming a useful tool in many situations, because they can be considered as a "valuable method for qualitative data collection" [3]. If we take into account the strengths and weaknesses of the discussion groups, which are mainly applied to this analysis we are trying to carry out, we should underscore the value and usefulness of this particular methodology. On the one hand, small groups give the opportunity of discussing in the particular context of personal interactions. This becomes a determining factor to go more deeply into a wide dialogue, with a number of crucial features: honesty, spontaneity, and expression of true opinions. On the other hand, it can be difficult to prevent subjectivity and bias, due to the nature itself of this research methodology. In any case, we cannot deny that qualitative methods of inquiry contribute to find out many elements that often go unnoticed in the process of quantitative researches.

1.1 Education and Information Literacy in the *Millennial Age*

There is no doubt that we are witnessing an unstoppable process of change, due to the spiral growth and the implementation of new technologies in the process of teaching-learning, mainly mobiles devices-smartphones. In any case, we should understand this process within the context of the new generations, conditioned by a number of factors and variables: *digitalism* [4, 5], immediacy and facility in terms of access to the Internet; and, as a consequence, easy accessibility to the information. The *millennial generation*, born after 1982, is characterized by a change of paradigm in social interactions, the connectivity and the development of new skills, and, to a greater or lesser extent, a generational shift. Nevertheless, we should underline that the concept of *millennial* itself shows controversies and it is susceptible of being interpreted in many different ways. In any case, this generation shares a number of features: they "are information technology mindset" [6]; they have naturally developed skills in multitasking; and they have the ability to integrate many new abilities at this regard.

We should start from a basic premise: millennials have the chance to search, get and contrast the information they need. The fundamental principles upon which this sector of the population rest are: knowledge, digital ability, information need, effectiveness and immediacy [7–9]. There is a shift of paradigm, due to the fast dissemination of devices and apps. Millennials have the ability to acquire new skills and to get used to new situations and contexts. Millennials have grown in a world typically rich in information and full of possibilities, as they are exposed to information technologies from a young age. It is an inherent fact for them to stay connected by many diverse means: mobiles, different chats, and constant access to information. Moreover, the devices they usually employ can be considered as multitask, so far as they can be used to listen to music, watch clips, read texts, and have access to different sources. At this regard, McCoy [10, p.13] underscores that "the frequency of classroom distractions that college students experience due to the use of digital devices is increasing". As a matter of fact, this statement highlights the current situation and underlines a point that could be applied to many different contexts of the current society. In this sense, we should take into account the relevance of teachers and professionals of education in the development of new skills to increase their awareness and sensitiveness towards the increasing difficulties both teachers and students may run into. Children and young people are the future of the society, and schools become an essential reference for the acquisition and development of values, attitudes and skills. For this reason, to analyze the attitudes towards these concerns becomes a priority. Teachers will be only able to give what they have and are. Concerning the use of new technologies and the development of information literacy, we can state that there is a paradox, derived from the immediacy and the ease of accessibility to information.

1.2 Teachers and the Implementation of New Technologies for the Acquisition of Information Literacy

The significant change we have been mentioning, experienced by the whole society, has led to a new change of attitudes and a number of priorities we should take into account. We cannot deny that the youngest sectors of our society, who have had immediate access to the sources of information, count, on the one hand, on a number of advantages and opportunities. On the other hand, they need to prioritize and develop a critic attitude towards their real levels on knowledge, in addition to an analytic and objective perspective [11]. Among the strengths of the millennials we may underscore:

1. Ease of access to information.
2. Adaptability to constant changes.
3. Multitask and media culture.

In any case, we can also find a number of weaknesses we cannot forget:

1. Lack of critical attitudes, needed for any digital-literate person.
2. Difficulties to select information.
3. Informational overstimulation [12].

It turns into a crucial issue to muster up critical thinking, attitudes and a deeper level of literacy in order to develop the skills that guarantee the success. That is why Harley considers these elements as key components, "concepts demonstrated to be meaningful and valuable in the context of student´s daily lives" [13].

2 Research

In order to analyze the importance of information literacy and the integration of mobile technologies, both in the process of learning-teaching and to acquire and develop all these skills, we carried out a research, based on qualitative and quantitative methodology. Students belonging to the University of Granada (N = 44) who are studying to become teachers (Faculty of Education) participated in this research. We selected this population due to a number of conditioning factors:

1. Volunteers were required to carry out this analysis.
2. Among them, we chose those who were in their last year of their university degree.
3. The sample gathered was also based, as previously mentioned, in the students' degrees: Education Grades. Future teachers represent a cornerstone in the understanding of trends and needs (Table 1).

Table 1. Sociodemographic data

		Frequency	Percentage
Gender	**Men**	**14**	**31.8**
	Women	**30**	**68.2**
Age	$\leq$ 25	10	22.7
	> 25	34	77.3
	Total	44	100,0

The sample selected represents 5% of the students of this degree, belonging to the last year.

Data were collected at the end of the first semester of the academic year 2018. Students filled in a self-reported paper-based questionnaire, composed by ten items. Students completed it in few minutes, at the end of their lesson. The instrument, prepared for this occasion, and based in a Likert-Scale (1–6) was administered to contrast and complete the information of our qualitative study, the main object of our research. The most relevant tool of this study was the focus group we implemented with students belonging to the last year of the Teaching Degree.

Concerning the procedure, first, the researchers reported the Dean of the Faculty of Education about the research, in order to ask for the appropriate permissions. Data collection was conducted as an anonymous and voluntary group activity at the university center. The students took part in the *focus group* and they filled out the

numbered questionnaires in their classrooms. For both proposals they employed two hours. Data were analyzed qualitatively. First, we transcribed the recordings and selected the most striking elements, according to the following criteria:

1. Prevalence (repetition rate).
2. Convergence or similarities in the answers.
3. Expert judgment, which sorted out and labeled the collected data. Two researchers and an external observer took part of the focus group and proceeded to carry out this task.
4. Contrastive analysis of the opinions and attitudes expressed during the focus group, and the information reflected in the qualitative survey.

After we analyzed the *focus group,* we obtained the following results.

(A) **Focus Group**

We can see that students are aware of the importance of being competent in information. As a result, they grant high importance to Information Literacy (IL) for many proposals, both in academics and in their everyday lives. In any case, as we can realize, there are differences between younger students and those over 25. These consider as crucial critical attitudes, rejection of manipulation and an optimum use of time. Moreover, they also include as being relevant the social dimension (contribution and openness to diversity). To a greater or lesser extent, students demand educational programs to develop these skills, beyond the new technologies, and as a priority for their future professional performance (Table 2).

Table 2. Importance of being competent in information for academic/daily life

Daily life	Academic dimension
1. Being informed	1. More significant learning
2. Being critic	2. Better results/marks
3. Discuss/converse on every topic	3. To be able to read and understand anything
4. Increase culture/knowledge	4. To know how to look for accurate information
5. Critical foundation by talking	5. Ability to refuse
6. Wary of being manipulated	6. Understand better what is happening
7. Being open minded	7. Being better prepared
8. To know what is happening all over the world/in our society	8. Promote (academically)
9. Contribute to society	9. Use the time wisely
10. Not to be indulgent	10. To be able to use a variety of resources
11. Live better/increase quality of life	
12. The ability to choose	
13. Increase general skills in life	
14. Learn easily new things	
15. Understand reality better	

**These answers match to direct quotes by the students, from the focus group (selected from the transcriptions due to their relevance)*

Item 2

"I cannot conceive my life without my mobile, even in the Faculty" (P.T, personal communication, November, 2017) (Table 3).

The relevant highlights in this case are related to getting documents for academic proposals and the information they need (over 90%). They are also keen on channels, because they are considered as useful and easy to manage (78%). That is why one of the most striking assertions was about the role of teachers and educators in the future of high education: "I often wonder why should I attend lessons, if you can find so much information on Youtube" (C.N, personal communication, November, 2017)[1].

Table 3. Integration of skills using mobile devices

Integration of skills using mobile devices
1. Searching database with the mobile
2. Crosschecking the information (found by the devices) with another different sources
3. Using new programmes and apps
4. Channels of information (YouTube)
5. Tutorials
6. Choosing the first information I find
7. Downloading PDF files to my device
8. Looking for useful information in my mobile immediately

Item 3

There has been a proliferation of certain applications and means, as Moodle platforms, Kahoot and diverse presentations. Nevertheless, students underscore a lack of training in this relevant field. In general terms, they are tired of monotonous presentations and they require the development of other aspects, mainly in the context of the growing new resources and technologies. In any case, they also demand the combination of traditional methods and new technologies, as an effective way to increase the effectiveness in the process of learning and teaching (Table 4).

"Teachers just employ PPT. We are fed up with that. They should renew their methods and general knowledge of technologies. Moreover, sometimes we find important to go back to traditional methods for some issues" (P.P., personal communication, November, 2017).

Item 4

So, as we can see, the resources used by students are basically mobile devices, mainly laptops, tablets and mobiles. Although they normally use mobile phones in their everyday lives, there is lower incidence of them in the classroom. Instead, they usually choose laptops to take notes, search for information or even their academic tasks.

[1] We do not reveal the names or any other personal data from the focus group to preserve privacy and anonymity.

Table 4. What kind of contents do you consider more appropriate for teaching (questionnaires, games, tests…)? Which are missing?

Presentations of more appropriate contents	Missing important aspects
1. PPT Presentations 2. Prezi presentations 3. Audiovisual tools such as Movie Maker, MOVAVI, etc.) 4. Showing vids/contents 5. APPS for digital blackboards 6. Interactive APPs (Thinglink, Nearpod, Adobe Scan, Kahoot) 7. Google Slide, Knovio, Slideshare (presentations) 8. Moodle Platforms	1. Original and engaging PPT presentations 2. Educative APPs 3. Tutorials 4. Teaching training programmes to incorporate APPs 5. Combine resources with dialogue and debate 6. Audiovisual montages well developed and original for the lessons (never downloaded from the net) 7. Combining resources with traditional lessons

Concerning the resources, we must underline they show a deep familiarity with many different apps and programmes, but they normally opt for a few they consider as easy and practical to handle. They, in turn, highlighted, during the *focus group*, that there is a lack of training on the part of teachers in this regard (Table 5).

Table 5. Resources, programmes and devices used by the University students of the Education Degree for lessons, presentations, and the research of information

	Programmes	Devices	Resources
In the classroom	Word PPT Adobe Reader Word Pad	Laptop Tablet Mobile	Laptop Tablet Mobile
Academic works	Word PPT Adobe Reader Word Pad	Laptop Tablet/mobile (for concrete apps)	Mobile Laptop Tablet Library computers Database
Presentations	Word PPT Prezi MOVAVI APPS for Q code	Mobile Digital Blackboard Tablet	Digital blackboard Laptop (with projector)
Search of information	Mozilla Firefox Chrome Internet Explorer	Laptop Tablet Mobile	Mobile Laptop Tablet Library computers Database

Item 5

Students report a number of advantages, derived from the use of mobile devices in education. It offers countless possibilities. In either case, students also perceive many disadvantages and dangers, related to the abuse of these devices, both in the academic context and in the daily life. Nevertheless, students often run into deep difficulties to set limits to the use of mobiles. The most distinctive limits they underline are distraction (85%) and addiction (65%). As far as advantages are concerned, students report ubiquity and the multiple possibilities that mobiles offer in every context (100%) (Table 6 and 7).

Table 6. Advantages and disadvantages/limits of the mobile devices in the process of teaching-learning l

Advantages	Disadvantages/limits
1. Immediacy	1. Distraction/lack of attention
2. Comfort and convenience	2. To be able of reading and understanding everything
3. Ubiquity (literal response: the possibility of working from every place)	3. Monotony
4. It is attractive	4. Addiction
5. **Adaptation to new languages and ways of relation***	5. Lack of concern for other different mean sources*
6. Countless possibilities*	6. **Lack of effort***
	7. **Lack of critical attitude***

(B) Quantitative Research

Table 7. Relevance of mobile technologies in Information Literacy

	n = 44	Male n = 13	Female n = 30	P
	Mean (sd)	Mean (sd)	Mean (sd)	
1. Mobile technologies are indispensable	3.14 (1.20)	3.08 (1.25)	3.17 (0.55)	0.826
2. Mobile, crucial for academic life and information literacy	3.19 (1.36)	2.77 (1.09)	3.37 (0.77)	0.192
3. It is impossible to renounce to mobile technologies for IL	3.65 (1.42)	3.31 (1.31)	3.80 (1.00)	0.305
4. Self-perception about mobile skills for IL	4.26 (1.34)	3.92 (1.11)	4.40 (0.84)	0.292
5. Perceptions on teacher's skills on the use of new technologies	3.84 (1.25)	3.23 (1.01)	4.10 (1.28)	**0.035**
6. Influence of age	4.47 (1.33)	4.15 (1.40)	4.60 (0.61)	0.320
7. Accessibility to Internet as a factor in the increase of IL	4.88 (1.21)	4.38 (1.75)	5.10 (1.47)	0.077

(*continued*)

Table 7. (*continued*)

	n = 44	Male n = 13	Female n = 30	P
	Mean (sd)	Mean (sd)	Mean (sd)	
8. Mobiles exert a negative influence on student's attention	4.79 (1.40)	4.62 (1.50)	4.87 (1.12)	0.597
9. There is no information without mobiles	3. 33 (1.64)	3.85 (1.67)	3.10 (0.99)	0.732
10. I use traditional methods in my learning process (in the classroom)	4.28 (1.62)	4.85 (1.06)	4.03 (0.95)	0.133

3 Conclusion

After we have analyzed the data, we can see some relevant aspects we should take into account.

1. There is a growing awareness of the importance of the mobile technologies in the process of learning-teaching. However, this relevance seems conditioned by age, as a crucial factor for the acquisition and implementation of methodologies linked to mobile learning. We should not forget that this idea seems to be linked to differences between generations and, in turn, between an important sector of teachers and students.
2. In this vein, it seems relevant to point out that most students find difficult to decouple the use of mobile devices from the acquisition and development of IL.
3. If we take into account the quantitative research, as far as students' point of view is concerned, the use of mobile technologies in not necessarily linked to diverse problems such as addiction to technologies, distraction or lack of interest in the classrooms. This statement is apparently in contradiction with the results obtained in the qualitative research. This fact underscores the relevance of combining both methodologies to contrast and enrich this sort of analysis.
4. It is remarkable that students usually employ traditional methods in the classroom, although they use, master and consider as crucial the implementation of new resources and apps to improve pedagogical skills and to encourage the development of attractive methodologies.
5. The results of the quantitative research did not show significant differences between women and men, concerning the perception of the analyzed items. If we take into account the age factor ($\geq$ 25 versus < 25), we must underscore that we only found significant differences in the perception of age as a crucial factor for the acquisition and development of new skills (**p = 0.26**); and regarding the unavoidable link between the use of mobile devices and the development of IL (**p = 0.37).**

6. The focus group, with its qualitative approach, revealed a significant mastery of new technologies, apps and programmes. There are a variety of resources that students use in their daily lives. They also show well-embedded skills to develop new abilities and knowledge to access to the information they need or they are interested in. Nevertheless, motivation plays a vital role in the acquisition of skills and new learning.
7. In this regard, there are many tools and resources completely unknown by students, simply due their lack of interest or knowledge.
8. It turns into a challenge and a priority to try to reduce the existing gap between generations concerning the use of new technologies. This is mainly relevant if we take into account differences in teaching and learning processes.

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Teaching Yourself to Learn: A Case for Incorporating Self-directed Learning Concepts into Information Literacy Education

Allison Nowicki Estell(✉)

Wentworth Institute of Technology, Boston, MA, USA
estella@wit.edu

Abstract. The ACRL's *Framework for Information Literacy for Higher Education* is designed to help librarians teach students to learn more effectively within the structured environment of higher education, in which arguably most information needs have been determined by the curriculum. As students enter their chosen professions and live their lives after the period of their formal education, however, they will need to set their own learning priorities. Self-directed learning theory is offered as a complement to current information literacy education practice. Self-directed learners strive to identify the moment and circumstances of their information need, and to evaluate the efficacy of their efforts. With guidance from information literacy instructors, students can learn to become their own teachers. Using the ACRL's *Framework for Information Literacy* as a proxy for current information literacy practice, this paper argues for the inclusion of self-directed learning concepts into information literacy education to support lifelong learning.

Keywords: Self-directed learning · Lifelong learning · Information literacy education

1 Introduction

"[T]eaching carries an awesome responsibility to encourage students to want to know, to show them how to know, and to insist that they ask and answer the question 'For what purpose do *I* need to know?' [1, p. 117]"; Christensen's statement may resonate with information literacy educators, who strive to develop in their students the skills and habits necessary to succeed in seeking, identifying, and using information ethically and effectively in service of their academic needs. Information literacy is an important competency for academic success, and because it is also important to effective lifelong learning, it seems worth exploring how to orient information literacy curricula explicitly toward preparing students for lifelong learning success before they leave the relative shelter and protection of their educational institutions.

If we define "literacy" as "ability or knowledge in a specific field" (such as reading, writing, finding and using information, copyright law, digital environments, finances, or health information) [2, pp. xv–xvi], we can see that there are a multitude of literacies people may need or want to acquire throughout their lifetimes. In the higher education

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environment, there is a focus on *information* literacy—and understandably so—as the academic credential one earns in that environment is information-based. The tradition has been to base credentialing on demonstration of mastery of a specified body of knowledge or "content," and mastery of the content is seen as an indicator of mastery of any skills and learning processes presumed to have been necessary to master the content.

However, the abundance of extracurricular opportunities (clubs, recreational activities, professional organizations) and institutional offices focused on general well-being (medical, psychological, social, career) suggests a concern for the whole person and a holistic view of preparing the student for post-degree success by a broader definition. Perhaps the goal of information literacy education in higher education should be not just to enable students to meet criteria sufficient to earn a credential and secure a job, but also to prepare them to succeed in those jobs and in their post-graduation lives, and to continue to apply their skills in new environments. Considering the winding paths and varied domains in which people can grow and mature, it would be prudent to enhance and expand information literacy education with additional training transferable to the multiple growth opportunities each student will encounter after graduation. Educating and encouraging students to transition and mature into their own teachers is an undertaking complementary to information literacy education and an efficient use of instructional time and resources; introducing students to self-directed learning theory may help them develop a literacy of learning itself. Examining the ACRL Framework for Information Literacy through the lens of self-directed learning theory, this paper argues for the incorporation of self-directed learning concepts into information literacy education to support lifelong learning.

2 Information Literacy as Defined by the ACRL Framework

In the United States, the Association of College & Research Libraries' *Framework for Information Literacy for Higher Education* ("the Framework") is a widely-consulted resource for information literacy educators. In this paper, I will use the Framework as a proxy for current information literacy education practice because the Framework, developed in 2015, is fairly current (in that it is a recent reimagining of the information literacy standards) but also not untested (having been in use for a few years already).

The Framework defines information literacy as: "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" [3, p. 3]. The Framework consists of six frames:

- Authority Is Constructed and Contextual
- Information Creation as a Process
- Information Has Value
- Research as Inquiry
- Scholarship as Conversation
- Searching as Strategic Exploration

Each of the Frames (concepts) is grouped with Knowledge Practices ("demonstrations of ways in which learners can increase their understanding of these information literacy concepts") and Dispositions ("ways in which to address the affective, attitudinal, or valuing dimension of learning") [3, p. 2]. The Framework focuses on information needs that are already recognized by the student—and often externally driven—but the core ideas of the Framework acknowledge that learning is an iterative process and that attitude and affect can influence the effectiveness of information seeking, finding, and use, principles that are compatible with self-directed learning.

Another affinity between the Framework and self-directed learning is in the role of what ACRL calls "metaliteracy": "Metaliteracy demands behavioral, affective, cognitive, and metacognitive engagement with the information ecosystem…with special focus on metacognition, or critical self-reflection, as crucial to becoming more self-directed in that rapidly changing ecosystem" [3, pp. 2–3]. The Framework tends to focus on metacognition as it applies to information evaluation; as we examine self-directed learning concepts, we will see that self-reflection is an important skill for successful self-direction, not just in the evaluation of learning content, but especially as it supports evaluation of one's own learning processes. If self-directed learning theory is incorporated into information literacy education to complement and augment the Framework, the resulting curricular outcomes may offer a more comprehensive array of skills, behaviors, and attitudes to prepare students for lifelong learning.

3 What Is Self-directed Learning?

Malcolm Knowles's definition of self-directed learning is widely-quoted:

> In its broadest meaning, 'self-directed learning' describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes [4, p. 18].

Other frequently-used terms that can be considered synonymous with self-directed learning include: "autodidactic," "autonomous learning," "learning projects," "self-education," "self-efficacy," "self-planned learning," and "self-regulated learning" [5, p. 3]. Stated simply, self-directed learners determine their own curricular content, evaluate their own learning, and facilitate their own learning process. The learning process includes both the process of acquiring knowledge and the process of transitioning from a traditional content-based structure to a process-based structure of self-directed learning [4, p. 37]. Knowles's work was addressed to the teacher making a transition from transmitting content to facilitating learning, but the corollary is that a learner must transition from receiving content/knowledge to actively determining what content/knowledge is needed and how best to acquire it in a given context or situation [4, pp. 21, 38].

Garrison took a "collaborative constructivist" view of self-directed learning, in which "the individual [takes] responsibility for constructing meaning while including the participation of others in confirming worthwhile knowledge" [6, p. 19]. Control and motivation are important to this view of self-directed learning, and Garrison asserted that "[t]hrough collaboration and control students learn to monitor and manage their

thoughts and behavior. It appears that shared control leads to intrinsic motivation and then to responsibility" [6, p. 30]. The collaborative constructivist perspective focuses on self-management, self-monitoring, and motivation as necessary to students' ability to truly take responsibility for their own learning.

Self-directed learning in the context of lifelong learning, then, requires that students be able to set their own learning priorities, not only determining whether they have identified the information they need, but also recognizing when they need to seek information in the first place. Without a predetermined curriculum or rubric for assessment, self-directed learners must become their own teachers, focusing on not just the content they are trying to learn, but also the process by which they learn.

4 Why Self-directed Learning?

Self-directed learning concepts have supported professional development in the fields of pharmacy, medicine, and human resources, as well as the teaching of math, science, elementary education, and educational technology [7, p. 20]; recently, self-directed learning has also been proposed as a framework for the self-study of copyright law [8]. Foreign language learning [9, 10], online learning [11] and mental health support groups [12], educational leadership coursework [13], and homeschooling [14] are other learning environments in which self-directed learning curricula have been applied.

In addition to academic and professional competency, well-being is another desirable outcome for students. Teal, Vess, and Ambrose explored connections and complementary relationships between concepts of self-directed learning, positive psychology, and wellness using a model of well-being with "five core elements: *Positive emotion*, *Engagement*, *Positive relationships*, *Meaning*, and *Accomplishment*" [15, p. 20]. Each of the five elements represents the eye of a flower from which emanates petals representing concepts of either positive psychology or self-directed learning [15, p. 21]. Mapping self-directed learning and positive psychology to well-being showed the complementary nature of the two perspectives and suggested an affinity–and possibly a correlation–between the two fields. Recent research has also examined the effects of self-directed learning on the quality of life up to and including during retirement [16].

Kranzow and Hyland argued the need for self-directed learning in the 21st century [13, pp. 3–4]), with special attention to the importance of incorporating self-directed learning in higher education as an actual competency [13, p. 5]. Their study examined the effects of an intentional self-directed learning curriculum in which social work and education leadership graduate students were exposed to self-directed learning concepts and required to attend a conference on self-directed learning. They found that "intentional curriculum," exposing students to self-directed learning concepts and literature, in addition to self-directed learning activities, increased students' self-directed learning readiness [13, p. 8] and was experienced by students as transformative in their development over the time of the course [13, p. 11]. Explicitly presenting self-directed learning concepts and literature directly to students as part of information literacy education may have even more of an impact than just trying to develop the skills, habits, and attitudes of self-directed learning in students through specific learning activities.

5 Where Do the Goals and Outcomes of Self-directed Learning and Information Literacy Education Overlap?

Patterson, Crooks, and Lunyk-Child identified six competencies of self-directed learners:

- Self-assessment of learning gaps
- Evaluation of self and others
- Reflection
- Information management
- Critical thinking, and
- Critical appraisal [17, p. 25]

These competencies mirror those included earlier in Candy's "Profile of the Autonomous Learner" [18, pp. 459–466]. Candy, who championed self-directed learning as an element of success in lifelong learning, compiled a list "attributes, characteristics, qualities, and competencies" of the self-directed learner through extensive review of the research on autonomous learning. Additional attributes, characteristics, and qualities of the self-directed learner include:

- Demonstrate curiosity/openness/motivation
- Be flexible
- Be persistent/responsible
- Be venturesome/creative
- Show confidence/have a positive self-concept
- Be independent/self-sufficient [18, pp. 461–465]

We can see the seeds of many of these competencies and characteristics in various places throughout the Framework, especially the last three competencies identified by Patterson et al. ("Information management," "Critical thinking," and "Critical appraisal"), but they are perhaps most evident in the fourth and sixth frames: "Research as Inquiry," and "Searching as Strategic Exploration" [3, pp. 7, 9]. In "Research as Inquiry," we see knowledge practices such as "monitor gathered information and assess for gaps or weaknesses" (resonating with the first competency of Patterson et al., "self-assessment of learning gaps"), and dispositions such as "consider research as open-ended exploration" (resonating with Candy's "Demonstrate curiosity/openness" and "Be venturesome") and "maintain an open mind and a critical stance" (resonating with Candy's "Be flexible" and the last competency of Patterson et al., "Critical appraisal") [3, p. 7]. In "Searching as Strategic Exploration," additional congruences emerge, especially in the dispositions: "exhibit mental flexibility and creativity" (again, resonating with Candy), and "persist in the face of search challenges, and know when they have enough information to complete the information task" (resonating with Candy's "Be persistent" and the second and sixth competencies of Patterson et al., "Evaluation of self and others" and "Critical appraisal") [3, p. 9].

6 Where Might Self-directed Learning Theory Complement and Enhance Information Literacy Education?

The Framework contemplates "the dynamic and often uncertain information ecosystem in which all of us work and live," yet focuses primarily on students' time at the higher education institution [3, p. 2]. The most valuable way that self-directed learning theory could augment the Framework would be to focus information literacy education on the explicit and transparent development of self-direction in students for the purpose of equipping students to retain and practice information literacy outside of and after their time in the higher education learning environment.

Appendix 1 of the Framework, which discusses implementation of the frames in information literacy education, focuses on applying the frames to courses and skills needed for specific academic disciplines. It is meant to be flexible enough to implement at multiple levels, from novice to expert in a given field [3, p. 10]. Designed as a guide rather than a prescription [3, p. 11], the Framework is susceptive to adaptation and augmentation. With a few calculated measures, information literacy educators could introduce students to self-directed learning concepts, triggering thinking about how one learns and the impact that developing metacognition about one's learning could have on lifelong learning and success in one's career and life in general after academia.

Although there is significant overlap between the Framework and self-directed learning outcomes, there are a few self-directed learning competencies which could be more fully addressed within information literacy education guided by the Framework. Self-directed learners strive to *identify the moment and circumstances of their information need*, and to *evaluate the efficacy of their efforts*. The first three self-directed learning competencies outlined by Patterson et al. (self-assessment of learning gaps, evaluation of self and others, and reflection) provide opportunities for information literacy educators to further emphasize the evaluation of one's own learning. Additionally, attention should be given to motivation and recognition of the need to learn.

6.1 Self-assessment of Learning Gaps

"For students to become self-directed learners, they not only need knowledge but must be able to assess their current level of understanding," which requires "assessing knowledge gaps" (of self and of collaborators); "creat[ing] a repertoire of skills"; "tolerating ambiguity in expectations of themselves"; and "exploring a variety of learning styles [and] approaches to learning" [17, p. 26]. In other words, students should be encouraged to identify and assess gaps not just in information and knowledge, but in their own learning abilities and strategies.

6.2 Evaluation of Self and Others

In the Framework, "evaluation" tends to be focused on the quality of specific information or resources; all but one usage of the word is referring to evaluation of resources or information [3, pp. 4, 5, 8, 9, 13]. Self-directed learning requires students to go further, evaluating themselves and their learning processes. Patterson et al. described

development of the ability to evaluate oneself or others as a trajectory from receiving constructive feedback, to assessing achievement according to a preset rubric, and, finally, to developing one's own criteria for evaluation [17, p. 27]. Students should move from identifying and evaluating content to recognizing and evaluating the application of theories and other skills and processes.

6.3 Reflection

Metacognition, and even explicitly "self-reflection," is addressed in the Framework [3, p. 3], but there is an emphasis on product and performance, rather than the learning process itself. Students should be encouraged to reflect explicitly on the learning process and their feelings about the process; if the curriculum so guided, a student's reflective abilities could expand over the course of learning, according to Patterson et al., from: the ability to identify discomfort; the ability to consider what could be better; the ability to recognize the elements of success and the impact of attitudes on success; and the ability to articulate one's strengths and areas of improvement, as well as one's learning strategies [17, p. 29].

6.4 Motivation and Independent Recognition of the Learning Need

Garrison discussed the importance of motivation to self-directed learning [6], but the Framework is focused on students' time in school, when learning needs mostly arise from externally-imposed assignments, rather than an internal indication or drive to learn. Silén and Uhlin outlined the ways that problem-based learning explicitly supported the development of self-directed learning skills and attitudes in a nursing program. "If the intention is to enhance the students' ability to become self-directed learners, and prepare for life long [sic] learning…, it is essential to recognise that students becoming responsible and independent is a learning process in its own right" [19, p. 461]. Information literacy educators should make explicit the fact that students will need to recognize their own learning opportunities and motivate themselves to learn when they no longer have external drivers.

7 Challenges to and Recommendations for Incorporating Self-directed Learning into Information Literacy Education

7.1 Challenges

> Taking responsibility to construct personal meaning is the essence of self-directed learning. At the same time, taking responsibility for one's own learning does not mean making decisions in isolation. The challenge for teachers is to create the educational conditions that will facilitate self-direction [6, p. 30].

If self-directed learning need not take place in a vacuum, then the process of becoming a self-directed learner may be guided by someone other than the learner her- or himself. This is good news for instructors: while it may not be immediately obvious how to

teach students to become self-directed, it would at least seem to be possible to do so, through collaborative and carefully-considered activities and readings that explicitly promote the development of self-direction.

Choosing an appropriate curriculum may be a challenge for instructors, but self-directed learners at any stage will face the challenge posed by choosing from the multiplicity of approaches they can take and the sheer volume of information available. In "Alternatives to Being Information Literate," Huvila's study participants recognized that their ability to seek and use information (or not), and the strategies they employed (or did not), were contextual and situational [20, p. 817]. Rather than viewing information literacy as a dichotomous state (of literate or not-literate), Huvila proposed a view, compatible with self-directed learning theory, that recognized a range of strategies, behaviors, and attitudes regarding information seeking and not-seeking [20, pp. 818–819]. This resonates with Brockett's "Paradox of Choice": even as people take greater control over their own learning, they may find themselves overwhelmed and even debilitated; people need to have the freedom—and understand that they have the freedom—to choose when, what, how, and even whether to learn [21]. This attitude of and toward choice should be illuminated for and developed in students, so that their efforts in self-direction are not stymied by the overabundance of possibility (in resources, methods, or pathways).

Self-directed learners and advocates for self-direction within information literacy education may also encounter institutional barriers. "In many ways, the traditional system and, by association, the faculty who teach within it inadvertently and implicitly communicate to learners that they cannot or should not learn on their own. If they could, so the logic goes, they would not need the institution" [22, p. 2]. Conventional learning structures can have a dampening effect on self-directed learning:

> When asked about [self-directed learning (SDL)] at school, students repeatedly expressed the need for student choice both in the actual problem and the method of solving the problem. Students identified the current 'structure' of education as a possible deterrent; rules, regulations, norms, assessments, and assigned-work are all things that may inhibit student choice opportunities for SDL. Although the students felt comfortable taking charge of their learning, they felt inhibited by current structures and systems [23, p. 40].

Instructors may need to develop relationships and foster learning environments which downplay the effects of existing assumptions and structures that undermine the development of self-direction in learners.

7.2 Recommendations

A review of existing literature provides practical guidance for instructors seeking to develop and incorporate self-directed learning competencies into information literacy education. Themes range from how to structure the curriculum to exploration of specific techniques.

Curricular Design. Several articles demonstrate the application of a scaffolded approach to developing self-directed learning skills and characteristics in students. Grow presented the Staged Self-Directed Learning (SSDL) model to provide guidance to teachers wishing to "equip students to become more self-directed in their learning"

[24, p. 126]. Grow acknowledged inspiration from the Situational Leadership Model of Paul Hersey and Kenneth Blanchard as presented in *The Management of Organizational Behavior* (1988). The SSDL model shows students moving through four stages: dependent (teacher as Authority or Coach); interested (teacher as Motivator or Guide); involved (teacher as Facilitator); and self-directed (teacher as Consultant or Delegator). He also provided advice on how to teach people in each stage of the model, as well as how to design a course curriculum scaffolded over the stages [24].

Curry, Mynard, Noguchi, and Watkins [9] reported on the efficacy of their efforts to teach self-directed learning concepts in the context of a language course, as judged by student feedback (through a survey) about the extent to which students' thinking was influenced by the course. While the findings are based on student evaluation of the course, rather than external assessment of the students' abilities, nevertheless, significant numbers of students did believe that the course had affected their thinking in areas important to self-directed learning: "learning how to learn" (including "finding ways that suit me," "finding effective ways to learn," "finding new ways to learn," and "freedom to choose and try different ways to learn") and "motivation" [9, pp. 26–27]. The article includes the learning outcomes for the course [9, pp. 35–36], as well as an extensive reference list of literature on self-directed language learning [9, pp. 31–34]; it is therefore a trove of resources for instructors seeking to design a curriculum to support the development of autonomy and self-direction in students of any discipline.

Silén and Uhlin's problem-based curriculum incorporated three learning stages: encountering a reality-based situation, inquiring into the situation, and inquiring into the learning process; working together (collaborative self-directed learning); and inquiring into thoughts, feeling, and actions during the learning stage [19, p. 466]. Curry et al. provided similar learning activities in their language learning curriculum: preparation for self-directed learning, self-directed learning, and evaluation of self-directed learning [9].

Comparing these plans for teaching self-directed learning to students, we can begin to identify a common thread: self-direction may be developed in students in learning situations which prompt the student to ask questions before and after a learning episode:

- Before: What do I need to learn? How will I learn it?
- After: Did I learn what I needed to? How did I learn? How did it feel? How could I learn differently or better in the future?

Engaging in metacognition about the learning process itself, (i.e., incorporating reflection into the learning process about the learning process), may help students to become more self-directed.

Specific Techniques. Even while conceiving of the self-directed learning curriculum in stages, there are a variety of methods and techniques one can employ to guide the student through those stages, including advising, coaching, and explicitly naming the biases against independence and self-direction in educational structures as they are sometimes implemented in higher education institutions. Yamashita [10] analyzed advisory encounters with a foreign language learner in the process of developing learner autonomy. Yamashita argued that, rather than viewing negative affect as

detrimental to learning, examination of negative affect (and positive affect) can be the springboard from which learner autonomy can be developed [10, p. 62]. An advisor can help a learner work in an affective dimension to improve self-directed learner autonomy because advisor-learner dialogue can expose to the learner the relationship between affect and cognition: "the learner acts as the agent in becoming aware of her affective states and [uses] this knowledge as a resource in making decisions about her learning, eventually leading her to succeed in learning and in developing learner autonomy" [10, p. 64].

In a similar vein, Seifert, Newbold, and Chapman recommended coaching to help students develop "'tactical' moves that empower a learner's self-direction" [22, p. 3]. The development of self-directed learning tactics was seen by the authors as necessary "to actively fight or subvert [the] institutional environment in order to improve learning" [22, p. 2]. The authors saw a need for learners to develop tactics in order to effectively direct their own learning in higher education institutions as they have been established: "our institutions are built and often run *in opposition to* self-directed learning" [22, p. 2]. "Coaching" is understood here as "raising insight and awareness out of which action will arise at the time most suited" for the learner; the effectiveness of coaching would be undercut if the coach asked leading questions or otherwise coaxed the learner to a specific predetermined conclusion [22, p. 6]. Coaching, in this sense, is a process that can mirror the process focus of self-directed learning.

Additional Resources. Self-directed learning can cause one to feel a tension between independence and empowerment on the one hand, and self-doubt and dismissal of one's achievements on the other [8]. Tough recommended strategies for helping to reduce students' reliance on external validation in the assessment of learning [25, pp. 147–165]. Additionally, Cranton, in *Professional Development as Transformative Learning: New Perspectives for Teachers of Adults,* offered several chapters that may be of interest to instructors wishing to design an intentional curriculum for self-directed learning: Chap. 3, "Strategies for Self-Directed Development," Chap. 4, "Critical Reflection," and Chap. 5, "Becoming a Transformative Learner" [26].

In closing, it seems fit to return to Knowles's seminal work, *Self-directed Learning: A Guide for Learners and Teachers* [4]. While several decades old, it contains many valuable "Learning Resources" and "Inquiry Projects" which keep the focus of learning on self-evaluation and the process of becoming self-directed, rather than on evaluation of content or assessment of the product of one's learning; it is a helpful reminder that self-direction is a discipline unto itself, and it should be studied intentionally and with purpose.

8 Conclusion

This paper has proposed that the incorporation of self-directed learning concepts into information literacy curricula in higher education could develop and support lifelong learning in students. Juxtaposing the ACRL *Framework for Information Literacy for Higher Education* with an outline of the concepts of self-directed learning theory,

I uncovered affinities and opportunities resulting from such a combination, and discussed challenges and shared resources for further investigation. Future researchers may choose to explore the parameters and details influencing the success of such a relationship.

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Artificial Intelligence and Labor: Media and Information Competencies Opportunities for Higher Education

Jesus Lau[1,2(✉)], José Luis Bonilla[3], and Alberto Gárate[3]

[1] Universidad Veracruzana, Veracruz-Boca del Río, Instituto de Ingeniería/Facultad de Pedagogía DSAE, Boca del Río, Veracruz, Mexico
jlau@uv.mx
[2] PIMSA- Cátedra Distinguida, CETYS Universidad, Mexicali, Mexico
[3] CETYS Universidad, Mexicali, Baja California, Mexico
{joseluis.bonilla,alberto.garate}@cetys.mx

Abstract. Artificial intelligence (AI) is emerging in our daily lives, making wiser robots and machine learning a reality. Some of our important decisions, either professional or personal, such as in the realm of entertainment, are already predetermined by the algorithms of AI. Our society, and our workforce, including university graduates, will soon, if not now, face unanticipated challenges in the labor market, not to mention their daily routines, due to new "learned" machine actions. Educational systems have the challenge and opportunity to train and re-train the new cadre of professionals in the development of more cognitive skills. Among these skills are Information competencies—the knowledge tools of any cognitive human action— that will enable them to compete in the job arena. In this conceptual paper, the basic role of information competencies in the development of cognitive skills demanded by the new artificial intelligence decision-making economy and the shifting of current jobs into new ones, and the opportunities for higher education will be discussed, reviewing current literature to identify IL potential strategies that can be deployed in higher education to enhance students' cognitive skills.

Keywords: Media and information literacy · MIL · Information competencies · Artificial intelligence · Future of labor · Employment · Higher education

1 Introduction

The aim of this paper is to discuss the impact of artificial intelligence (AI) in employment, and decision-making and the role of higher education and media and information competencies (MIL) in enabling graduates to play an active role in the new AI-triggered economy. The terms, information competencies and information skills, discussed later in the paper, are regarded as similar terms despite the common disagreement in the literature [1], favoring UNESCO use of competencies. The literature

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review was carried out in EBSCO Academic Search, Google Academic, and SpringerLink, looking for publications of the last two years due the rapidly evolving AI field.

AI already impacts several facets of our lives [2] but the two most important ones are the way jobs are being transformed and how it is starting to shape decision-making. AI is defined in popular terms as the capability of a machine to mimic human cognitive functions such as learning and problem solving [3], while machine learning is the ability to learn by a computer system with data and without explicit programming [4].

Human civilization has leapt forward with each technological automation revolution. Each mechanization step has meant the substitution of human labor, such as industrialization, and the mechanization in the nineteenth and twentieth century, and, later, automation of standardized data processing. The standardized data processing using information technology substituted many tasks that were normally done by individuals, but, in the previous century, there were still tasks that could only be done by humans [5]. AI developed slowly since its start in 1956 when it was first mentioned during a conference in Dartmouth College. Early research was led by the United States of America (USA) Defense Department and the British Government and, later in the 1980's, commercial applications were explored [6]. AI was originally focused on single task performance but now with machine learning and access to big data, AI can perform simultaneous tasks to include full processes [7]. AI economic applications have two opposite labor scenarios: (1) it will be just another process of automation; or, (2) human labor risks becoming obsolete and being replaced by AI. The labor impact measurement is still in early stages. However, it is clear to the authors that there will be a disruption in the labor market. AI contributes to simulate human capabilities, so its potential to automate even cognitive tasks is high. This wave of AI innovation may be, according to Barrat, "Our final invention" as cited by Korinek and Stiglitz [4] because machine learning may substitute human control. There are also strong fears of military uses that may be conducive to human self-destruction.

The current technological developments in AI coupled with computer/robotics and communication advancements are changing the way people live not only for those who live in the Internet-connected societies but potentially to even off-line rural or urban periphery communities. The impact on less-skilled societies of developing countries may create a wider cognitive-economic gap. There are key triggering factors in this digital revolution: AI, robotics, and big data. AI and machine learning success are already used in health care and transportation but current developments cover a wide range of areas. An example is the local wholesale store that already sells automated vacuums to clean home floors that seem to complete specific cleaning tasks better than human beings.

2 AI: Labor Opportunities and Challenges

As stated earlier, the potential impact of AI on jobs is enormous. For example smart vehicles may put drivers out of work in the next few years: in the USA alone four million professional drivers may be at risk of losing their jobs [9]. The library profession, at the heart of our concern, is also listed as one that may disappear in the future

according to mass media reports. This is a direct AI consequence of the overall impact of technology, associated with earlier information and communication technology (ICT) development. This is seen in the transformation of paper-based information to digital media, that is, paperbacks to e-books, and the way that people may now carry a full personal library on a Kindle or even on their cell phones. New current technology professions, such as social media managers, are also expected to disappear [5].

There are different opinions of AI labor's high impact. An analysis by Arntz [10] who studied tasks and jobs in OECD economies, suggests that 9% of the actual jobs are potentially automatable. Another review by Frey and Osborne [11] who focused on the implementation of machine learning and mobile robotics suggests that as much as 47% of jobs of the US economy could be replaced by those technologies in a decade or two [5]. Helbing [11] also confirms that in the coming 10 to 20 years around half of today's jobs will be executed by AI and automated robots and about 40% of today's top 500 companies will have vanished. This challenge for university graduates is, in addition to contemporary labor challenges related to employment, such as the increased professional competition market, the shrinking opportunities to choose a job that fits personal preferences, and the high probability of having obsolete professional competences in a short period of time, creates more obstacles than ever before. Therefore, the sum of these factors plus the expected big AI changes in automation will create the need for reskilling, upskilling, and retraining strategies for companies and universities. They will be critical for companies and policy-makers. Such organizations have to identify the proper approach to face the future of work and implement strategies to fuel the economic growth and enhance societal resilience in the evolving technological digital revolution. Individual workers will have to develop, more than ever, life-long learning skills to maximize employment opportunities and remain competent in a labor market that is rapidly changing [12]. The university graduate will soon, if not now, face unanticipated challenges in the labor market due to new deep learning and machine learning technologies [13].

Voice command devices such as Siri, Cortana, Alexa [14] and, soon the announced human-similar voice assistant, Duplex of Google, are already impacting library reference services. Young children at home are now getting used to asking these devices about their school questions. Years before these simple question-answers were handled by humans staffing public library service desks. Most sophisticated beta tested AI technologies harvest apples and other fruits by the thousands in a day with a much higher output than the human picking skills of rural workers [15]. Care robots for the elderly and the sick mainly developed in Japan may be AI breakthrough technologies [16]. The potential military uses are troubling, on the other hand, such as potential killing robots and the already in use drones and self-operated army machines. Google is the most important player in the West for professionals who are in the library and information service sector. With largest and most powerful computer assets with 10 million servers, Google could be labeled the memory processor of the Western world. The numbers of information services that are increasingly becoming intelligent have made this company indispensable for any Internet-enabled individual.

Whatever the future impact of AI on labor, it will certainly affect the new cadre of university graduates who will have to master information and communication technologies (ICT), demonstrate entrepreneurship, develop social skills, and manage semantic technologies to add intelligence to their e-learning environments and ensure lifelong learning [17]. Graduates will have, more than ever, to constantly enhance their lifelong learning skills. The speed of change in the professional landscape is fast and will be faster as AI becomes a triggering element in manufacturing new products and services that will, in turn, demand more cognitive capabilities to humans. A constant learning process where certainly information competencies are a must. The competencies that Graduates need and will need more, due to AI changes are "… the ability to think critically and make balanced judgment about any information" and the skills to find and use information are critical. Information competencies empower individuals "to develop informed views and to fully engage with society" [18]. However, information literacy will have to adapt its learning process to deliver the proper MIL skills enhancement. The core principles of access; evaluation; management; use and communication [18] may be the same in the AI environment, at least in the case of evaluation and use. Search, discovery, and retrieval are being transformed into capability shielding media and information bombardment that individuals are subject to by intelligent algorithms in the most information-developed social groups. Evaluation and use principles will be the key components but will need to be improved to adjust them to the new formats of media and information that are now presented in personalized packages where objective distinction between real, fake, or manipulated information outcomes may be difficult to identify.

2.1 Decision – Making Impact

It is a fact that computers make our lives simpler but there is a privacy price to pay. Big data has always existed but now can be captured, stored, and manipulated with the powerful computing capability of big companies. Coupled with the permanent use of technology that allows machines to analyze data left behind by individuals, big data will potentially increase: it is expected that in ten years there will be "…150 billion networked measured (data) sensors," when probably even our clothing will be connected [18]. This computer power and the potential of mighty AI data analysis raise concern to scientists in regard to the impact on citizens' decision-making. The recent scandal, under government scrutiny, of Cambridge Analytica and its assumed impact on the USA elections is an example of a potential big data and AI to influence electoral decisions. AI capability to subtlety influence and "manipulate" personal actions is mainly through social media where algorithms identify our tastes, preferences, and even signals of our state of mind [19]. The AI automated harvesting systems of Facebook (FB) have marketing goals so that it can provide, like other providers such Google or Amazon, personalized search results, tailored add announcements, [20] and the sale of products and services that are "relevant" to individuals. Other examples of AI algorithms suggestions are those that most of us have experienced, such as FB friends' news, Spotify music choices, airplane flights, Netflix entertainment suggestions, among other applications. Face recognition in FB has also led to personalized product ads that sound relevant to the user. For example, FB posts adds for clothes,

underwear, shoes and other garments to suit users' body types and dressing tastes [21]. This may not sound harmful but in the long run personalized marketing messages may unconsciously influence shopping behavior [22].

AI advancements in big data analysis demand better media and information skills of citizens who have to cope with the pressure, bombardment, and seductive social media input. They have to develop or strengthen their information awareness to gain greater consciousness of the new logarithmic pre-decided information. Otherwise, social media will be sheepherding them as irrational consumers and shallow decision-makers and directing them by their emotions with seductive stimuli of media. However, consciousness is achieved by greater input of quality information – a relative term depending on the individual, where reading and media and information literacy have a crucial role to play. People need to be able to filter, assess and ascertain information that is relevant to them, as well as to be able to search for quality information with the new AI tools to be not only media receivers but also administrators of their information inputs and outputs.

2.2 Information Literacy Opportunities

As digital devices and AI input become the standard day-to-day tools users and education institutions must also monitor potential new information behavior. Interaction with mobile devices seems to be shaping new ways users process information. Studies suggest that frequent use of mobile devices decreases working memory to memorize conceptual information but spatial intelligence is developed to know where to retrieve that information. There are indications that attentional performance of individuals to perform tasks is negatively affected, especially those facing greater cognitive demand, due to the multiplicity of stimuli in media. These stimuli generate emotional gratifications that give the sensation of satisfied needs, which in turn promotes an impulsive use of the devices. Wilmer, Sherman, and Chein [23] state more smartphone usage correlates with more intuitive and less analytic thinking.

Setting media skills aside, information skills relate to academic information. Information channels are also changing, advancing beyond the standard sources of journal articles and book formats. However, the source format is not evolving as fast as social network media. Nevertheless, professionals have to be aware of new ways that information is generated, processed, and distributed in academia-related fields. Academic and scientific information is becoming interlinked with social network features and formats. Some information packing is now produced in mass media formats, such as TED conferences, YouTube videos, blogs like Medium, and Wikipedia. New media formats have become tools for research and learning. These new ways to produce, organize, and store academic information with social media tools are playing a strong role in information dissemination. Along with media-based information there are new publication repositories that capitalize on social media to communication and feed repositories. The best examples are ResearchGate [24], Academia.edu, and Mendeley, illustrating that the standard subject or institutional repositories are something of the past. Several are using AI profiling to harvest, upload, and prompt author' content dispersed in the web space. Graduates have to be aware of such information chain changes to take advantage of them and to be able to evaluate the AI-based system

suggestions for reading, along with pseudo-scientific channels that now pursue authors. The information evaluation skill is therefore as vital as ever for university students and faculty.

As manipulative technologies increase their power, educational institutions more than ever have to focus their learning processes, in general, "…on critical thinking, creativity, inventiveness and entrepreneurship rather than on creating standardized workers (whose tasks, in the future, may be done by robots and computer algorithms)". "…Education should provide an understanding of the responsible and critical use of digital technologies, because individuals must be aware of how the digital world is intertwined with the physical one" [11]. In other words, graduates need to be more cognitively-capable than before. New technologies are changing the way we act and react to information stimuli. Traditional information skills will have to focus more on evaluation than on discovery, search, and retrieval. Evaluation of information and especially media will have to rely more on intuition as the massive stimuli will surround citizens where time for information validation will not be on hand. As stated, people will have to be ready to evade or take the best advantage of "filter bubbles" or the so-called resonance effect of customized information addressed to them by AI-powered systems, where people who think alike gather around and the discordant ones are kept away [25, 26].

2.3 Information Literacy Challenges and Opportunities

The basic role of information and media competencies (or media and information skills) in the development of cognitive skills is crucial as information is a key element to gain knowledge and make better decisions. However, information literacy needs to keep focused, as stated, on increasing information consciousness of graduates, so that they are fully aware of the external stimuli that AI-processed systems may be bringing to their attention. In other words, individuals need to understand how and why an AI-articulated system may be contacting/sending personalized information to him or her. AI systems may not be generating information to solve uncertainty or provide an answer, rather, they may be generating unwanted needs, feelings, or actions. Therefore, people need to be aware that they are subjects of systems that may be inducing addictive actions' behavior. According to Helbing et al. [11] big data, AI, cybernetics, and behavioral economics are shaping our society. If individuals want to benefit from such digital revolution, it has to be a fair and democratic one, so as to give room to human diversity and not endorse a monolithic human grouping. He proposes adherence to ten principles for a fair digital society, most of which implicitly include use of media and information skills, except three: Transparency; social and economic diversity; and interoperability and collaborative opportunities. The Helbing principles offer idealistic but clear orientation as to what MIL needs are addressed at educational institutions, such as higher education, in the increasingly decentralized information systems managed by algorithms (See Fig. 1).

Info-Competencies in Digital Societies		
MIL	**Skills**	Access – Evaluate – Manage – Communicate
	Content	Digital – Print – Spoken word
Digital Society Principles (Helbing, 2017)		• Decentralized information systems • Information self-determination • Information pollution reduction • Enabled user-controlled information filters • Digital assistant and coordination tools creation • Collective Intelligence • Responsible citizen behavior through digital literacy

Fig. 1. Information competencies - digital society principles (Sources: Helbing et al. [11]; CILIP [18]).

Helbing's ideal principles need to be part of the MIL philosophical framework and strategies, even at the general learning processes followed by universities (See Fig. 1). Students have to be aware of the increased and powerful centralization of information systems that dominate almost worldwide. Any MIL learning program has to support "informational self-determination and participation", and make users aware that AI "… can use algorithms to analyze online data to predict and influence human behavior in a way that eludes the user' awareness of such influence" [19, 27]. The AI influence realized in a target group can be propagated by users themselves through the interaction with other users, especially those messages that have assigned emotional values [28]. Graduates have to be promoters of information systems transparency in the way that they operate and influence audiences. Likewise, they need to promote reduction of "the distortion and pollution of information" where AI business interest could contribute up to $15.7 trillion to the global economy in 2030, and where a staggering $9.1 trillion is likely to come from consumption side effects [29]. In other words, individuals have to have the MIL capability to avoid being just a customer-buying target and instead, need to be enabled to control information AI filters. Social networking services usually use a clickwrap button in their terms and conditions section, that avoids content that may seem unimportant but that contains policies that should be known by the user [30]. Ideally, the use of clickwraps could fulfill a political economic function that suggests the success of the integration of capitalist production methods with social network services, with the capacity to manufacture consent [31]. Social networking sites probably play a socializing role by transmitting to users a reality where personal data are freely exchanged and self-disclosure is highly common, a trend that MIL learning should include. Sharing personal information and seeing how other users share their own information cultivates the perception of privacy in such a way that users may be less concerned about privacy risks and pay less attention to privacy safeguards [32]. Additionally, the need "to support social and economic diversity" is crucial for the

betterment of society, especially in the creation of a "collective intelligence." Finally, the last Helbing principle of promoting "responsible behavior of citizens in the digital world through digital literacy and enlightenment" is at the heart of MIL goals to help citizens become socially responsible of media and information use.

3 Conclusion

The advent of AI-powered systems is increasingly affecting the way we take decisions and the future of employment, where jobs may be scarce for human beings, including graduates. AI will potentially automate most jobs in thirty years and probably fewer new ones will be created. Universities will have to train and re-train graduates to develop high cognitive competencies according to the new AI job demand. The most effective way is for students to learn how to be effective thinkers, where quality information input is at the core. An informed individual has greater consciousness of himself and the external world, in other words, an informed person also has greater awareness. Universities have the challenge and the opportunity to train and re-train the new cadre of professionals in the development of higher cognitive skills. Among these skills are media and information competencies–the knowledge capability required to take any cognitive action–that enables them to compete in the job arena [12]. Educational systems ought to educate current and future graduates to be fully capable of information management, taking into account the information competencies of access, evaluation, management, and communication of information [18]. This can be accomplished under the philosophical umbrella of the Helbing principles, so that graduates can cope with the global centralized information systems; gain "self-determination and participation" in a digital society; promote transparency improvement to achieve greater social trust; are aware of the "distortion and pollution of information;" have the power to control AI information systems' filters; support social and economic diversity; take advantage of the interoperability and collaborative opportunities that systems provide; "support collective intelligence," and finally promote "responsible behavior of citizens in the digital world through digital literacy and enlightenment" [11].

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Author Index