Informacijsko ponašanje studenata i uloga visokoškolske knjižnice

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Students' information behaviour and the role of academic library

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Libellarium, VII, 1 (2014): 119 - 139.
UDC: [004.5:025.4.036]:027.7
Proceeding of the Summer School in User Studies (SSUS), Zadar, Croatia, 11-14 April, 2012

Abstract

In this paper the author presented the results of some of the available studies of students' information seeking behaviour conducted in different countries. The aim of these studies was to identify information needs, sources, and types of library use by the university students from various disciplinary fields. According to the results, the majority of the respondents needed the information for academic purposes (such as papers, assignments or examinations), frequently using information sources like books, journal articles, online sources etc. For many students the internet was a very important source in finding academic materials. Most of the students received advice in finding relevant information sources from their lecturers, peers, and librarians. This paper also describes some aspects related to information seeking behaviour of young students (Generation Y, and Millennial generation) who were influenced by their peers, and had poor understanding of their information needs. They prefer quick Google search, navigation through virtual libraries and spend more time downloading the materials than utilizing e-sources. Although the academic libraries were often used only for borrowing books and using reference material or printed periodicals, it has been established that the role of academic libraries was very significant in satisfying university students' information needs. Further research that could be done building onto the selected studies is examination of information seeking behaviour of the students between different disciplines while taking into the account various context situations in which information tasks are performed. Moreover, further studies should explore factors that affect students' library use, and identify significance of the library instruction in improving academic library services for users.

KEYWORDS: information seeking behaviour, information needs, information sources, students, academic (university) libraries.

Introduction

Wilson defined information seeking behavior as the goal oriented process of purposive seeking for required information in which the individual can interact with manual information systems (for instance journals or a library), or with systems based on computer (such as the Internet) (Wilson 2000, 49).

The main purpose of this paper is to offer a review of most important research results from some of the available studies concerning information behavior of university students (undergraduate, graduate and postgraduate). Moreover, a few major issues about the academic (university) libraries in information seeking behavior of students such as types of sources and services used by students, reasons and frequency of library use and similar will be presented.

The research questions which the author is attempting to answer are: What are the students' information needs? What kind of information sources students use and why? What is the role of academic libraries in students' information behavior? Research methods used were literature overview and literature analysis. First part of the paper offers examples of general studies on students' information behavior, while the second part is mostly dedicated to young users of academic libraries discussing their information behavior and some future scenarios of academic libraries as related to students.

Studies about information seeking behaviour of university students

Information needs, sources and library use

The paper *Scholarly use of information: graduate students' information seeking behavior* (George et al. 2006) presents the results of the study the aim of which was to describe the graduate students' information seeking behavior and their use of information for the processes of inquiry, and scholarly activities. The authors conducted in depth semi-structured interviews with one hundred graduate students of engineering (26), humanities (20), arts and architecture (16), computer sciences (14), sciences (13), and business and policy (11) constituting a representative sample of masters, and doctoral students from all colleges and departments of the Carnegie Mellon University. Research data indicated that graduate students' information seeking behavior had been influenced by the academic staff such as advisers, and professors (96%), often representing the first step in their research process, offering recommendations, providing guidance, or directions and resources like books, journal articles, research papers, their own papers, or those of noted authors, spreadsheets, and data sets. This occurred during the research seminars, in formal one-to-one meetings and in casual conversations, or via e-mail. About one-third of respondents reported that other students shared with them information on reference books, papers, journals, articles, Web sites, movies, and names of key people in the field which

expedited the process of information searching. Graduate students (40%) turned to university librarians for the technical aspects of information seeking, most of them being the students of business, and policy (72%), and not many students of engineering (15%). University library staff respond to the questions and point to relevant and new resources. They also teach graduate students how to use the library, find resources, form more focused keyword searches, navigate the library website and conceptualize new project. The internet played a huge role in graduate students' search for information. All graduate students (91% studying business and policy, 62% arts and architecture) searched the university library intranet, or the internet, for their assignments, and most of them (77%) described the internet as extremely useful. This was their next step after meeting with advisers, or the primary search method. 97% of the graduate students searched the non-library internet, and 73% of the respondents reported that they had used the Google search engine for their information seeking (93% in computer sciences to 50% in humanities). Most frequently graduate students (68%) searched for professional, academic, governmental, business, personal, and organizational websites. One half of all graduate students (64% in computer sciences, 35% in humanities) used the internet to find research papers, journal articles, white papers, or/and working papers. The research has shown that the respondents use various searching techniques. Graduate students checked citations from the key materials to which their advisers or colleagues drew their attention. Sometimes they found this reference lists randomly in books and articles. Afterwards they checked the citation rate of the author, or the article in order to track those which were more cited.[1] According to George and co-authors (2006) Ellis has described this process of information gathering through references, bibliographies, footnotes and endnotes as citation chaining. Nearly a half of all graduate students (47%) indicated that they had used an open-ended keyword search mostly with Google, which is most evident in business and policy (64%). Although students found general searches time-consuming, because of the massive amount of non-credible information which can be irrelevant to the topic, they used this method often in order to collect ideas when they did not know much about their topic, or when they wanted to develop a search strategy. University library played an important role (e.g. huge, crucial, and significant) for more than half of all graduate students (55%), and as many as 75% of students of arts and architecture in their research. 94% of graduate students used the university libraries' online services emphasizing reasons like convenience, easy access, time-saving, and speed (100% of the respondents in humanities, and business and policy, 79% in arts, and architecture, and computer science). 82% of the respondents came to the university library for books, and reference materials, while 58% of the students used physical resources like printed periodicals (85% students in the sciences, and 80% in humanities).

1 29% of graduate students used citation indexes like CiteSeer to search for full text articles and papers. Electronic articles were preferred because of the ability to easily track and quickly build a body of literature.

Some students went to library to write, use printers, or for their own personal interest and fun. A preference for convenience and the need to have information quickly has been the most frequently cited factor by graduate students (58%) for consulting libraries. Results of the study have shown that the information seeking behavior of graduate students was random while developing a search strategy and choosing a general idea or an area of focus of their research field, or while browsing for background information. On the other hand, an organized information seeking behavior included a regular planning sessions with an advisor, the use of citation chaining, and planned search strategies.

Kerins, Madden and Fulton researched the information seeking behavior of engineering, and law students in Ireland. According to the results of their research, students learned the approaches in information seeking strategies from the educators excluding the library staff, or libraries. Students of engineering chose the information channels by accessibility. Key factors for engineering students when selecting an information source were opening hours, physical distance of a resource, speed, ease of use and accessible language. They preferred channels that require the least effort, like the internet, from which they expected to satisfy their initial information need, since nowadays it is a speedy information source. The internet was the first source with the help of which the majority of engineering students used to find the information for their projects. Using the internet they could also formulate an idea for their topic quickly. The students of engineering consulted books, journals, and technical handbooks from the library to validate the information they found on the Internet (Kerins, Madden and Fulton 2004). Most of the law students did not prefer the library resources to their academic programs. This study has shown that their knowledge of basic print materials was limited, and that they had problems in identifying suitable information sources in the area of legislation, case law, and journal articles. Information seeking for law students in their undergraduate, and postgraduate programs centered on reading textbooks, course packets, and reading lists. Almost all the respondents reported that *Google* was their search engine. In their information seeking, which had been based on short-term focus, instead of a lifelong learning which could have been helpful for their potential careers as practitioners, law and engineering students were influenced by their lecturers, or an expert. Engineers looked at a variety of library resources when seeking information for their projects, and some of these were library catalogues, library leaflets, or guides, library staff, technical handbooks, journals, online databases etc. On the other hand, engineering students turned to the library in the middle of their information seeking process. That way the librarians could lead them to information sources necessary for the completion of their projects (Kerins, Madden and Fulton 2004).

Martin studied the information seeking behavior on a convenience sample of 200 undergraduate majors at the University of Central Florida to find out where they found the information for their academic research, and to examine if the instructions received at the library had any impact on the types of sources

used. Results from his study indicated that the Internet has been used for the class-related research by almost three fourths of the students, although 79% of the students considered that academic library resources (such as books, and journals) were more credible than the internet sources: 78% of the respondents have chosen the freely available internet instead of the library's resources. In this case there was no statistically significant difference in using academic, and non-academic sources between students who had attended some library instruction sessions, and those students who had not attended any library instruction sessions. From his personal experience author has emphasized that the undergraduate students were not using Google Scholar, and several studies from his paper confirmed that the instructor guidelines had a more significant role in student citations than the library instructions. He concluded that students were not citing the internet sources simply because they were told to use more academic sources (Martin 2008).

In her paper Callinan examined how students use the library and different sources of information for their course-work. The purpose of the study was to understand what are the differences between the first year biology and the final year biochemistry students at the University College Dublin (Callinan 2005). According to her results more students in their final year (35%) reported that they had visited the library on daily basis than did those in their first year of study (7 %). First year students (one-third of respondents) were more likely to visit the library once a week which is less than the final year students (13%). The main reasons for visiting the university library given by both sample groups were borrowing the books, studying for the courses, using the computers (first year students), and photocopying (this service has been used by the final year students six times more than by the first year students). Final year students mostly came to the university library to read or photocopy printed journals. Some other reasons for visiting the library included meeting the fellow students, and setting up their printer accounts, using reference material (26% of the final year students, 10% of the first year students), leisure reading and browsing the shelves (which was characteristic for a higher percentage of the first year students). The e-library has been used more by the final year biochemistry students (56.5%) than by the first year biology students (27%). In this study both sample groups indicated a high value of handouts given by the lecturers and the textbooks assigned to the course. 48% of the final year students reported using journal articles for course-work in comparison to approximately 1% of the first year students. On the other hand, there was a higher percentage of the first year students who used web sites than those who used library books. The help received from friends was the primary type of assistance received when using the library, especially for the final year biochemistry students (96%) and slightly less for the first year biology students (67%) (Callinan 2005).

Reasons for information seeking, searching strategies and information pathways

In the study *Information seeking behaviour of undergraduate students in the humanities in three universities in Nigeria* (Baro, Onyenania and Osaheni 2010) authors conducted a research on the information needs, sources, and information searching strategies of undergraduate students. For that purpose they have conducted a descriptive survey, as well as questionnaires, interviews, and observation methods on a sample of 259 persons which was 30% of the total population used for the study (867). The respondents were selected by the random sampling technique.[2] Reasons why the undergraduate students searched for information were of an academic nature (93.2%), connected to personal needs (4%), and sports information (2.8%). The respondents indicated they had needed academic information for writing the course assignments, seminar papers, tests, and examinations, class discussions, and research papers in their final year. It has been established that for the most students (82.4%) library was a primary source to obtain information. Almost the same percentage of the respondents reported using archival materials (70.8%), and community heads, or chiefs (69.2%) as the sources of information. Journal articles were consulted by 68.8% of the students, and 65.6% of them used the Internet. More than a half of the respondents (55.6%) indicated using databases. "The study revealed heavy reliance […] also on human resources such as community heads/chiefs, lecturers and colleagues for information to meet their information needs" (Baro, Onyenania and Osaheni 2010, 114). Information seeking behavior of the students has been examined according to David Ellis' model. 65.2% of the respondents indicated browsing the library collections to find relevant materials, while 60% indicated using a differentiating strategy through the selection between the known sources by noting the information value, and the distinctions of the source specifics. Monitoring (using the card catalogues, or lists from the library notice boards) has been used by 57.2% of students. 55.6% of the respondents acquired the academic information through the lecturers, and from their colleagues as a starting point. 54.8% of the students used chaining references at the end of the consulted books, and 50.4% pointed on using an extracting strategy (using the library card catalogue) as a search strategy in retrieving relevant sources.

Kakai, Ikoja-Odongo and Kigongo-Bukenya (2004) have studied the information needs, and seeking behavior of the undergraduate students at Makerere University in Uganda carrying out a cross-sectional survey on the sample which included 104 undergraduate students chosen by a non-probabilistic quota sampling techniques from the first, second, and third year of study at the Department of

2 In the survey participated slightly more female (55.2%) than male students (44.8%) who were all from the History Department in the Humanities of the Niger Delta University (32.4%), University of Port-Harcourt (36.8%) and Delta State University (30.8%).

Biochemistry at the Faculty of Science, and the Department of History at the Faculty of Arts. The results showed that students' information demands were mostly connected to the course assignments (86), examinations, and tests (68), enhancing the lecture notes (55), and class-group discussions (44). Students needed less information for the dissertation research, and tutorial presentations (15) but also for the seminars, or the workshops preparation (10). The most three preferred information sources of the students were lecture notes and handouts, departmental Book-Banks, and the University Library. Students assessed the University Library as the only well-established institutional information source which had various information resources for the further research. Besides textbooks which were frequently used by 97.1% respondents, other sources like newspapers, reference materials, the internet, theses/dissertations had very low frequency of use (between 21 and 30 respondents), while print journals, conference literature proceedings, online databases, and CD-ROMs were the least used information resources (between 1 and 15 students). According to the research, the students of Makerere University followed five of Ellis' six information-seeking activities: starting which referred to consulting lecturers, colleagues, some extent reading lists, and the card catalogue, browsing on the opened shelves, chaining (viewing the references at the back of books), monitoring (through using the lists on the library notice boards, colleagues, and card catalogues), and extracting with the help of the card catalogue. It was established that the undergraduate students used differentiating strategy only through inspecting the contents of information sources. 78 respondents consulted the library staff when they hadinformation problem, and 41.4% of students needed help only 'sometimes'. Most students avoided to use the subject catalogue because of their poor searching skills knowing only how to use the author, or title catalogue.

Seiden, Szymborski and Norelli have conducted a research on information seeking behavior of the undergraduate students using digital resources at the Scribner Library at Skidmore College (USA). Most of the respondents in the study were juniors, and seniors (29 of 42) of English, Psychology, Art, Studio, Business and Government.[3] Authors conducted individual interviews, and focus groups. Over 40% of the students experienced searching Web bibliographic and full text databases. Twenty-seven respondents said that they had done database searching very frequently (several, or many times before). Nearly 50% of the students had learned how to search in a one-on-one contact with a librarian, 36% reported learning on their own, and just 12% noted that they had learned how to search from their friends. A half of the students had some sort of a formal library instruction, but only 17% felt that this had helped them. The

3 There were four students from first year and nine sophomores. Four respondents were from American Studies, two from English, Psychology, Philosophy, Exercise Science, Biology and Geology and one from History, Education, Music, Economics, Sociology, Asian Studies and Classics.

results from the focus group revealed that the peers played an important role in search instruction for those respondents who relied on them. The reasons for selecting databases were their intellectual area of coverage (40%), professor's directions to use them(30%), features of the database like the simplicity of use, its currency, or a type (full text), a former familiarity etc. The most used database/ service in the study was Lexis/Nexis (20). 60% of those students who used the web reported they had used it for the research. The students most frequently utilized adding additional terms, changing the used terms, and the database to refine their searches. Most of them literally translated a topic into the search words. According to the results, the students preferred to determine subject's relevancy by looking at the headline, or the title (60%), the abstract (17%), the authority of the source (12%), the language, or the date of the material, and the availability of the source in the library. The students were generally satisfied with their searches, and had very accurate expectations related to the format, and type of the materials that could be found in the database they were searching. The factors for using the computer based resources mentioned by the students were: convenience (38%), efficiency (43%) full text (17%), currency of the data (14%), completeness of the data (12%), Boolean capabilities (7%), requirement, and familiarity with the usage of the online databases as opposed to the print sources (5%), availability, and the possibility of printing from the online databases (2%) (Seiden, Szymborski and Norelli 1997).

Mahajan explored the information-seeking behavior of undergraduate, and postgraduate students, and researchers in the social sciences, and humanities in India (at the Panjab University of Chandigarh). The author collected data from 250 respondents using a descriptive survey method (questionnaire). According to the research results almost a half of the undergraduate students, and more than a half of the postgraduate students spent approximately 5 to 10 hours in the library per week. A collection of textbooks in the library was rated as good by the majority of the undergraduate students, and nearly a half of them considered the collection of journals, reference books, and theses to be very good. The textbook collection was rated as very good by a half of the postgraduate students, while the reference collection was judged similarly by only about one quarter of them. Most of the postgraduates were satisfied with the journals, magazines, newspapers, and theses. A majority of the students indicated satisfaction with the help obtained by the library staff regardless searching for information in the reference books, manual catalogue, or OPAC. Most students needed information for examinations spending less time on information gathering since they were available in the textbooks, or in the classroom. The students consulted books more than other sources (journals, databases etc.) which researchers preferred. The most used informal sources were e-mail, and discussions with the teachers who provided books, and journal articles for the students (discussion with librarians was not much liked) (Mahajan 2009).

Head and Eisenberg in their study of students' Wikipedia use revealed that respondents mostly turned to course readings (97%), Google (95%), online

scholarly databases (93%), OPAC (90%), instructors (87%), and Wikipedia (85%) when needed background information about their research topic, while library shelves (69%), and librarians (45%) were less frequent sources (Head and Eisenberg 2010). The study sample consisted of 2,318 participants from social sciences, humanities, sciences, education, business, engineering, and occupational training.

Analyzing 219 reference lists of Masters' theses from economics, psychology, and mathematics, and conducting semi-structured interviews on 73 respondents, P. Junni (2007) realized that the most common method for seeking information was tracking references in other sources (particularly at the beginning when students were not familiar with the subject). All of the respondents looked for information in the library using the title, the author's name, or the subject in order to make goal-oriented searches. While the most respondents studying psychology relied on the search engines, or portals in the library, students of economics more often used the browsing method. Professors or friends were the information sources for the most respondents studying mathematics. It was unexpected that students did not use general search engines on the web much because they thought that the searches would took up too much time, and they would not be able to find a quality material. Since the respondents experienced troubles in finding reliable scholarly publications by using Google, or Altavista, many of them searched Universities' databases (Proquest and Ebsco). The least used methods for seeking information were looking for sources on friends' or experts' advice, and alerting services for papers in scholarly journals. The respondents from economics received most publications from the Internet (44%), and the others had less online sources (psychology 28%, and mathematics 25%). The respondents most frequently borrowed, or copied information sources from the University libraries, or institution, and obtained many publications from full-text databases subscribed by Universities.[4] Journal articles were most used by psychology students (55%), and respondents studying mathematics mostly consulted monographs, and course literature (79%).[5]

Bronstein (2010) carried out an empirical study in Israel on 18 students of library and information science who wrote a personal diary, and answered an open-ended questionnaire about their information source preferences and information pathways. According to results of the study, the main source types

4 Students were generally satisfied with their full-text databases considering that they had helped them in finding relevant sources. Some respondents retrieved sources from publisher's home pages, from authors' home pages, or ordered it through inter-library loans from the Internet. The least common methods for obtaining information were asking for sources from the authors (electronic and paper copies).

5 Students of economics had more thesis citations (2.6%) than those studying mathematics (0.9%). Moreover, they often cited the news press (8.2%), grey literature (4.7%), company information (2.3%), and official sources (6.9%) than the respondents from mathematics, and psychology.

utilized by the respondents were the network and human sources, while the less used were printed and expert sources. The participants mostly searched for the information about health, genealogy, and tourism. Students' preferred criteria for the network sources were accessibility, and availability of the information sources related to full-text availability, physical proximity, language, easiness of use, and time-saving. The preferred criterion for the human sources was availability of the content which included the quality, and reliability of the information. Regarding the information pathways the most searches consisted of only one step after which networked sources (25%) have often been consulted, and in a lesser degree human sources (4.66%), printed sources (2.7%), and expert sources (1.55%). In most cases the typical pathway began with a networked, or a human source, also appearing in steps 2, and 3. The first two information steps in the pathway fulfilled the information needs of students in the majority of the searches (90.48%), and, according to the findings, expert sources appeared just at the beginning of one-step pathway. Feedback on the information received in previous steps was provided by information sources used in steps 3 and 4 (9.52%). With human (31.89%), and networked sources (59.47%) started information pathways mostly in personal searches, while in academic searches students relied more on formal sources like academic databases (22.07%), and printed materials (18.18%) using human sources (10.38%), and web sites (5.19%) less.

Ozoemelem studied how postgraduate students of Library School in Delta State University (Abraka) in Nigeria utilize electronic resources using questionnaire on a sample size of 78 participants. Findings showed the students had poor skills in the use of ICT, and that they mostly accessed the Internet in Cybercafé. On the other hand, both male, and female students used electronic resources a lot (Ozoemelem 2009).

Rowlands and Nicholas brought a description of an action research project about the reception of e-books within a UK higher education in which 1819 undergraduate and graduate students, academic staff and researchers participated. Multivariate data analysis established book discovery relation to demographic factors (gender, subject field, and academic status). Cluster I (12%) consisted of male (99.4%), graduate students (42.8%), and staff (39.6 %) who had a high dependence on Google, and Amazon, and other informal ways of book searching, and the lowest dependence on the library systems (searching the UCL catalogue, or visiting a library). In the Cluster II (12%) mainly female (94.2%), and undergraduate, or graduate students (94.9%) were represented, probably from the life and social sciences with the highest dependency on using the UCL library, and its catalogue, but they are averagely dependent on the external library sources. Cluster III (18%) was composed ofof male (100%), graduate students (53%), and faculty (44%) from a wide range of disciplines who had a high level of dependence on institutional library services, and the lowest trust in general search engines. In Cluster IV (13%) dominated male undergraduate students (99.4%) across all disciplines. Less depending upon book reviews and

publishers' catalogues, they were highly dependent on institutional provision, following reading lists and moderately 'self-sufficient'. Cluster V (9%) was a group consisting of female (100%), and almost entirely undergraduate students (98.3%) from the medical (40.7%), or life (28.8%) sciences who prefer their friends as sources for book recommendations, and also have a high dependence on the institutional library systems. In the Cluster VI (20%) were female (97.3%), graduate students (47.8%), and faculty (40.4%) from the medical (26.8%) and life (24.3%) sciences who had high ratings for the informal, and personal search modes, and a very low dependence on personal uses of library services being reasonably self-sufficient. Cluster VII (16%) was a female group (99.5%) in which dominated graduate (48.6%), and undergraduate (38.5%) students studying the arts, and humanities (73.6%) who had the lowest propensity for the informal modes of book discovery (in particular a lack of interest in Google, Amazon, and other Web services), and the highest tendency of using libraries and catalogues (Rowlands and Nicholas 2008).

Academic libraries and young users' information behaviour

Until the 1980s traditional academic libraries in UK were mostly oriented on collections, administrative procedures as well as rules, and regulations. The competition between institutions (related to the customer-centered practices in the commercial world), and the emergence of electronic information (including general changes in the information-seeking behavior of scholars, and students), and the Internet, were the indicators of a more service-oriented approach ('What do users want?') which became meaningful throughout the research into user studies (user surveys, systematically collected statistics of library use, users' satisfaction with the services).[6] Joint Information Systems Committee (the JISC) helped the libraries in the UK at the national level to establish practice-oriented research, and transform their services in user-oriented ways. Undergraduates, postgraduates, teachers, full-time researchers, external users from many professions have different needs, and wants influenced by their subject areas. R. Carr (2006) concludes that users' wants and needs should be an integral part of a professional approach to library service planning in order to examine the contextual reasons for the differences between them, and that every effort should enroll an even-handed, and open-minded allocation of the scarce resources.

6 Among others it was also supported by the developmentof online catalogue, the 'portalisation' of Web-based resources, the population of institutional Virtual Learning Environments for teachers and students, the digitisation of materials and a streaming of a new cadre of academic librarians to keep in touch with the 'Google generation'.

Library information behaviour

Kamarudin (2001) was studying information-seeking behavior of students who had used the electronic resources at the University Library of UiTM, Shah Aiam. The author tried to find out how students felt about various aspects related to the electronic resources, and whether their knowledge, and skills helped them in the utilization of the electronic services provided by the library. 180 students participated in a questionnaire survey, and the results indicated that several significant relationships existed between gender, major, semester, year of respondents, and the search strategies they employed. The research results showed that Accountancy students (49.4%) were most frequently the users of the electronic sources.[7] The most respondents were in their second year (46%), and in the first semester (29.4%). Searchers looked for information about the major topics of their academic papers, and the search topics were dispersed over a broad of general, and specifics subjects. Students mostly searched a single topic by one search term (110 respondents used two search terms, while 43 respondents used three search terms, and just 17 used three search terms). Title search (128), and keyword search (109) were the most popular methods of access to the electronic resources. Subject search (57), author search (32) and Boolean operators (3) were less frequent. Students needed information for the written assignments (60.6%), discussions, and presentations (23.9%), final term / research papers (11.7%), and general knowledge (1.7%). The most preferred sources of information were books(87.2%), followed by printed journals (67.2%), and reference materials such as encyclopaedias, abstracts, and indexes (51.7%). 45% of the respondents were generally satisfied with the outcomes acquired from database searching, and 55% of respondents were not satisfied with their search results. Students reported they had mostly spent 30 minutes to 1 hour for searching (55.6%). They learned the necessary skills to use electronic resources through trial, and error (29.4%), guidance of the library staff (28.3%), formal library instruction program (22.8%), and from friends (18.9%). The majority of the respondents indicated having one formal library orientation (56.1%), and emphasized their need for help only sometimes (68.3%) when using the electronic resources (Kamarudin 2001, 50-102).

Sookhtanlo, Mohammadi and Rezvanfar revealed that the most important impact on library information-seeking behaviour among undergraduate students of agricultural extension, and education in Iran had knowledge about library scientific resources, and availability of library sources. In addition, students' information seeking was affected by their English language skills, a total number of books related to a subject, and by the number of computers

7 They were followed by Education (37), TESL (21), 7 students from A Level Medicine (ALM), 6 persons from American Top University (ATU), Engineering and Information System Management (ISM), 3respondents from Information Technology (IT) and A Level German (ALG) and 2 students from American Degree Foundation Program (ADFP).

used for searching. The main resources students utilized were textbooks, and journals (Sookhtanlo, Mohammadi and Rezvanfar 2009).

In the longitudinal study Whitmire examined the differences in library use by the undergraduate students at different class levels and findings indicated that library use was low in first, second and third year without exceeding for the third year of study (mean 2.64). The most important library activity at all stages of undergraduates was using the computers in the library. Library service "ask the librarian" decreased between the first and the third year undergraduates. The library catalogue (card or online) was most frequently used by first year of undergraduate students (Whitmire 2001).

Examples of the studies with Millennial Generation and Generation Y

Connaway, Dickey and Radford in the paper entitled *If it is too inconvenient I'm not going after it* (2011) described two multi-year projects (Sense-making the information confluence: The whys and how's of college and university user satisfying of information needs and Seeking synchronicity: Evaluating virtual reference services from user, non-user, and librarian perspectives) pointing out that "both studies especially highlighted the millennials' preference for Google, and human sources for quick searches for information" (Connaway, Dickey and Radford 2011, 4). In the sense-making study information-seeking behaviors were investigated on a sample of 44 faculty, undergraduates, and graduate students in the U.S. during the course of three years, and in the second phase 307 randomly-sampled respondents fulfilled an online survey followed by the telephone interviews. Convenience was more typical for the academic library users in research-connected than in personal situations, and more often appeared as a factor in selecting internet search engines, electronic databases, or the university libraries. Findings from the nine focus group interviews indicated that undergraduates relied on Google in particular, while graduate students cited Google because of its simplicity, and speed. Faculty students most often used office library, or personal home to find quick information. Convenience, and "immediate answers" were also major indicators for the information seeking of users' , and non-users' virtual reference services not only in academic, but also in everyday-life situations (quick information needs were observed in all demographic categories, even though mostly expressed by the younger participants).

According to the global survey conducted by OCLC, 89% of college students used search engines to start an information search (search engines better fit college students' lifestyles than physical, or online libraries), used the library less, and became information consumers who rapidly switch between commercial search engines, social networking sites, bookmarked resources, wikis, and electronic services provided by their library ("Information behaviour of the researcher of the future: executive summary" 2008). The 'OCLC' (Online Computer Library

Center) revealed that 20% of university students needed information from library web sites for most assignments, while 70% of them used the web for some information regarding assignment. Students most often used full-text articles (67%), less often used electronic books (21%), and online reference (6%), and 90% of students used print resources from their library (Williams and Rowlands 2007). Findings from the computer log trails studying by CIBER showed that digital information seeking behavior of diverse, volatile, and promiscuous users in virtual libraries can be described as horizontal and bouncing (60% of the respondents look only one or two pages from an academic site, and then `bounce' out and possibly never come back), navigating (spending a lot of time to find their way around), squirreling (downloading content), checking (assessing authority, and relying on favoured brands), and viewing in nature (users spend from about four to eight minutes on e-journal and e-book sites). The research indicated that young people spend an insufficient amount of time in evaluating information (determining relevance, authority, or accuracy), have a poor understanding of their information needs, and prefer to express themselves in a natural language. CIBER's deep log analysis found out that young people (males in particular) move very quickly through online pages extensively clicking on hyperlinks. Advanced search facilities were rarely used because it was assumed that search engines understand their queries. Many students from the US utilize social networks to discuss subjects regarding their education.

Taylor studied information search process of the millennial generation (born between 1982 and 2000) as a part of their assigned research project. A total of 80 students participated in the survey, and evaluated 758 different Web pages. Findings indicated that respondents retrieved around 35% of the documents after completing the rough draft, which referred to backfilling (adding sources late in the research process after finalizing their report). The majority of subjects (67%) studied in fewer than four of the search stages. Documents for the final presentation were evaluated in the extracting stage by more than half of the students (53%), and only 16% of students prepared the final deliverable in the stage of verifying. The respondents evaluated most of the documents (around 70%) in the final two stages. Analysis of the evaluation of Web resources showed that students selected more categories like structure, depth, amount of information and recency, than authority, validity or quality of the documents. Subjects chose Wikipedia (in approximately 15% of sites) for the later stages of the research project, and verifying information gathered previously was selected by 16% of students (Taylor 2012).

In the paper *Researchers of Tomorrow* three groups of doctoral students in the UK were studied through a longitudinal qualitative study on 47 members from Generation Y doctoral students, national context-setting survey on over 2000 Generation Y doctoral students, and on over 2000 older doctoral students[8]

8 Generation Y was defined in this study as the children of the Baby Boomers who were born between 1982 and 1994.

(Carpenter et all. 2011). The most cited information sources by both samples, with more Generation Y students (83%) were peer-reviewed articles in journals, papers and posters at conferences produced, or planned as part of their doctoral research. All students from the Generation Y did not need a lot of support from library staff, or supervisors in identifying, and finding relevant research resources, and most of them felt confident assessing the quality, and relevance of the resources. The most frequently cited technology applications by the Generation Y (58%) were reference management tools and citation. Generation Y was mainly influenced by the suggestions (50%) of their peers in using open web technology, and peers helped 39% of the respondents from the older age groups sample. Generation Y received less help from the library staff (34%) than the older students (42%). 29% of students in Generation Y passively used Internet discussion forums, and 13% made its' active use, while 23% read the blogs. Authors reported that "More of the Generation Y survey sample (29%) than older age groups (23%) are active users of consumer social networks; whereas slightly more of the older age groups sample than Generation Y made active use of internet discussion forums (16% and 13% respectively). More than a half (60%) of the Generation Y group did not use Skype, and Facebook was used by the majority only for personal reasons (not for work). Students from the Generation Y survey sample who used some kind of institutionally provided technology had been more persuaded to use the technology by their supervisors (41%) than older students (36%), and received help from their supervisors (35%); they were also likely to read (52%), to photocopy (50%), or to borrow (40%) the material they had found at the library.

New services in academic libraries have to be provided in relation to growth of mobile applications and handheld devices like for instance smart phones, iPads, e-book which impact user expectations. According to the 2009 ECAR study 51.2% of undergraduate students had an Internet-capable handheld device, and 14.8% of respondents wanted to use the library services from their handheld devices which will increase as vendors offer mobile applications for OPACs and interfaces to electronic resources, and as more libraries organize mobile interfaces to their own digital collections, or text messages to reference services (ACRL Research Planning and Review Committee: 2010 top ten trends in academic libraries).

Future of the academic libraries

Final report of UK project *Academic libraries of the future* includes scenarios on future organization and potential services that libraries could offer. Among the others, *Wild West* scenario emphasises corporate power and capitalism in which "private providers compete with each other and the state to offer students educational services, including information services and learning material"(Academic libraries of the future s.a., 2). Consumers have the power

to select learning materials, courses and so they can create a personal experience of education.

The document *Futures thinking for academic librarians* brings 26 different scenarios, and some of them are related to students. The scenario *Academic niche networking* refers to sharing ideas in small online communities (where students take courses in highly specialized majors), and disappearing of physical departments at universities. According to the scenario *Archives on demand* every student, teacher and researcher is a manufacturer, and the special collections in academic libraries reach new users worldwide. The scenario *Breaking the textbook monopoly* include inviting student contributions, as well as creating and sharing faculty's course materials, modules, software, tests, streaming videos, and other tools. In the scenario *Community over consumerism* students contribute to the financial, environmental, and human area accepting distance education to reduce carbon footprint and participating in in-person events a few times a year. *Creative conscription* scenario requires from students to give the company or agency, which sponsors them as top students, two patents after graduation or six years of service. The scenario *Everyone is a "non-traditional" student* describes students as active in designing their own learning outcomes, and creating personalized curricula. Students are assessed by the faculty on demonstrations of online tutorials, marketing plans, policy documents etc. The scenario *I see what you see* gives students opportunity to design visual projects simultaneously using touch screens distributed across campus spaces. Since IT systems of university and its' library are the targets of criminals and hackers, the scenario *Increasing threat of cybercrime and cyber terrorism campus* predicts student records, and financial data protection by IT professionals. In the scenario entitled *Kinesthetic fluency* students interact moving with the help of handheld devices, and dance mats featuring in study rooms and classrooms. The scenario *Longevity is the new wealth* establishes continuing distance education in satellite campuses for senior Boomers who can return to the college campuses of their youths. The scenario *Meet the new freshman class* relates to the economically and socially privileged students who have high skills in digital media. The scenario *No need to search* emphasize media savvy students who easily manage visual text and data concentrating on synthesis, analysis, and interpretation. According to the scenario *Out of business* the academic library becomes less necessary, and visible, as information companies provide superior tools for faculty and students. The scenario *Right here with me* predicts that students will be alerted by their handheld devices when passing a bookstore with material they need to cite and scanning the title page will be embedded in proper citation style with an added endnote. Students will locate study team members and share notes with them by checking in on location-based services (meetings will be held without the need for study rooms). In the scenario *Think U* students master digital storytelling with intuition and sensing skills, while the scenario *This class brought to you by…* reveal students who graduate from several schools which they choose progressively. The scenario *Woven learning* is described as transformed learning areas in which students can smell or hear some data (Staley and Malenfant 2010).

Conclusion

The available examples of user studies described in this paper explored general information behavior of university students from different disciplinary areas. A special emphasis was given to the studies which examined the role of academic (university) library in the process of students' information seeking. According to the results of the studies conducted by George and coauthors (2006); Kerins, Madden and Fulton (2004); Baro, Onyenania and Osaheni (2010) and Kamarudin (2001) students most often use the information sources such as books, journal articles and databases which they need for academic tasks (for instance examination or paper). The majority of the respondents in these studies reported that their lecturers and peers had been very important factors in finding information resources, since they had given them some directions, or suggestions. This is also confirmed in the study by Seiden, Szymborski and Norelli (1997). All above mentioned authors except Baro, Onyenania and Osaheni (2010) found that the internet was convenient for the students in finding scientific papers and other relevant materials. Head and Eisenberg (2010), and Connaway, Dickey and Radford (2011) in their studies found that students use Google as their search engine, and this is elaborated in the paper *Information behaviour of the researcher of the future*(2008). The findings from the study by Baro, Onyenania and Osaheni (2010) are surprising because authors established that for the most students the library, and not the internet, was the primary source to obtain information. Studies performed by George et al. (2006), Callinan (2005), Junni (2007) and Whitmire (2001) have shown that the academic library served students for borrowing publications, consulting reference materials, and using computers in the library. All of these findings indicated that the internet and academic libraries had a very significant role in information behavior of university students. Since the university students are likely to use the internet, academic libraries should provide some online services like for instance ask the librarian, tutorials for learning of information literacy, instruction sessions for those students who are not familiar with the library use etc.

The results of the several selected studies about information behavior in young students (Williams and Rowlands (2007) and *ACRL Research Planning and Review Committee: 2010 top ten trends in academic libraries*) showed that they prefer virtual libraries for navigating, and downloading content. They spend a short period of time reading e-books, or e-journals, and expect from the academic libraries to offer new services over mobile devices (such as smartphones, and iPads). These findings force academic libraries to reinvent their role in order to offer some new services for the young users who do not have a habit of visiting the library. Academic libraries are especially invited to follow the users' expectations by adjusting their services to the changing needs of young students. The existing services should be enriched by acquiring new media technical equipment. New services can be created considering results from the studies that bring new knowledge about information seeking behavior of

the users in the library, students' learning, their information preferences etc. Special collections in academic libraries should be accessible to the new users worldwide, which is described in the scenario *Archives on demand*. The scenario *Breaking the textbook monopoly* predicts student contributions through creating and sharing faculty's course materials, modules, software, and similar tools, which can be implemented from the library. Academic libraries can participate in the scenario *Longevity is the new wealth* by supporting continuing distance education in satellite campuses for senior Boomers. Libraries are invited to encourage students' high skills in digital media (from the scenario *Meet the new freshman class*), and engage media savvy students (described in the scenario *No need to search*) who easily manage visual data synthesis, analysis, and interpretation in organizing different library programs. According to the scenario *Out of business* the academic library become less necessary, while information companies provide superior tools for students. Academic library needs to be a part of the scenario *Right here with me* in which students will be alerted by their handheld devices when passing a bookstore with material they need to cite. Through the library students will be able to locate study team members and share notes with them by checking in on location-based services without the need for study room meetings. Libraries should be included in the scenario *Think U* where students master digital storytelling with intuition and sensing skills, and in the scenario *This class brought to you by…* which offers students to graduate from several progressively chosen schools. It is also expected that libraries coordinate scenario *Woven learning* conceived as transforming learning areas in which students will perceive smell or hear of the data.

From selected studies presented in this paper some research issues arise. They can be significant for further studies. Some of those should explore:

- information seeking behaviour of the university students between different disciplines of the social sciences, since for example Junni (2007) in her study revealed certain differences in using the web and the academic library among the students of psychology and economics.
- information seeking and library use of the university students of various levels of education like for instance Mahajan (2009) who has examined the information-seeking behaviour of undergraduate and postgraduate students or Callinan(2005) and Whitmire (2001) who have researched library use indifferent year of study.
- various context situations in which information tasks are performed such as information pathways in academic and personal searches which has investigated Bronstein (2010).
- indicators for students' library use such as demographic data (gender, subject field, academic status) elaborated by Rowlands and Nicholas (2008); physical distance of a resource, accessible language, speed and ease of use identified by Kerins, Madden and Fulton (2004); convenience found by

Connaway, Dickey and Radford (2011); full text, currency of the data, and Boolean capabilities reported by Seiden, Szymborski and Norelli (1997).

- a role of the library education for the users (instruction sessions) mentioned by Martin (2008), Seiden, Szymborski, Norelli (1997) and Kamarudin (2001) which can be embedded in curriculum and help students to obtain necessary skills of information literacy enhancing academic library services for the users.

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Sažetak

Informacijsko ponašanje studenata i uloga visokoškolske knjižnice

Rad predstavlja rezultate dostupnih studija o ponašanju studenata pri traženju informacija koje su provedene u različitim zemljama. Cilj tih studija bio je identificirati informacijske potrebe, izvore informacija i načine na koje studenti iz različitih disciplina koriste visokoškolsku knjižnicu. Prema rezultatima, većina ispitanika trebala je informacije za akademske svrhe (npr. seminarske radove, zadatke ili ispite) često koristeći informacijske izvore kao što su knjige, članci iz časopisa, online izvori itd. Za mnoge studente internet je bio vrlo važan izvor u pronalaženju akademskih materijala. Većina studenata dobivala je savjete za pronalaženje relevantnih informacijskih izvora od predavača, prijatelja i knjižničara. U radu se također opisuju neki aspekti vezani uz informacijsko ponašanje mladih studenata (generacija Y i milenijska generacija) na koje su utjecali njihovi prijatelji i koji su slabo razumjeli vlastite informacijske potrebe. Oni preferiraju brzo pretraživanje preko Googlea, pregledavanje virtualnih knjižnica i provode više vremena preuzimajući materijale s interneta, nego koristeći e-izvore. Iako su visokoškolske knjižnice često korištene samo za posudbu knjiga te korištenje referentne građe i tiskanih časopisa, ustanovljeno je da je uloga visokoškolskih knjižnica vrlo značajna u zadovoljavanju informacijskih potreba studenata na sveučilištima. Daljnja istraživanja koja bi se provodila na temelju odabranih studija mogla bi ispitivati informacijsko ponašanje studenata između različitih disciplina uzimajući u obzir razne kontekstualne situacije u kojima se provode informacijski zadaci. Osim toga daljnje bi studije trebale proučavati čimbenike koji utječu na to kako studenti koriste knjižnicu i identificirati važnost knjižnične edukacije u poboljšanju usluga visokoškolskih knjižnica za korisnike.

KLJUČNE RIJEČI: ponašanje pri traženju informacija, informacijske potrebe, informacijski izvori, studenti, sveučilišne i visokoškolske knjižnice.