Digital Literacy of Students at the Faculty of Humanities and Social Sciences Zagreb: An Empirical Study

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Abstract – **The paper presents the results from the empirical research study of students at the Faculty of Humanities and Social Sciences, Zagreb, Croatia (FHSS) about their perception of digital literacy, one of key literacies in the 21st century essential for employment and participation in digital society. The results indicate that the students were acquainted with the term digital literacy for the first time early in their education. Now when they are part of the higher education system, the students recognized the most valuable characteristics, activities, skills, and competencies related to digital literacy. They also indicated the preferred ways of acquisition of new knowledge about digital literacy. Finally, the respondents highly rated the value of digital literacy for their success in the study, employment, and life in digital society.**

Keywords – digital literacy, students, higher education, empoloyment, digital society

I. INTRODUCTION

As future employees in different industries, students like being prepared and like being equipped with knowledge and skills appropriate for the employment within the framework of the Industry 4.0 and beyond. "The exponentially increasing proliferation of new digital technologies has steered the individuals of the digital society to consume more digital content, reproduce it, create new content, share it and provide a critique of it when needed" [1]. Today students in Croatia aim to acquire knowledge and skills that will secure them employment amid rapid emergence and deployment of new technologies necessary both in professional and personal life.

Demonstrating the knowledge and skills of mastering digital tools and services has become a priority in modern developed societies for every individual. The digitalization of services in every area of life has rendered the ability to use digital tools an important skill and keeping oneself updated in the world of digital tools and services has become a priority [2], especially for young people like students entering local and global labor market.

The pandemic of the virus SARS-CoV-2 and the time after the pandemic, demonstrated a need for digitally literate individuals ready to start teaching, learning, and working online immediately, almost without any additional education or training. The current general situation in the world seeks education from individuals different from that of the previous century [3]. Therefore, digital literacy has been given a high priority in education.

In the last two years, the emphasis of scientists and professionals working in the field of education was on many different types of literacies, including digital literacy. During that period, digital literacy has evolved in parallel with rapid technological advancements, so it has become necessary in academic life to prepare students for long-term learning [4]. But, possessing the digital literacy knowledge and skills or merely "knowing" is not enough. Today's education demands focusing on the development of additional skills like soft skills, communication, creative thinking, and adaptability [5]. Still, the focus of this paper will remain only on digital literacy.

II. DIGITAL LITERACY

Digital literacy is one of many literacies and is considered being a part of the umbrella term - information literacy. There is no general consensus on what exactly constitutes the term digital literacy, however, many definitions of that term are available. One of the first definitions of digital literacy originates to Gilster [6]: "the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers". Audrin and Audrin [7] did a systematic literature review on digital literacy definitions and aspects of definitions and found out plentitude of approaches suggesting the development of notions about digital literacy since 1997. Tinmaz, Fanea-Ivanovici and Baber [8] also did a systematic review on digital literacy and one of their conclusions is that digital literacy is an umbrella term for many different technologies seeking case studies which would explore different implementations of this term.

Digital literacy is seen as "a technical skill to operate digital devices, such as computers, smartphones, smartboards, projectors, social media and website or blog design" [9]. Other authors like Kesici [2] suggests that digital literacy is not only an ability to use digital tools and services, but it also includes high-order thinking skills such as analysis, synthesis evaluation, and critical and creative thinking. For other authors, digital literacy is not related exclusively to use of ICT per se. Martin [10] interpreted digital literacy as "the ability to succeed in encounters with the electronic infrastructures and tools that make possible the world of the twenty-first century". Digital literacy "provides an individual with core capabilities to achieve

valued outputs in life. It is a critical enabler of economic transformation as it promotes employment opportunities through the ability to access digital content and online services" [11]. "Young people are encouraged to use the internet, because they are told that digital skills are crucial in order to be successful in the information society" [12]. According to the American Library Association [13], digital literacy is "the ability to use ICT to find, evaluate, create, and communicate information, requiring both cognitive and technical skills". Generally speaking, digital literacy is "about being able to operate in the digital world in its widest sense and this embraces a range of skills that are needed for life" [14]. Another view of digital literacy is content oriented. Heitin [15] suggested that digital literacy "also refers to content creation. That includes writing in digital formats such as email, blogs, and Tweets, as well as creating other forms of media, such as videos and podcasts".

Jones introduced and explained another related term - critical digital literacy - literacy is not solely about how you think but and what you do after reading and writing online (and 'critiquing' what we read) and that your actions are part of wider societal actions and rooted in communities and that it depends on people and contexts [16].

Some of the skills covered by the term digital literacy include: internet search, hypertextual navigation, content evaluation, assembling knowledge, creating content, organising and sharing content, reusing content, filtering and selecting material and self-broadcasting in social networks [8]. Furthermore, digital literacy includes using ICT, processing information, and engaging with media and they all are related to general literacy and numeracy, social and emotional skills, critical thinking, complex problem solving, and the ability to collaborate [17]. International Telecommunication Union [18] in its document "Digital insights 2021" differentiate between three levels of digital skills - basic, intermediate and advanced; "Basic skills refer to foundational skills for performing basic tasks and cover hardware, software and basic online operations. Intermediate skills refer to skills that enable the use of technologies in more meaningful and beneficial ways. They include skills required to perform work-related functions and they expand to account for changes in technology. Advanced digital skills are needed by specialists in ICT professions such as computer programming and network management. They include: skills related to emerging technologies, such as artificial intelligence, big data, cybersecurity, the Internet of Things (and app development), and are acquired through advanced formal education". According to Pavey [14] digital literacy incorporates media literacy; communications and collaboration; career and identity management; ICT literacy; learning skills; digital scholarship; information literacy.

Digital literacy competencies include using, understanding, accessing, managing, collecting, coordinating, estimating, providing information, and evaluating information from ICT-based sources [8].

Digital literacy is also related to digital inquiry in digital environment: connecting ideas to personal interests and a desire to know, asking questions that probe beyond simple fact gathering, investigating answers from multiple perspectives, constructing new understandings, expressing the new ideas through a variety of formats, and reflecting on both the process and product of learning [19].

TABLE 1. CHARACTERISTICS OF DIGITAL ENVIRONMENT [19]

Opportunities	Challenges
Amount of Information	
Information available on practically anything that students want to know Multiple formats and languages Levels from novice to expert	Too much information pressures students toward passive acceptance of whatever they find to avoid an unending search Information accepted if found quickly and easily; little in-depth probing
Organization of Information	
Participatory organization (tagging and organizing text for own personal and academic use) Natural language searching Platform of tagging provided by others	Lack of sequence and hierarchy in information (order has nothing to do with time, place, or even synchrony with researcher's main idea) All information presented with equal importance
Type of Information	
Diverse formats (visual, oral, graphic, video, audio) Diverse types, from personal opinion to research	Specific information with little or no contextualization Lack of general overview information
Access to Information	
Multi-tasking Consolidation of devices—one-stop information access	Pressure for speed Widening digital divide Environment favors access over reflection
Interactive Environment	
Collaboration and shared learning Deepened learning through social interchange of ideas High engagement and participation by all, even the shy or reluctant	Individual voice is lost in group dynamic Ability of individuals to post and publish leading to assumption of authority ("If I said it and it's on the Web, then I must be an expert.")

III. RESEARCH

During their education at the Faculty of Humanities and Social Sciences, University of Zagreb (FHSS), the students are educated about ICT as they enroll specific undergraduate or graduate courses. The purpose of the research study in this paper was to get an insight into perceptions about digital literacy by the students at the FHSS. The goals of the research study were: 1.) establishing the most important characteristics and aspects

of digital literacy recognized by the students at the FHSS and 2.) establishing importance of digital literacy for success in their studying, employment, and life. The basic presumptions (hypotheses) were: 1.) students of the recent generations at the FHSS are almost fully aware of the term of digital literacy and its characteristics and aspects; 2.) surrounded by ICT, they are aware that mastering digital literacy has become essential for the success in their studying, employment, and life. A self-administered online questionnaire consisting of 12 closed type questions was implemented using as research tool. The online questionnaire was available from January 13th till January 27th 2023. An invitation to participate in the research was sent on two occasions to the students' mailing list. The total of 105 students participated in this research study. The limitations of the study are that it includes only students at the FHSS who actively participated in the research study and, based on that fact, the results of the research study cannot be generalized on the whole population of the students at the FHSS (more than 7000 students). However, the findings provide an important understanding of digital literacy by the participants in the research study. It should be noted that the questions in the questionnaire did not include gender or year of study because the sample of the research was not stratified and did not include the specific number of students (participants) according to each year of study. Instead, the call for participation aimed at inviting as many students from the FHSS as possible. During an academic year, the students at the FHSS are invited to participate in many research studies and therefore are possibly becoming reluctant to participate in another new research on any topic. For that reason, this research study used non probabilistic convenience sample.

IV. FINDINGS

The following part of the paper presents the results of the empirical research study of the students at the FHSS.

Q1. In what phase of your education did you encounter the term digital literacy for the first time? (N=105)

TABLE 2. ENCOUNTERING THE TERM DIGITAL LITERACY FOR THE FIRST TIME

	N	%
High School	30	28,6
Elementary school	31	29,5
University	28	26,7
Not sure	16	15,2

The answers to the first question indicate that almost two thirds of the students participating in this research encountered the term digital literacy as early as elementary or high school, before they enrolled the FHSS, and approximately one third encountered the term as late as university. The earlier they had encountered the term digital literacy the better insight into it they got. Simultaneously they acquired necessary knowledge and skills as society has become more intensively digital over the last two decades influencing lives of the respondents on many levels.

Q2. Which of the following characteristics do you relate to the term digital literacy? (multiple answers possible) (N=105)

TABLE 3. DIGITAL LITERACY CHARACTERISTICS

	N	%
Management of content in digital environment	87	82,9
Analysis of content in digital environment	84	80
Awareness about content in digital environment	82	78,1
Access to content in digital environment	80	76,2
Identification of content in digital environment	76	72,4
Evaluation of content in digital environment	65	61,9
Synthesis of content in digital environment	50	47,6
Creation of new knowledge	50	47,6
Communication of knowledge to other people	46	43,8
Integration of content in digital environment	35	33,3

The question 2 focused on the list of relevant characteristics of digital literacy found in the selection of literature in the references of this paper. Management, analysis, and awareness (all content related) are the top three choices of the respondents. The students' choice of answers gives us an insight into their view on relevance of the characteristics of digital literacy in the table 3. Their choices have been possibly influenced by the study programs at the FHSS focusing increasingly on the content in digital environment for daily student activities. One of the limitations of the online self-administered questionnaire was inability of researcher to ask additional questions about reasons for making choices like these.

Q3. Which of the following activities do you relate to the term digital literacy? (multiple answers possible) (N=105)

TABLE 4. DIGITAL LITERACY RELATED ACTIVITIES

	N	%
Use of electronic devices	91	86,7
Browsing and searching information on the internet	85	81
Collaboration in online environment	83	79
Presentation creation	82	78,1
Selection of data and information	80	76,2
Text editing	79	75,2
Understanding of personal security online	78	74,3
Fake news detection / recognition	74	70,5
Interpretation of information and digital content	74	70,5
Critical thinking when processing information	72	68,6
Interaction by use digital technology	71	67,6
Uploading of information and digital content on the internet	69	65,7
Sharing of content by used of digital technology	65	61,9
Information storage on digital medium	65	61,9
Selection of software for a task	63	60

	N	%
Understanding of a device security	62	59
Information processing and management	62	59
Understanding of role of ICT in society	61	58,1
Data management	60	57,1
Creation and use of databases	56	53,3
Ethics in use of ICT	56	53,3
Data evaluation	52	49,5
Technical problem solving	53	50,5
Creation and use of spreadsheets	50	47,6
Backup creation and storing it on different locations	51	48,6
Communication with other people by use of Web 2.0 tools	49	46,7
Creation and editing of sound	48	45,7
Creation and editing of video	48	45,7
Visualizing content in software	43	41
Web page creation	42	40
Collaboration with other people by use of Web 2.0 tools	41	39
Programming	29	27,6

This question offered a long list of activities related to digital literacy and use of ICT in general. Use of electronic devices, browsing and searching information and collaboration online are at the top of the list based on the number of answers given by the respondents while once popular Web 2.0 tools, Web page creation and even programming are at the very bottom of the list. Judging from the results, Web 2.0 tools are no longer attractive i.e. the respondents are willing to communicate and collaborate with other people but are not bound to Web 2.0 tools for doing so. Web 2.0 is now an old paradigm and seems started becoming unattractive to the current generations of students. Nevertheless, the respondents highly valued collaboration in online environment which, in many cases, still presume use of Web 2.0 related software. The answers in the table 4 suggest that the respondents chose more frequently more content oriented answers and less frequently technology oriented answers.

Q4. Which of the following skills do you relate to the term digital literacy? (multiple answers possible) (N=105)

TABLE 5 DIGITAL LITERACY RELATED SKILLS

	N	%
Independent research	83	79
Being acquainted with terms related to ICT and popular digital platforms	82	78,1
Adoption of new technologies	73	69,5
Collaboration in digital environment	71	67,6
Creation of multimedia for presentation on the internet	63	60
Explaining technology to other people	51	48,6

In this question the students were asked about skills related to digital literacy they recognized. They chose independent research as the most highly valued skill related to digital literacy. The students at the FHSS spend a significant amount of time during the day doing research supported by the ever-growing number digital information resources. The FHSS belongs to the scientific area of social sciences and humanities, so it is rather surprising to see the students' strong orientation towards knowledge related to ICT and popular digital platforms and adoption of new technologies instead of collaboration in digital environment which is immanent to younger generations of students at non-technical faculties. Collaboration at the workplace in the digital environment between employers and employees and between employees themselves is one of the prerequisites of the modern age. Being acquainted with the terms related to ICT and popular digital platforms and adoption of new technologies are also important skills because of the rapid changes of ICT suggesting that the students wish to be up to date with the latest developments.

Q5. Which of the following competencies do you relate to the term digital literacy? (multiple answers possible) (N=105)

TABLE 6. DIGITAL LITERACY RELATED COMPETENCIES

	N	%
Acquisition of new knowledge about existing ICT	88	83,8
Reading and understanding of multimedia and hypermedia	80	76,2
Connecting information	78	74,3
Appropriate communication in online environment	78	74,3
Finding and critical thinking about information	75	71,4
Reading of visual symbols	60	57,1
Personal ideas management in online environment	57	54,3
Collaborative work to communicate information	47	44,8
Synthetic thinking – creating new combinations out of existing information	44	41,9
Management of teams by use of ICT	37	35,2

This question aimed at finding out about competencies related to the term digital literacy. While there is no surprise in seeing acquisition of new knowledge at the top of the list of answers, it is surprising to see collaborative work, reading of visual symbols and management of teams positioned lower on the list of the chosen answers, compared to answers in questions 3 and 4. All these lower ranked activities have become dominant during the pandemic of the virus SARS-CoV-2, for practical reasons.

Q6. In what ways do you supplement your knowledge about digital literacy? (multiple answers possible) (N=104)

TABLE 7. SUPPLEMENTING KNOWLEDGE ABOUT DIGITAL LITERACY

	N	%
Independent learning by use of different information resources	94	90,4
At the FHSS	56	53,8
By reading literature on a specific topic	34	32,7

Webinars on the internet	19	18,3
Lectures (non-study related) at the FHSS	8	7,7
Lectures (non-study related) outside the FHSS	7	6,7

Independent research is one of the most important students' activities at universities in general. The internet has only expanded the capacities for this activity by offering different digital information resources and tools available to the students at the FHSS. Independent research as a form of supplementing knowledge about digital literacy is followed by reading literature and by participating in Webinars. The latter have become popular during the time of the SARS-CoV-2 virus pandemic and are still popular. Other type of lectures at the FHSS and outside of it are less represented in the results being less attractive to the students.

Q7. Which of the following answers describe important aspects of digital literacy? (1=least important; 5=most important) (N=105)

TABLE 8. RATING IMPORTANT ASPECTS OF DIGITAL LITERACY

	1	2	3	4	5
Selecting a technology	4	9	45	41	6
Searching information on the internet	2	4	10	34	55
Evaluation and selection of information resources on the internet	0	1	10	29	65
Use of a digital technology	3	4	23	47	28
Behavior while using a technology	0	2	17	44	37

In this question the students were asked to rate aspects of digital literacy from the least important to the most important. Evaluation and selection of information accompanied by searching information on the internet were chosen as having the most significant impact on the respondents. These results are similar to those in questions 3 and 6 in which browsing and searching information on the internet and independent learning by use of different information resources were highly rated by the respondents. Three other aspects related to technology in general were also important to the students but were also rated a bit lower in comparison to use of information resources. Still, the technology (understanding of it and use of it) is important to the students, which was confirmed in questions 3, 4 and 5.

Q8. According to your estimation, which of the two ways of acquisition of knowledge do you think is better for acquisition of knowledge and skills about digital literacy? (N=105)

TABLE 9. QUALITY OF WAYS OF ACQUISITION OF KNOWLEDGE AND SKILLS RELATED TO DIGITAL LITERACY

	N	%
Independent way of learning (apart from lectures at the FHSS)	53	50,5
Formal way of learning (as a part of lectures at the FHSS)	52	49,5

Quality of independent learning and formal learning were represented almost identically in this question, while in question 6 independent learning as form of supplementing knowledge about digital literacy gained significantly greater popularity among the students in this research. One could ask, if the quality of both independent learning and formal learning was almost equal, why is independent learning so much more popular for the students and what are the shortcomings of formal learning?

Q9. Rate the importance of digital literacy for success at the FHSS (1=not important at all; 5= most important). (N=105)

TABLE 10. RATING IMPORTANCE OF DIGITAL LITERACY FOR SUCCESS AT THE FACULTY

	1	2	3	4	5
N	0	3	15	35	52
%	0	3	14	33	50

The students (half of them) participating in this research rated digital literacy most highly for achieving success at the FHSS and four fifths of the students ranked digital literacy highly (4 and 5 on the scale), which is very significant.

Q10. Rate your own level of knowledge and skills of digital literacy (1=no knowledge about digital literacy at all;5=extensive knowledge about digital literacy at all). (N=105)

TABLE 11. RATING LEVEL OF KNOWLEDGE AND SKILLS OF DIGITAL LITERACY

	1	2	3	4	5
N	0	2	31	56	16
%	0	2	30	53	15

Almost two thirds of the students in this research rated their knowledge 4 one the scale of 5 which is high and overall ratings of digital literacy in this question are high. This is an estimation made by the students themselves and is not measured precisely by some type of a test. However, it shows an optimistic picture about the students' preparedness for activities related to digital literacy.

Q11. Rate the importance of digital literacy for successful employment (1=completely insignificant;5=completely significant). (N=105)

TABLE 12. RATING THE IMPORTANCE OF DIGITAL LITERACY FOR SUCCESSFUL EMPLOYMENT

	1	2	3	4	5
N	1	5	9	43	47
%	1	5	9	41	45

This question offers results similar to the results in question 10, but this time about importance of digital literacy for successful employment of students. The students in this research rated digital literacy highly

important for success in their employment (over four fifths of them by choosing 4 and 5 on the scale).

Q12. Rate the importance of digital literacy for life in digital society (1=not important at all; 5= most important). (N=105)

TABLE 13. RATING THE IMPORTANCE OF DIGITAL LITERACY FOR LIFE IN DIGITAL SOCIETY

	1	2	3	4	5
N	1	3	9	24	68
%	1	3	9	23	65

The last question aimed at rating the importance of digital literacy for life in digital society. Based on the results (approximately two thirds of the students chose the highest rank), digital literacy is very important for life in digital society which reflects the students' view on their role in digital society now and in future.

V. CONCLUSION

The importance of digital literacy has increased because of the invention of myriad of electronic devices and internet technologies and because of the growing digitalization of society in general. The research about digital literacy of students at the FHSS achieved both research goals and confirmed both hypotheses. It showed that almost two thirds of the students who participated in this research have encountered the term digital literacy early, in elementary or high school which prepared them for the studying at the university where use of digital technologies intensifies even more. In three consecutive questions, the students chose the most important activities, skills and competencies related to digital literacy. The results also created a picture of what is important to the students at the beginning of 2023 regarding digital literacy. A shift from Web 2.0 and technology itself towards content related activities, skills and competencies can be observed. The students in the research like to supplement their knowledge by themselves and the during the formal education at the FHSS. Finally, the students in the research see digital literacy as highly important for their studying at the FHSS, employment and life in digital society. They rated their knowledge of digital literacy rather highly. Digital literacy is important to all students because it is one of the basic literacies today. It has entered the education system in Croatia at an early age, preparing school students for their education at the university level, employment and finally, for life.

The future research about digital literacy and university students should:

1.) be carried out regularly (annually) to provide more data about trends in digital literacy acquisition at the FHSS

2.) include additional aspects of ICT especially emerging technologies that will be used at the FHSS or carry a potential for used in education and research at the FHSS.

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