Digital Literacy as a Prerequisite for Achieving Good Academic Performance

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Abstract. The paper presents results from the research of students at the Faculty of Humanities and Social Science in Zagreb, Croatia about their perceptions and views on digital literacy. The results indicate that students recognize and relate the concept of digital literacy with a number of ICT supported activities in which they are involved on a daily basis at the university. Furthermore, the research showed that there is a connection between use of ICT and academic performance of the students in research. The students also exhibited a need for expansion of their current knowledge in a number of ICT related areas among which are many related to the content creation for the internet and multimedia. The research results will serve as an important component in the development of new or expanded university courses that include the use of ICT in any form.

Keywords: Digital literacy, digital technology, academic community, Croatia.

1 Introduction

Modern networked participatory society presents many challenges for its citizens demanding from them a good command of digital literacy related skills and the knowledge necessary for solving problems in their professional and private life. This society is "characterized by the extreme ease of access to information thanks to sophisticated discovery tools, and the abundance of digital content increasingly available online. Oftentimes content is produced by not just a single author but by many collaborating authors, with often open and free access to all types of information in the form of publications, institutional repositories, museums, archives, and art galleries." [1]. In order to avoid exclusion from the networked participatory society, citizens have to start with the acquisition of digital literacy related skills and knowledge very early in their lives and continue their education throughout their life. This is not an easy task because of the inaccessibility of ICT and the internet which is necessary for education in digital literacy. According to the International Telecommunication Union – ITU, only 40% of the global population is online [2] and digital natives make only 5% of the world population and 30% of young people (15-24 years old) [3]. These data evidence the existence of the digital divide that makes

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many digital literacy related educational efforts very difficult. In spite of these unfavorable numbers, educational institutions around the world continue providing education in digital literacy especially in primary and secondary education institutions. Higher education institutions are no exception, as they prepare adult students for the labor market which demands highly skilled and well educated professionals, proficient in the use of ICT and able to manage information and knowledge [1]. Croatia is no exception as its higher education institutions offer digital technology oriented study programs which include mastering digital literacy related skills and knowledge. Many students who come to universities are already technology savvy, they "… chat about burning CDs, downloading MP3s, and writing in HTML" [4, p. 207]. These skills are further expanded during their education at universities by the participation of students "in new media environments and digital modes of learning" [5, p 248]. Having in mind these conditions, this paper focuses upon students at the Faculty of Humanities and Social Sciences in Zagreb (FHSS), Croatia, and their perceptions and views of selected aspects of digital literacy as they represent a prospective workforce that will shape the future society.

2 Digital Literacy

Digital literacy is generally defined as the ability to use ICT to find, evaluate, create, and communicate information, requiring both cognitive and technical skills [6]. This definition assumes possession of a wide range of technological, cognitive and social competences including "the ability to operate computers and navigate the net effectively, to cope with large volumes of information, to evaluate the reliability of information, and to critically assess what seem to be natural (and not ideologically biased) technological tools" [7, p 1]. Bawden [8] sees digital literacy as an ability to read and understand hypertextual and multimedia texts. According to Špiranec [9] digital literacy is "…the ability to read and understand hypertext or multimedia texts and includes understanding of images, sounds and text of the dynamic non-sequential hypertext". In some countries, the word ICT is added to the concept of digital literacy resulting in digital ICT literacy: it is "the ability of individuals to use ICT appropriately to access, manage, integrate and evaluate information, develop new understandings, and communicate with others in order to participate effectively in society" [10. p. xiii]. Digital literacy definitions are not always explicitly related to ICT. One such definition is proposed by Littlejohn, Beetham and McGill who suggest that digital literacy [11, p. 547] "…means the capabilities required to thrive in and beyond education, in an age when digital forms of information and communication predominate". In addition to the possession of the wide range of technological, cognitive and social competences, digital literacy also assumes a wide range of communication forms, "from relatively simple communication via email or instant messaging to more complex forms of scholarship that involve sourcing using, evaluating, analysing, aggregating, recombining, creating and releasing knowledge online"[11, p. 547]. Digital literacy includes a number of skills attributed both to teachers and students including the ability to:

1. carry out basic computer-based operations and access resources for everyday use,
2. connect together a functional computer system,

3. read manuals to conduct basic technical activities or for troubleshooting,
4. use search engines to retrieve responses in the form of text, images and videos that will assist with solving the problem,
5. regularly update of anti-virus software,
6. use educational software [12, pp. 26-27].

Ng suggested the existence of a basic level of skills related to digital literacy [12] which would also presume the existence of the advanced level of such skills, which is researched less frequently. The same author [13, p. 1068] offered another view of digital literacy as a three dimensional model:

1. "Technical dimension: possessing the technical and operational skills to use ICT for learning and in everyday activities;
2. Cognitive dimension: the ability to think critically in the search, evaluate and create cycle of handling digital information, and
3. Social-economic dimension: being able to use the Internet responsibly for communicating, socializing and learning".

In the center of the model where all three dimensions intersect, Ng puts digital literacy and summarizes it as carrying out basic computer-based operations to access resources for everyday use; searching, identifying and assessing information effectively for the purposes of research and content learning; and solving problems or creating products that best demonstrate new understandings.

All these approaches to digital literacy focus on the most commonly recognized aspects of the use of digital technology necessary for inclusion of citizens in the networked participatory society and confirm that digital literacy has become "a keystone for civic engagement, educational success, and economic growth and innovation" [14, p. 38].

3 Research

The focus of this research is on students as they represent a specific group of citizens exposed intensively and frequently to ICT in their daily activities. Previous researches showed that students at the FHSS use ICT (and digital scientific information resources) on a daily basis in their learning process [15-16]. However, there is no recent research about digital literacy as a separate topic and that was the motive for initiation of this research. The purpose of the research was to get an insight into selected aspects of the digital literacy of students at the FHSS. The objective of this study was to collect data about their understanding of the term of digital literacy and its application and influence in important segments of the students everyday ICT related activities. An online (Web) survey with 15 closed questions was chosen as the research method. While this method has its shortcomings, it is a legitimate and practical method for collecting data from a large number of research participants. The research was initiated on June 9th 2014 by sending an e-mail invitation to the students' mailing list and by sending an e-mail invitation to the freshmen enrolled in the ICT course in the first year of the undergraduate study. Since membership in the mailing

list is no longer mandatory for all students at the FHSS, the total number of respondents was limited. The online survey was closed on June 23rd 2014 with the total of 112 students who participated in the research. Because of the space restrictions, only partial results will be presented in the next part of the paper.

4 Results and Discussion

In **Question 1**, students were asked to indicate their year and type of the study. The total of 112 respondents participated in the research: 19 (19.96%) from the first year of the undergraduate study, 2 (1.78%) from the second year of the undergraduate study, 12 (10.71%) from the third year of the undergraduate study, 2 (1.78%) from the fourth year of the undergraduate study, 29 (25.1%) from the first year of the graduate study and 48 (42.85%) from the second year of the graduate study. The distribution of students in this survey was determined by their membership in the students' mailing list. On the list, there are (generally speaking) more students of the graduate study than students of the undergraduate study.

Question 2. Which of the following activities do you relate to the concept of digital literacy? (N=111)

Table 1. Activities student relate to the concept of digital literacy

Activities	*N*
Editing photos	92
Editing audio files	82
Editing video files	78
Writing text (by using (citing) other information resources)	71
Creating computer animations	66
Broadcasting of video over computer network	66
Broadcasting of audio over computer network	64
Creating computer illustrations	62
Creating computer simulations	56
Creating technical plans	45
Writing text (without using other information resources)	36

The results in this question suggest that students connect the concept of digital literacy most frequently with creation of multimedia and editing of different types of digital content as well as with writing text by including (citing / using) other information resources. These activities might be more interesting to them (as part of their curricular requirements) as they pursue them more often (as part of their curricular and extracurricular requirements) than less frequently chosen activities by the same group of students in this research.

Question 3. Please, rate your knowledge in doing the following activities (1=without knowledge, 5=excellent knowledge)

This question offered a large number of options related to the possession of knowledge necessary for participation in ICT related activities. The best rated ICT related activities are: managing e-mail and SMS, searching the internet, file download and watching video on the internet. All these activities are related to the frequent use of the internet (and smartphones). Most poorly rated knowledge areas are use of online simulations, creating Web pages, creating quizzes, creating online surveys etc. Some of these activities in the group with the lower ratings might be very important for students and their learning process and they should be given more attention because they provide direct support to education.

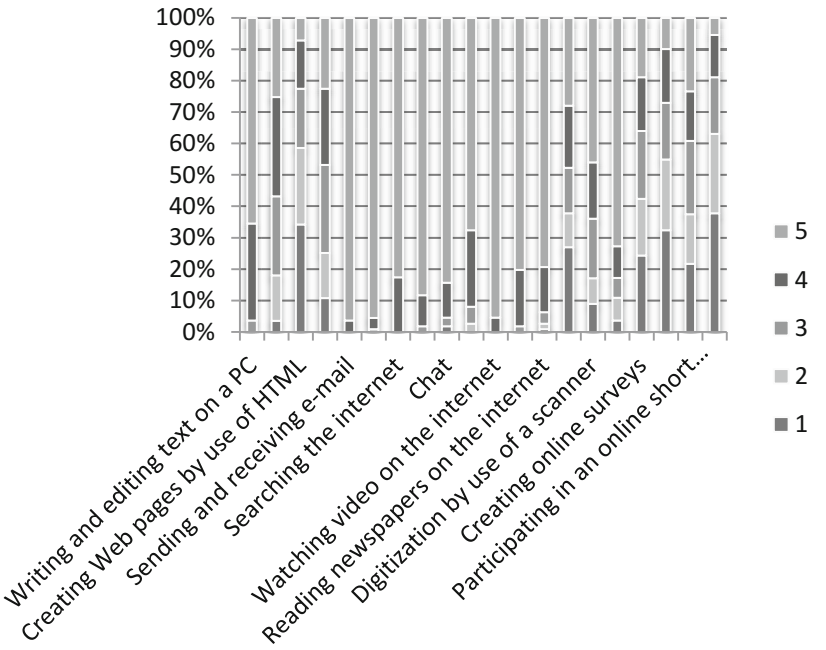

Fig. 1. Knowledge of students about selected activities

Question 4. Which of the following areas of knowledge would you like to expand? (multiple answers) (N=111).

For this question the list of answers was further expanded to include even more ICT related activities students would like to master. On the basis of students' preferences, the best rated areas of knowledge were: Web development and multimedia. Traditional computer related activities such as advanced text editing and use of spreadsheet software were positioned much lower on the list of the preferred knowledge areas for expansion. These results suggest a distinct orientation by students towards the more efficient use of the Web and towards creation or development of multimedia content while other areas with lower rank could be considered as mastered (use of e-mail, use of online social networks, file sharing on the internet, creating presentations, use of spreadsheet etc.).

Table 2. Areas of knowledge students would like to expand

Areas of knowledge for expansion	*N*
Creating Web pages	86
Digital photography editing	68
Creating animation for Web pages	66
Video editing	65
Simple Web applications development	61
Development and management of databases	60
Digital photography	54
Audio editing	52
Advanced text editing	48
Complex Web applications development	44
Preparation of digital content for publishing (on the internet or in print)	43
Use of spreadsheet	40
ICT supported foreign language learning	38
Online survey development	31
Online courses development	29
Mind map development	25
Use of videoconference systems	20
Files sharing on the internet	19
Creating presentations	16
Use of online social networks	11
Use of teleconferencing systems	10
Use of e-mail	7

Question 5. What type of education for use of ICT have you had so far? (multiple answers)(N=111)

Table 3. Types of education for use of ICT students have had so far

Types of ICT education	*N*
Self learning	100
University course	84
Short course taken before university enrollment	16
Short course outside the university	12
Some other form of education	10
Workshop organized by the university	9
Workshop organized outside the university	4
Short course organized by the university	2

According to the results in the table 3, students learned how to use ICT mostly by themselves and by attending the university courses. Other types of education are less present in the results. Self-learning is a popular type of education because students can determine their own learning pace, the quantity of learning material and the overall investment of time and effort in this type of learning. In Croatia, almost all universities offer courses that include topics related to ICT. In addition, organizations such as the University Computing Center (http://www.srce.hr) offer short courses to

members of the Croatian academic community. The number of self-learning students in this research implies that students evidently have a need for acquisition of new knowledge and that there are either some problems related to availability of other types of education to students, or problems with the quality of the existing education – which as a consequence, lead the students to decide to learn how to use ICT on their own. Self-learning enables students to set the learning pace, to pause or stop learning or to speed it up when necessary. The internet also helped in the distribution of educational material thus facilitating its use.

Question 6. Please, rate the influence of ICT on the following segments of your life (1=without influence, 5=very strong influence).

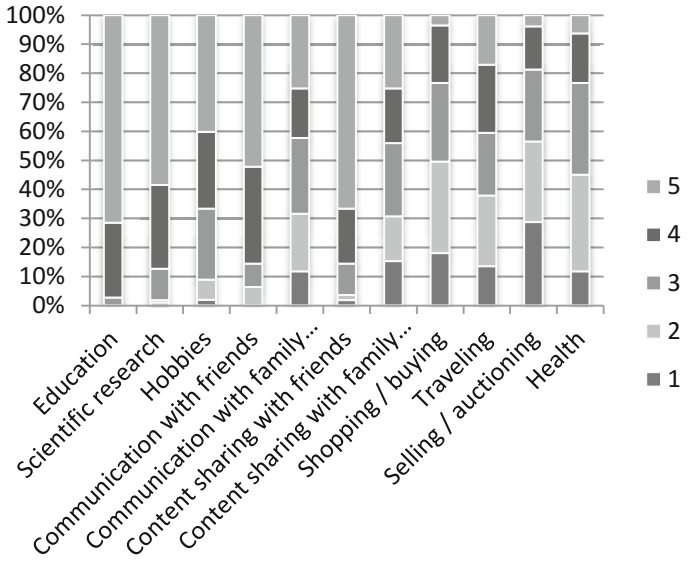

Fig. 2. The influence of ICT on the following segments of student's life

The results indicate that ICT has the strongest influence on those activities that are related to the respondents' daily activities namely education at the university. Other popular activities were scientific research, content sharing and communication with friends, while segments such as health and buying and selling are least influenced. These results were expected since students are occupied mostly with their daily educational routine while internet commerce is still not frequently used by students.

Question 7. Please, rate the influence of ICT on your academic performance (1= without influence, 5=very strong influence).

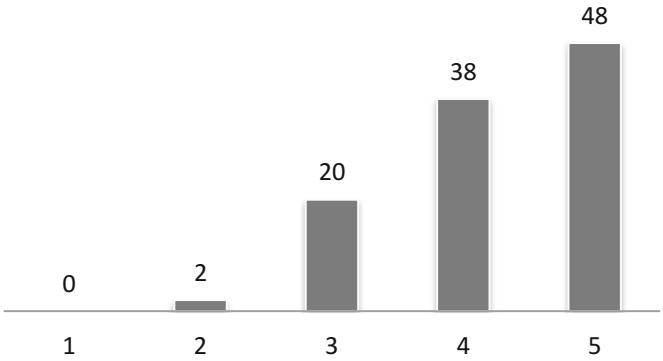

Fig. 3. Influence of ICT on students' academic performance

In this question the respondents were given an opportunity to rate the influence of ICT on their academic performance. The ratings suggest that the students who participated in this research are aware of the increasing influence of ICT on their academic performance. Since ICT is playing a more important role in the lives of the students, it was expected that the students will in the future continue to grade highly this type of influence on their most important activity – education.

Question 8. In your opinion, who is responsible for the development of digital literacy of an individual? (multiple answers).

The respondents gave the following answers (number of the respondents is given in the parentheses): individual himself / herself (96), high school (95), university (83), elementary school (81), Croatian academic and research network (39), family (35), professional societies offering short courses (33) and nonprofit organizations (33). That individuals consider the development of digital literacy as their own responsibility might indicate that the respondents are not satisfied with the current educational programs available to them, or that they can't find adequate existing educational activities that would help them improve their digital literacy related skills. While self-learning is widely present in the internet era, this result might also indicate that the educational institutions are no longer central to education in digital literacy skills for these students. It is also interesting to see that the elementary school is rated lower than the high school and the university for education in digital literacy, because it is often said that ICT skills should be taught as early as possible to prepare individuals for further education and later on for the labor market. Other options are given less priority in the results.

Questions 8. and 9. In your opinion, what influence will digital literacy have on quality of life (in general) and quality of education of an individual (in general)? (1=without influence, 5=very strong influence).

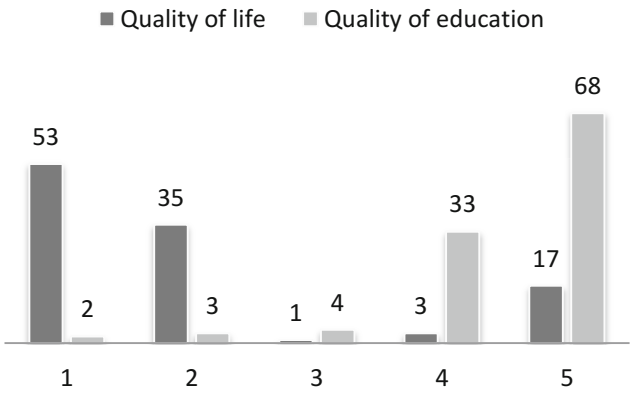

Fig. 4. Influence of digital literacy on quality of life and quality of education (in general)

The results in these two questions indicate existence of a contrast in opinions among the students about the influence of digital literacy on quality of life and quality of education (in general). It is possible that students haven't perceived the importance of digital literacy on one's life as strongly as on the quality of their education. Results like these are possible because the respondents personally experienced the influence of digital literacy on their own education and have first-hand experience at the university and most of them still haven't experienced such an influence in their lives outside the university so they don't yet attribute such an importance to digital literacy.

5 Conclusion

Digital literacy has become very important for the development of different segments of the networked society especially for the inclusion of citizens into the social and cultural activities supported by digital technology. This inclusion helps citizens to become co-creators of their new participatory culture and not just passive consumers of culture created by others. This is especially true for younger generations who are intensively involved in the use of digital technology. One such group of citizens is the student population which is deeply involved in the use of digital technology. In the research conducted at the FHSS students demonstrated their deep understanding of the importance of digital literacy which influences their lives, education, research, communication with friends considerably. They were also very confident about their knowledge of the use of ICT. The results indicate their orientation towards self-learning as an addition to the university courses they attend during the academic year. They selected areas of knowledge that (in their opinion) require further expansion, and by doing this they demonstrated maturity in thinking about their future and have reacted faster than the official bodies at the university in charge of development of study programs. Finally, they were very certain about the importance and influence of ICT on their academic performance. All these results are good indicators of the current state of perception of digital literacy in education and thus serve as inputs for the development of new university courses. As these students will be entering the labor market, their skills and knowledge will become more important for them in order to avoid exclusion from the networked participatory society.

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