

Access to digital information resources as a support to academic achievement

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Abstract. *This paper presents results of the research of students at the Faculty of Humanities and Social Sciences (FHSS) in Zagreb, Croatia and their use of digital information resources. The results indicate tendency toward selection of digital information resources for use in their education; the maturity in assessing quality of these digital information resources and the maturity in distinguishing the good and the bad sides of digital information resources including open access information resources. The results could be integrated into the process of selection of reading materials for the courses at the FHSS, now that students' preferences are more clearly identified.*

Keywords. Students, digital information resources, open access, academic community, Croatia

1 Introduction

The increased use of digital information resources has become common in the higher education in Croatia.[17] Compared to traditional printed information resources that have been used for research and teaching at universities around the world for centuries, digital information resources are more convenient to access, easy to search, and downloadable.[19, 641] However, digital information resources are still not universally available and accessible as their use can be sometimes very expensive. To overcome this barrier, the Open access (OA) initiative was developed. This initiative offers the OA literature that is "(...) digital, online, free of charge, and free of most copyright and licensing restrictions." [14] Only a part of the scientific and professional digital information resources used by the academic community is available on the internet without any barriers while the remaining digital resources are available from the fee based (paid)

information resources such as full text databases on the internet on site of big publishers and information resources aggregators or in university libraries. University libraries are still very important as they cater to the varied information needs of students, faculty members, and research scholars by facilitating access to information resources including the OA information resources, they secure relevant information resources and arrange them, and, finally, they supply specialised services to the users.[11] However, these efforts of libraries might be insufficient as the quantity of digital information resources on the internet increases and as library users in the academic community continue seeking material for research and education on the internet more than in libraries. To find out more details about selected aspects of use of digital information sources by the students at the Faculty of Humanities and Social Sciences (FHSS) in Zagreb, Croatia a research study was initiated and this paper presents results of this research study.

2 Access to digital information resources for research and education

Work of students and researchers depends on the access to quality and reliable information resources. For centuries libraries have provided access to different forms of knowledge in printed and digital format locally as well as to offsite scientific information resources.[9, 66] "With the widespread proliferation of computers, networks, and networked information today, access to information is (or can be) relatively easy, inexpensive, widespread, and democratic." [4] Consequently, libraries have begun adjusting to the new conditions caused by the growth of popularity of online information resources to meet goals of their parent institutions – universities. In the

academic community, these goals are related to research and education, so the library activities reflect on: “effective teaching, resulting in high graduation rates, high grades in examinations, high employment rates after examination; effective research, resulting in high valuation and use of research results and publications, renown of faculties or research groups, high amount of special grants, awards, honours.”[12] The internet era introduced a change of attitude towards the library in students’ population: “Students may consider the library more as a social place than a site for the reference desk or physical books. In addition, the size of library collections becomes less critical in an era when Google and other large-scale digitization projects make it possible for any institution to have access to millions of books.”[10] As a result, students have begun seeking information on the internet more frequently than in libraries, especially if information is free of charge and easily obtainable.

In the era of highly commercialized access to information resources, every form of free of charge access to information resources is welcome. Fee based (paid) information resources have become one of the major barriers in research and teaching primarily because of the high annual journal subscription rates which are far too expensive for many libraries.[7] The same applies to students who seek information resources that are free of charge, that the peer reviewed content and that are easily obtainable, that are used in common file formats readable on many electronic devices etc. Many of these presumptions are based on (now) common fact that “the internet has profoundly and permanently changed the ways in which information can be disseminated and discussed.”[5, 791] Commercial publishers have also very clear business goals: they seek profit in dissemination of information “(...) to exploit its sale value and does so on the assumption that there will be sufficient demand for the information (because it has potential use value for others).”[3, 1579] As the financial conditions at universities and in libraries around the world deteriorated, the OA imitative presented itself as a possible solution to these problems. Two factors helped the success of the OA: the role of the internet for easy dissemination of information and the traditional publishers’ long history of the production, dissemination, and archiving of the huge volume of the peer reviewed scholarly articles.[8]

OA means “(...) free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself.”[1] For Sawant, “The OA literature is digital, online, free of charge, and free of most copyright and licensing restrictions.”[13, 16] The OA

is usually achieved through self-archiving and OA scientific journals. The self-archiving allows authors to store their published journal articles in digital repositories while publishing of the OA journals means starting new generations of journals committed to free and unrestricted access to scientific and professional information.[18, 230] The OA has many benefits. Readers can benefit from the OA in the following ways: “greater access to research outputs without the often prohibitive costs associated with traditional publishing; no requirement for passwords or other forms of authentication; greater access to academic research findings for those researchers, academic and professional, who work outside academia; ensuring that those who actually provide the money for publicly-funded research (i.e. taxpayers) have access to the outputs they have funded”. [14] Science can benefit from the OA too: all articles become freely and universally accessible online; the authors hold copyright for their work and grant anyone the right to reproduce and disseminate the article, provided that it is correctly cited; a copy of the full text of each the OA article is permanently archived in an online repository separate from the journal; authors are assured that their work is disseminated to the widest possible audience, the widespread availability of articles will enhance literature searching; the results of publicly funded research will be accessible to all interested readers and not just those with access to a library with a subscription; a country's economy will not influence its scientists' ability to access articles.[2] While there is rather extensive literature about relationships between universities, their libraries and publishers and their efforts to provide quality content for research and education, little is known about students’ views and attitudes about the use of the digital information resources including the OA information resources in their education. To find out more details about access and use of digital information resources by students at the FHSS, a research study was initiated.

3 Research

While there are many assumptions about the use of digital information resources by students at the Croatian universities, there are not many studies that would go into details and explain the relationship between students on one side and university libraries and the OA information resources on the internet on other side. To discover the status of digital information resources among students, two researches were conducted in 2012[16] and 2013[17] at the Faculty of Humanities and Social Science in Zagreb, Croatia (in further text - FHSS) about attitudes of students towards use of digital information resources and modes of use and preservation of digital information. The first research indicated that the students at the FHSS are still oriented towards the use

of printed information resources in the FHSS's library. The same research showed that students at the FHSS do search for digital versions of scientific information resources both in the FHSS library and on the internet as an addition to the use of printed information resources. The second research about the use of digital information resources carried out in 2013 showed that students at the FHSS seek unlimited accessibility and availability of digital content that could be used on a number of different electronic devices owned and used by students. The same research confirmed that students would love to use the digital content without any barriers but they need someone else (a library) to take care of the long term preservation of the digital content they create during their years of studying. The results of these two researches showed a slow but definitive shift from use of printed towards use of digital information resources. To find out more about the selected aspects of the current use of digital information resources by students, a new research was necessary. Another research by Zubac and Tominac [20] explained the role of libraries in provision of information resources for education and research. Unfortunately, the OA research studies in Croatia [6] focus mostly on researchers and their use of fee based and the OA information resources while students are frequently not in researchers' focus. This was the motive to initiate this research study to investigate ways in which students select, access and use digital information resources necessary for their education and to investigate their perception of the quality of information resources they use. The goal of the research was to collect data about use of digital information resources (including the OA information resources) for educational purposes by students at the FHSS. The main hypothesis of this research is that the students and the FHSS now use digital information resources including the OA information resources regularly in their education. They are also increasingly aware of the good and the bad sides of particular digital information resources used in their learning process including the OA information resources. Although the research had a limited scope, the results are very valuable as they provide an insight into the researched topic and present a starting point for a new research.

The target sample for this study was comprised of students who were members of the student's mailing list at the FHSS. Since membership in the mailing list is not obligatory for all students any more, their number on the mailing list is limited. So are the results of this study. The questionnaire consisting of 15 closed type questions was chosen as a tool for this research. The initial call for the participation was sent to the students' mailing list on April 21st, and the second call was sent on April 28th. The research was closed on May 2nd with the total of 81 students who participated in the research.

4 Results and discussion

The first question in this research was related to the respondents' gender. The total of 81 respondents participated in this research, 59 of them were female and 22 male respondents.

Question 2. What is the year / type of your study?

Table 1. Year / type of study (N=81)

	N	%
First year – undergraduate study	11	13.6
Second year – undergraduate study	2	2.5
Third year – undergraduate study	9	11.1
Fourth year – undergraduate study	3	3.7
First year – graduate study	23	28.4
Second year – graduate study	28	34.6
Postgraduate study	4	4.9
Part time study	1	1.2

Since not all students at the FHSS are members of the students' mailing list, only a limited number of them participated in the research. Although limited in number of participants, the collected results in this research will be used as an orientation for future research.

Question 3. Where do you start your search for content you usually use in your learning process?

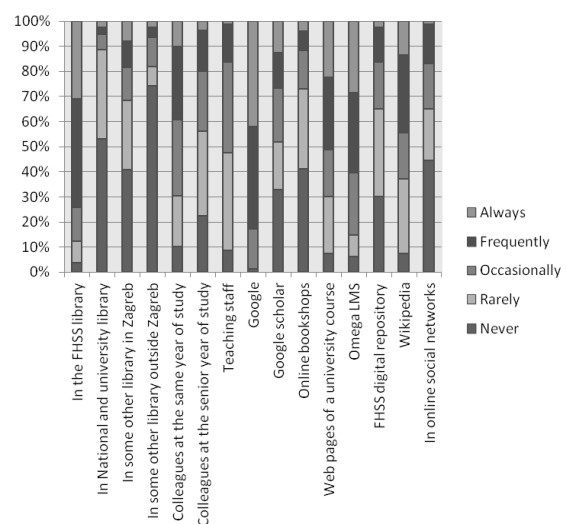


Figure 1. Starting points for search for content used in students' learning.

The results in the Fig. 1 indicate a greater popularity of a small part of all available starting points for search for content used in the learning process by the students. These starting points include: library at the FHSS, Google, Web pages of university courses students are enrolled in, LMS Omega at the FHSS and

Wikipedia. Less popular starting points are: colleagues, teaching staff, online bookshops, the FHSS digital repository. Least popular starting points were: The National and university library, public libraries in Zagreb and outside Zagreb, Google scholar and online social networks. Differences appearing in the results are related to the different information needs of students and their perception of value of particular starting points for their study including the possibility of offering quality content necessary for acquisition of new knowledge in their learning process.

Question 4. Which type of digital content (regarding its price) do you use for your learning process?

Table 2. Content type (regarding price) used in the learning process (N=79)

	N	%
Mostly content free of charge	75	94.9%
Mostly paid content (content for fee)	0	0%
Equally content free of charge and paid content	4	5.1%

The results in the Table 2 are very indicative since they clearly demonstrate students' orientation towards use of the free of charge content. Free of charge content comes in many flavours on the internet and not all of it can be used without administrative of other barriers. Nevertheless, the FHSS students' inclination towards use of free of charge learning materials is evident, probably because of their financial status and inability to pay the fee based information resources which are too expensive for the teaching staff too.

Question 5. Which type of digital content do you use in your learning process? (multiple answers)

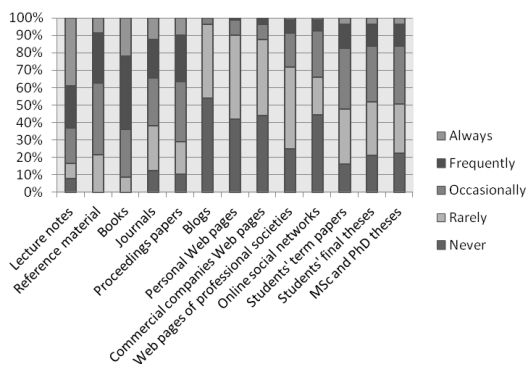


Figure 2. Use of digital content in the learning process In this question the respondents were given the list of 13 types of digital content and frequency of their use.

Lecture notes, books, journals (journal articles) and reference material as well as papers from proceedings were the most popular types of digital content used by the students who participated in this research. Blogs and personal Web pages that were once popular now are least frequently used information resources by the students in this research. The students occasionally used other students' term papers, final theses and MSc and PhD theses which are usually available in the library at the FHSS and on its Web pages. Based on these results, we could say that the students prefer quality content over content that could be found on the internet but is of an unknown provenance.

Question 6. Choose reasons for use of digital content in your learning process. (multiple answers)

Table 3. Reasons for using digital content in the learning process (N=81)

	N	%
Fast access to information	75	92.6%
Material for writing term papers	74	91.4%
Free of charge use	67	82.7%
Material for writing home assignment	64	79.0%
Information quantity	59	72.8%
Literature review on a specific topic	57	70.4%
Finding answers to specific questions	49	60.5%
Information novelty	39	48.2%
For research purposes	37	45.7%
Pleasure of use	36	44.4%
Searching for news	29	35.8%
Content quality	28	34.6%
Helping others to find digital content	13	16.1%
Entertainment	11	13.6%

In this question the respondents were given the list of 14 reasons which might be crucial in the process of choosing digital content for inclusion in the learning activities by students themselves. Most of these reasons are related directly to academic activities of students. As a result, about half of these reasons were rated highly by students who recognized them as valuable. The digital content offers specific advantages over the printed content and these advantages help students in achieving their academic goals faster and better.

Question 7. In your opinion, which characteristics of digital content used in your learning process do you find most important to you? (multiple answers)

Table 4. Characteristics of digital content used in the learning process important to students (N=80)

	N	%
Searching	78	97.5%
Content storing to a personal digital device	73	91.3%

Content download	73	91.3%
Time saving	66	82.5%
Copy / paste	54	67.5%
Printing	52	65.0%
Content variety	49	61.3%
Highlighting text	48	60.0%
Absence of physical limitations of content storing	40	50.0%
Content integration in student's work	36	45.0%
Some other characteristics, not listed here	4	5.0%

Most of the characteristics selected by the respondents in this question reflect their practical experience with the everyday use of digital content in the learning process. These answers could be added to the answers given in the previous question to create a more complete picture of what attracts students to the digital information resources more than to the traditional printed information resources. These answers have a special value since many assumptions about students' use of information resources (in general) are not always based on research.

Question 8. In your opinion, which of the following characteristics of digital content used in the learning process can be attributed to its quality? (multiple answers)

Table 4. Quality related characteristics of digital content used in the learning process (N=81)

	N	%
Content structure	58	71.6%
Author's reputation	55	67.9%
Topic / title	45	55.6%
Topic scope	41	50.6%
Author's institution reputation	40	49.4%
Recommendation by someone else	40	49.4%
Publisher reputation	25	30.9%
Number of pages	18	22.2%
Format	17	21.0%
Price	10	12.4%
Contact with author	7	8.6%

Answers in this question imply that the FHSS students have clear preferences when it comes to choosing characteristics which they attribute to the quality of digital content (journal articles, textbooks, scientific books etc.). The content structure and the author's reputation were two most frequently chosen characteristics while topic / title and its scope author's institution reputation and recommendation are also important characteristics important to students when they chose digital educational material for use in the learning process. It is not surprising to see that the content structure is the most important characteristics since use of digital content is not linear and separate parts of digital publications of interest to students are

much more easily combined into new digital documents and this feature is very popular among students. Other characteristics presented in students' answers are inherited from or more related to the printed education materials. It is interesting to see format so low in the results list as this is a very important characteristics or feature of digital content.

Question 9. Which methods of digital content exchange do you use? (multiple answers)

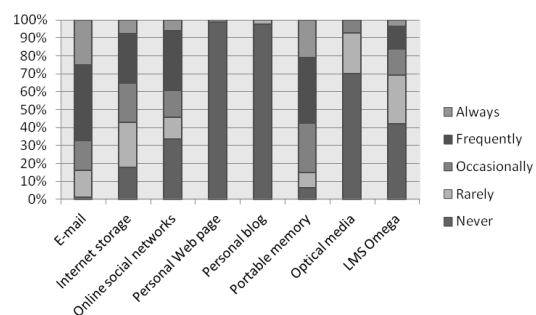


Figure 3. Methods of content sharing with colleagues

Most frequently used methods of sharing the digital content with other students were e-mail and portable memories such as USB memory sticks. The internet storage services (such as Dropbox or Google drive) and online social networks are also used frequently. Other methods were used far less frequently as they are not so accessible and students don't consider them to be so practical. Optical media are slowly going out of use, while blogs and personal Web pages were almost not used at all by students in this research. The answers suggest longevity and convenience of e-mail as one of the most basic internet service that has its own limitations when it comes to size of attachments sent with text messages. Internet storage services are becoming used more frequently as they assume both authorized and anonymous use and they are a direct replacement for once frequently used FTP servers.

Question 10. Meaning of open access for use in your learning process. (multiple answers)

Table 5. Meaning of open access to students for their learning process (N=81)

	N	%
Free access to information	78	96.3%
Easier access to learning material	72	88.9%
Equality of access to information regardless of one's financial status	62	76.5%
Access to the greater quantity of learning material	58	71.6%
Long availability of learning materials	50	61.7%
Help in writing term papers	50	61.7%
Possibility of self learning	42	51.9%
Quality review of a topical area	41	50.6%

Content sharing with colleagues	40	49.4%
Increase in teaching quality	37	45.7%

Reasons for use of OA information resources offered in this question could be perceived as basic for understanding the importance and role of OA in general. They are all well known reasons and the results in this question prove that students have recognized and understood main benefits for use of OA information resources.

Question 11. Reasons for non use of open access digital information resources. (multiple answers)

Table 6. Reason for non use of open access information resources (N=80)

	N	%
Lack of access right to open access information resources	61	76.3%
Doubt in quality of open access information resources	30	37.5%
Inability to find open access information resources	23	28.8%
Unfamiliarity with open access information systems	20	25.0%
I'm not familiar with existence of open access information resources	6	7.5%
Unwillingness to use open access information resources	4	5.0%
Lack of time for use of open access information resources	3	3.8%

Although OA initiative promotes access and use of information resources without any or with as little as possible barriers, such information resources are still not universally available. The answers in this questions confirm that assumption as 76,3% respondents chose lack of access right to OA information resources as the most important barrier. This answer could also mean that OA is seen differently by different institutions around the world and not all of them are ready to allow limitless access to their information resources although they declare them to be OA. Another barrier was doubt in the quality of OA information resources which is well known problem and requires additional education of users about features such as quality control of OA information resources. Fee based scientific information resources are mostly known to have a quality control filter called the peer review process which guarantees that low quality scientific works won't be published in high quality publications. While this quality control mechanism in science is far from being perfect, it is the only largely used control mechanism scientific community has and on which it relies. The OA scientific information resources do also employ this mechanism to prove that their content is of equal quality as content in fee based

information resources, however, proliferation of number of false OA journals is destroying the reputation of the legitimate OA journals which have been available online for years and have built their reputation of quality of their authors and content. Another two important problems were inability of students to find OA information resources and lack of time for use of OA information resources. In both cases, libraries at universities should additionally promote the OA information resources to students. Too often they promote only fee based information resources because they want these information resources to be used optimally by students and research and teaching staff while the OA information resources are somewhat left behind. The OA information resources are less known to students because they don't know where and how to find them. The rest of the problems related to non-use of the OA information resources were unfamiliarity with the OA information resources which, again, can be solved by increased promotion in libraries and lack of time and unwillingness to use of OA information resources are two problems that are related to individual students only.

Question 12. Rate the importance of open access initiative in the process of your education.

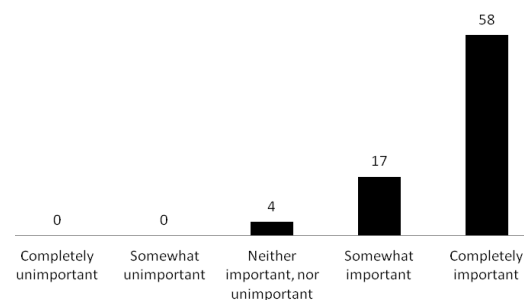


Figure 4. Importance of open access information resources on the internet for education of the respondents (N=79)

The OA initiative is now over a decade old and scientific world and higher education institutions are very well informed about its benefits. Participants in this research clearly indicated their opinion about importance of the OA initiative in education which could also mean that students who participated in this research are also well informed about positive sides of the OA and that they are using it in their learning process. Exploring practical sides of use of the OA information resources such as use of articles in the OA scientific journals, conference proceedings and books is the best way to get acquainted with this globally important initiative.

Question 13. Rate the importance of the digital content for your academic achievement.

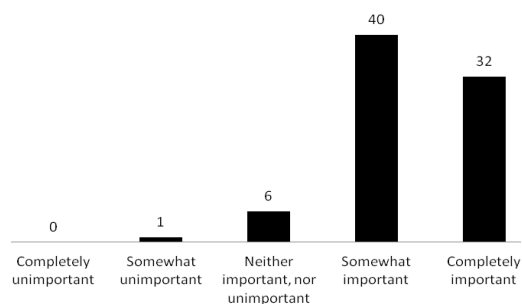


Figure 5. Importance of digital content for the students' academic achievement (N=79)

The results in this question indicate that the digital content has become important for the academic achievement of students. 32 out of 79 respondents rated importance of digital content as completely important and 40 of them as somewhat important which confirms the conclusion that this type of content is gaining popularity.

Q14. Rate your satisfaction with the quality of the digital content available on the internet used in your learning process.

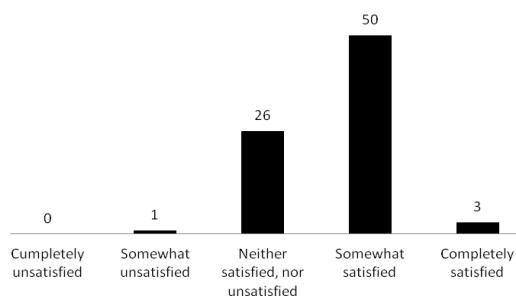


Figure 6. Quality rating of digital content available on the internet (N=80)

Question number 8 offered an insight into the student's perceptions of characteristics of digital content related to the concept of quality so this question represents their final rating of digital content. Significant number of students rated fairly high their satisfaction with the digital content they are using in their learning in this question. However, there are almost one third of the respondents who find digital content to be neither of satisfactory nor unsatisfactory quality. These students are probably still evaluating digital content for its implementation in the learning process. It should be pointed out that not all programs of study at the FHSS require use of digital content in the learning process since most of their educational materials is available in the library of the FHSS in

printed form. Some of these materials are being digitized to facilitate easier access to students using portable computers, tablets and smartphones.

Q15. Rate the impact of the digital content used in the learning process on your academic achievement. (1=least important, 5=most important)

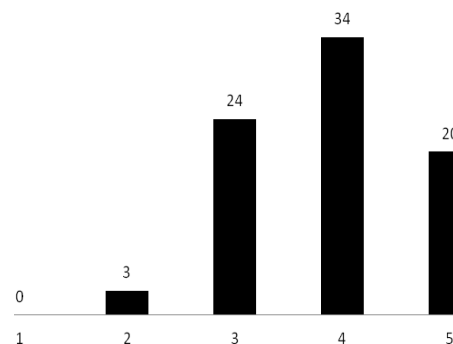


Figure 7. Impact of digital content on the students' academic achievement (1=least important, 5=most important) (N=81)

The last question was related to the estimation of impact of digital content on academic achievement. The respondents' ratings of digital content for inclusion of digital content (in general) in the learning process suggest that digital content has gained popularity among students and that they recognize its importance for their academic achievement. The students' rating of digital content are high and they confirm that digital content will play even more important role in higher education in Croatia in near future.

5 Conclusion

Digital information resources available on the internet have become very important in higher education institution around the world. Croatia is no exception. Students at different universities use the digital content on a daily basis yet many aspects of that use are unknown. This research confirmed continuing use of the digital information resources by the group of students at the FHSS who participated in the research. Their use of the digital content is directed more towards the free of charge information resources than to the fee based information resources. They are also aware of the existence of the OA initiative and understand its benefits which are very important because the OA has its foundations mostly at universities around the world. The participants in this research are very clear about what type of digital content they want and what characteristics that content should possess. Their determination comes from the daily use of the digital content for different

educational (and research) purposes. Students who participated in this survey demonstrated that they are truly participating in the shift towards use of digital information resources in education and that they are aware of good and bad sides of digital information resources used in their learning process including the OA information resources. Finally, their use of the digital content could serve as a model to all policy makers who seek reliable information about students' preferences and experience in use of the digital content in their education.

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