# Information behaviour of university students: a literature review

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## Abstract

This literature review attempts to give an overview of the field of university students' information behaviour. Students are generally one of the most investigated groups in the field of human information behaviour, but the field of students' information behaviour is difficult to draw into a coherent knowledge base. There are many studies of different aspects of information behaviour conducted over different groups of students. This paper presents some of the key conclusions and perspectives of selected studies. Studies in this field are conducted from the beginning of 1970's when the focus was on exploring the usage of library resources and services. During the last two decades the interest in students' library use and information behaviour in general has increased and the focus of research expanded. This review presents the literature in the following main areas: disciplinary differences in information seeking and use, the impact of curriculum and wider context including learning and teaching, effects of personality attributes, and studies that focus on use of electronic information resources. This paper also highlights research problems that authors suggest as topics for further studies.

**KEYWORDS:** information behaviour, university students, user studies.

## Introduction

At the end of 1970's and at the beginning of 1980's there was a shift of paradigms in user studies, related to the move from system centered to person-centered user studies (Limberg 2000, 51). As Saracevic quotes the early motivation for user studies was pragmatic, to discover guidelines for the improvement of practice (Saracevic 2010, 2578). Eskola (1998) centers his interest for researching students' library use and information behaviour around the library practice. In fact, the interest for this field has increased especially in 1990's because of the increase in number of students and the libraries' consequent attempt to meet their needs (Eskola 1998). In parallel with the shift of focus, there was also a shift in methodology. The move from system-centered to person-centered user studies

increased the use of qualitative research methods and in-depth understanding of human experiences (Limberg 2000, 51). Also, it is important to emphasize that "qualitative user studies have been strongly influenced by cognitive psychology which led to the formulation of the 'cognitive viewpoint' in LIS, articulated and discussed by Dervin and Nilan, Allen and Ingwersen among others." (Limberg 2000, 52). The important characteristic of the cognitive viewpoint is that it assumes that "information is a process made up of stages that over time can be delineated and operationally defined" (Cole 1997, 57), which forms the basis for many information behaviour models which are also the grounds for students' information behaviour research.

Case (2008, 301) states that students in general are one of the most widely studied roles of all, and he categorizes them as the non-employment role. There are many studies of different aspects of students' information behaviour conducted over different groups of students, and as Rowley and Urquhart (2007) quote the students' information behaviour is diffused and difficult to draw into a coherent knowledge base. This literature review includes only research of university students, and is based on categorization of literature by Rowley and Urquhart (2007). According to these two authors, there are two main directions for research: research of individual information behaviour, and research on the patterns of usage of resources. The research in the former direction use small-scale studies which usually examine the information behaviour of students in specific universities and disciplines, while studies in the later direction focus on usage of information sources and often include implications for training and support. Furthermore, research into individual information behaviour can be divided into three subgroups: (a) studies of information seeking and searching; (b) studies that examine disciplinary differences in information seeking and usage, and (c) studies that look at information behaviour in a wider context that often includes learning and teaching (Rowley and Urquhart 2007, 1163).

Even though students in general, as well as university students, are often studied role, literature does not offer unique review of information behaviour of university students. Case (2008, 301) in his review of research of particular social roles states that role of a student coincides with other categories, particularly age-based categories, and that most studies involving students are focused on some other phenomenon and therefore he does not offer a unique review of research categories of students.

## Research into individual information behaviour

### Studies of information seeking and searching

Studies of information seeking are often influenced by a particular model. For example, many studies are based on Kuhlthau's model of information searching (Kuhlthau 2004). Kuhlthau's ISP model (Information Search Process) is primary based on research with high school students, but it is an important starting

point for later research of information behaviour within population of university students. "The model describes common patterns in users' experience in the process of information seeking for a complex task that has a discrete beginning and ending, and requires construction and learning to be accomplished… People experience the Information Search Process holistically, with an interplay of thoughts, feelings, and actions." (Kuhlthau 2005, 230). The key stages identified in the model are: task initiation, topic selection, prefocus and exploration, focus formulation, information collection, search closure, and start of the writing process. Kuhlthau's model is developed in a learning context, and the main point is that information seeking is a process of seeking meaning. One of Khulthau's conclusion is that users do not clearly understand the task of forming a focused perspective, and so Kuhlthau indicates a new kind of intervention on the part of the information professionals that meets the process needs of information users.

Kennedy, Cole and Carter (1999) use Kuhlthau's ISP model in the context of research of undergraduates seeking information for course assignments in the humanities and social sciences. They assume that students in order to avoid information overload might skip the necessary stages of topic definition and elaboration which ISP model is identified as crucial. They investigate the phenomenon of so called "false focus" which can appear if students defines their focus too early in the process. This can lead to problems in further research stages. This phenomenon may even appear if an information specialist suggests to the user to limit the search so that the end result will be manageable, but may be incompatible with the uses information need and interests.

While researching the group of doctoral history students, Cole (1997) analyses elements of so called information-as-process models. He uses three different models (Kuhlthau's ISP model, Belkin's theory of ASK, and Dervin's sense making theory) where the theories begin with the person becoming aware of a gap in knowledge. Cole's study investigates the existence of a stage that is prior to that stage, named stage *zero* – "the initiating conditions where the information process actually 'opens'." (Cole 1997, 63).

Studies of Whitmire on university students' information behaviour are an example of connecting a model of information searching and epistemological models. Whitmire (2003) has conducted several studies of undergraduates' epistemological beliefs and their impact on information seeking behaviour by comparing models of epistemological development which are analyzed in parallel with Kuhlthau's ISP model. The results of the content analyses confirmed the hypotheses about the expected relationship between epistemological beliefs and information-seeking behaviour. This study (Whitmire 2003) has shown that *absolute thinkers* need help from their instructors to select a topic and that they often give up during the information collection stage, while students rated at the highest levels of epistemological beliefs stage were more persistent, use a variety of search techniques, and reject conflicting information in the information collection stage. They think of themselves as capable of creating knowledge and use their own viewpoints to select or reject information sources.

Also, in the context of information seeking and searching research, there are many studies with implications for library practice that describe students behaviour in the context of specific information literacy programs, often including assessment. Therefore, information literacy models are often used as an addition to analysis of information behaviour. It is customary that this kind of research is conducted before and after information literacy programs to test prior knowledge or the successfulness of a program. Erdelez, Basic and Levitov (2011) are highlighting the difference between information seeking models and information literacy models. "While information seeking models are more theoretical and provide a basis for hypotheses for further research, information literacy models are oriented towards practical application in the educational setting". Their research does not apply to university students but to elementary and secondary school environment. This research is interesting in this context because it is based on a different method. The focus of that research is on models, and not on behaviour. In this model oriented research the goal is to determine if models include information encountering (serendipity), as a type of opportunistic discovery of information, and whether they have components that can accommodate this type of information behaviour. There is also research on the opportunistic discovery of information in the context of university students. Nevertheless, the authors emphasize the need for additional research that will strengthen "further connections between information behaviour research and information literacy instruction and will also provide a more complete understanding of the potential role information encountering in this instruction." (Erdelez, Basic and Levitov 2011).

Another type of research focuses on changes in information seeking and searching behaviour of different generations of students, especially Millennial and Google generations. The research of Holliday and Li include findings from the qualitative study that test Kuhlthau's ISP model on the Millennial generation of students in a different information environment than in the 1980s and 1990s when Kuhlthau's original model was developed. They assumed the changes in both, students and the information environment, "could have a significant impact on students' thoughts, actions, and feelings as they go through the search process" (Holliday and Qin 2004, 357). The main conclusion is that easy access to information "enables some students to skip steps in the process, especially focus formulation, because many students stop after their preliminary searches, thinking that they have completed the research process" (Holliday and Qin 2004, 356). Their results show some changes in students' information behaviour with regard to the ISP model, which is the result of changed information environment as well as cognitive changes.

In this literature review studies oriented toward information systems (e.g. database, Internet usage) are not included because, as Case states, those studies are typically concerned with issues other than information behaviour *per se*, e.g. information retrieval (Case 2008, 229).

## Studies that examine disciplinary differences in information seeking and use

Many studies that examine disciplinary differences in information seeking and use are conducted with students of medicine. Medicine is specific because it is an area in which the expansion of information is enormous and which is critically dependent on up-to-date information. Therefore students need skills in problem-solving and independent information seeking. As Eskola (1998)states, these factors have influenced the implementation of problem-based learning approach in the medical education. Problem based learning encourages the students' independent information seeking because students need to seek and gather information from different sources, e.g. libraries, databases, experts, etc.

During the 1990s with the implementation of modern conception of learning in the medical education, interest in medical students' information behaviour has grown. Many studies, as well as Eskola's (1998) study conducted at Finnish universities, have shown a connection between problem-based learning approach and changes in the use of library services as well as in information sources in general. Problem based learning requires from the students to use a greater variety of sources than do traditional methods. Eskola (1998) also studied information literacy as a part of the students' information behaviour. He compared information literacy of medical students studying in the problem-based and traditional curriculum. The results confirmed that information literacy skills were more evident in the problem-based learning curriculum. The active use of information sources in the educational context offers opportunities to get different viewpoints.

A similar study of medical students was conducted by Wildemuth and coauthors (1995). The aim of this study was to examine to what extent is searching proficiency related to prior personal knowledge in the domain. The study has shown that curricular implementation of a well structured database in a particular domain enables students to develop specific skills related to searching and database use in that domain, and that searching efficiency develops over time and is transferable. Similar to medicine, nursing science is specific because it is an interdisciplinary field encompassing diverse research orientations: applied research, action research, medical-clinical research as well as theoretical and sociological aspects, and so on. Urquhart and Crane (1994) studied the information seeking skills and perception of information sources for nurses. They discovered an interesting fact that nurses rely more on information sources such as colleagues and health specialist than on the formal sources of information.

There are also many studies that examine disciplinary differences in the use of different information sources, as well as more detailed studies which examine, for example, the connection between searching methods and the usage of networked resources (Talja and Maula 2003).

## Studies that look at information behaviour in a wider context

According to Rowley and Urquhart (2007) there are also studies that look at information behaviour in a wider context which include learning and teaching methods and other contextual factors (Rowley and Urquhart 2007, 1165), where factors such as influence of personality, motivation, language, race, etc can be added. Considering that the impact of learning and teaching methods were described in the previous chapter, the emphasis will be on the other factors.

Many authors (Rowley and Urquhart 2007; Case 2008) in the context of research on influence of personality on information seeking emphasize the Heinström (2002) study. As Heinström states, some of the researchers in information science have emphasized individual characteristics and their influence on information seeking, but these studies have mostly focused on the influence of cognitive abilities or cognitive styles of information seeking, or on Kuhlthau's ISP model which considers the importance of feelings. As Heinström pointed out, there are only a few studies which have empirically tested the influence of personality on information behaviour (Heinström 2002, 255-256). Heinström measured personality traits and approaches to studying among 300 postgraduate students, identifying three types of behaviour: fast surfing, broad scanning, and deep diving. The focus was on students' information seeking in preparation of writing their master thesis. "The conclusion of the study was that personality and approach to studying influence the information seeking habits of students preparing to write their master thesis. These results are related to other influential variables of information-seeking strategies, such as discipline differences and the stage of the thesis process in the concluding discussion." (Heinström 2002, 3). This research also emphasizes the importance of the impact of students' feelings on information-seeking behaviour, but not as a state in information seeking process as in Kuhlthau 's ISP model, but as a personality trait.

The feeling that is often mentioned is anxiety. According to Kuhlthau, the feeling of anxiety is strongest in the beginning of a search, and strongly influences information search process. Anxiety is also mentioned as the specific phenomenon – library anxiety (Katopol 2005). Library anxiety is commonly manifested through: barriers with staff, affective barriers, comfort with the library, knowledge of the library, and mechanical barriers. Kwon (2008) investigated library anxiety among college students and found a negative association between library anxiety and critical thinking dispositions among graduate students.

There are also different researches which have direct implications for library practice, e.g. library use of different ethnic student groups (Whitmire 2003), impact of students' language skills on the usage of database systems (Vanopstal et al. 2012), etc.

## Research on resources usage patterns

Results of the most of the studies in this field have practical implications, usually in developing library services. As George et al. quote "a great deal of the more recent literature seeks to examine how students' information behaviour has changed in light of the dramatic shift away from paper-based and toward electronic sources of information" (George et al. 2006). As a form of support to librarians in their efforts to meet the students' information needs, there are a lot of studies investigating changes in student behaviour and expectations which are related to traditional and web library services, as well as to behaviour of students on the Internet. One of such studies is OCLC study White Paper on the Information Habits of College Students: How Academic Librarians Can Influence Students' Web-Based Information Choices, conducted in 2002 (OCLC 2012). The focus of the study were web-based information habits of college students and their use of campus library websites. Results show that students value access to accurate, up-to-date information with easily identifiable authors, but at the same time they need assistance in finding information in electronic or paper formats. That and similar studies, showed the need for library services that provide access to quality web-based information resources as well as the need for organization of information literacy programs. Teachers also have a significant impact on university students' information behaviour and there are studies exploring teachers influence on, for example, the usage of information sources.

There are a lot of methods in the research of the use of information resources. There are quantitative methods such as: log analysis, bibliographic analysis, structured interview, etc., but there are also qualitative methods such as unstructured interview and focus groups. George et al. point out the advantage of using qualitative approach in "exploring the topic broadly while still retaining a comparable structure that enables a better frame of comparison when analyzing the responses" (George et al. 2006). Another commonly used quantitative method is citation analysis, where by the whole field is called student citation behaviour. This method is significant because it determines what resources are students actually finding and eventually citing in their papers, determining "the result" of their searching behaviour. In 2002 Carlson (2006) conducted a citation analysis using data from 583 bibliographies he collected from student research papers to test how the citation behaviour of students is affected by the following three factors: the students' year of study, the academic discipline of the enrolled course, and the level of the enrolled course. The results showed that all three variables had significant effects on student citation behaviour. It was observed that the level of the course in which student was enrolled has a stronger effect than a student's year of study, because the number of citations increased in higher years of study. The academic discipline was also shown to be an important factor. This was evident in the fact that students enrolled in social science courses cite journal articles much more than do students enrolled in humanities courses. Carlson (2006, 15) states that there was a lack of research

on the influence of the level of the course and the types of sources that students cite, although it is expected that those factors reflect the growing ability to think critically in their discipline. However, there are studies that examine expectations of instructors in giving a research assignment and on student reactions on to their expectations. Valentine (2001, 15) found that students tend to focus on teachers' instructions but although they understand that they need to use "good" information sources, they did not know how to recognize and find them, which is also related to the level of their information literacy. For these reasons there are studies that are taking citation behaviour as a criterion for measuring the impact of information literacy programs (Scharf 2007).

Citation analysis is also often used in researching changes in student behaviour due to the changes related to the importance of online sources. There is for example Davis' (2003) study, where he found that students' bibliographies are longer and less scholarly when compared from 1996 to 2000. Even though students use more sources, most of them are non-scholarly sources found on the web. Thus many current studies investigate students' use of electronic resources, whose results are useful especially in restructuring library services.

## Research approaches and philosophies

In the field of university students' information behaviour the most common approach is the combination of qualitative and quantitative methods. Although it is common to distinguish different methodological approaches in the social sciences (Eskola 1998), in the field of information behaviour there are many examples of studies that combine different methods and data analysis, wherein a higher presence of quantitative approach can be seen. As Eskola (1998) states, this can be related to the growing interest in qualitative methods in other areas of the social sciences, as well as the fact that there are a number of factors associated with information behaviour (e.g. individual, situational, historical, contextual, etc.) which would not be taken into account if a research only applied quantitative methods. The most common data collecting methods which are used in qualitative approach are: in-depth interviews, diaries and observations, while the most common quantitative methods are: structured interview and questionnaires. There are many examples of research which use several methods (triangulation) as away to ensure validity, especially in qualitative research. Eskola (1998) emphasizes the importance of qualitative research in exploring participants' perceptions of the search process, not only the participants' actions. George and the co-authors quote that interviews as qualitative methods are useful for exploring the past as well as the current information seeking behaviour of students, and also as "a means of exploring the topic broadly while still retaining a comparable structure that enables a better frame of comparison when analyzing the responses" (George et al. 2006).

Depending on the method of research, studies use different samples. For qualitative methods there is usually a smaller sample ranging from ten to twenty subjects (Eskola 1998; Eskola 2005). However, depending on the specific needs the sample in qualitative approach can be also much more larger, e.g. if researchers want to include participants from all colleges and departments of the university (George et al. 2006), or if it is a comparative study (Talja and Maula 2003) etc. Quantitative approach uses larger samples, e.g. citation analysis of hundreds of bibliographies (Carlson 2006). Data analysis are following the principles of qualitative or quantitative analysis, or combining both techniques. Usage of both techniques is particularly important in analyzing the verbal data, as Chi states "this quantitative-based qualitative approach basically operationalizes one's subjective impression by coding the verbal evidence for that impression and comparing the frequencies of the codes quantitatively" (Chi 1997), which also contributes to less subjective interpretation of results. It can be observed that a lot of studies and data analysis are influenced by a particular model of information seeking but there are also measuring instruments taken from other areas of science, especially from psychology (e.g. California Critical Thinking Disposition Inventory – instrument for measuring dimensions of critical thinking dispositions (Kwon 2008, 119).

There are different philosophical foundations related to research approaches and theories and models used. There are many studies based on Kuhlthau ISP model as has already been mentioned and those studies are essentially constructivist in their nature. The constructivist view is one of the cognitive approaches which takes information as process that involves reflection, action and interpretation, whereby "the information seekers are agents, making meaning as they proceed, with reality known through cognitive structures" (Rowley and Urquhart 2007, 1165). Besides Kuhlthau's ISP model as an example of constructivist information-as-process model of information seeking, there are also other influential models and theories that are based on this approach e.g. Belkin's ASK theory and Dervin's sense making theory. All these theories are based on the theory that the person who seeks information becomes informed in a series of stages which end when the need for meaning is satisfied (Cola 1997, 58). Constructivist view as a part of the cognitive view, in the epistemological sense, divide the world into the outer world of the object (information) and the inner world of the subject (the recipient). That is a dualistic view "of a subjective and an objective world, a separation between the inner world, that is inside somebody's head, and the world out there, e.g. information" (Limberg 2000, 52). As an alternative approach in information behaviour studies Limberg (2000, 52) advocates phenomenography. She describes it as a set of theoretical assumptions and a methodology. As opposed to studies based on the cognitive approach which "adopt a first order perspective focusing on what people do and how they act" (Limberg 2000, 54), phenomenography uses the second-order perspective and is directed at phenomena as they appear to people. Also, in contrast to cognitive approach, phenomenography views experience "as a relation between subject and object,

that is, between a person and a phenomenon, dissolves the separation between the two, indicating the non-dualistic stance of phenomenography" (Limberg 2000, 55). So, Limberg's study based on the phenomenographic methodology is in accordance with Kuhlthau's view of the information search process "as distinguishable but integrated in the larger learning process "(Limberg 1999), however, her research object is to study how these two processes interact with one another, viewed from the perspective of the learner.

Although Limberg's study is not focusing on university students but on high school students, her study is often quoted in the context of university students and in the context of different research approaches. Also Bruce stresses the importance of phenomenography as a research approach "devised to allow the investigation of varying ways in which people experience aspects of their world" (Bruce 1999) and its significance in providing outcomes which are applicable to professional practice.

## Conclusion

The early motivation for user studies of university students was pragmatic, mostly focused on discovering guidelines for the improvement of library practice. During the last two decades the focus of research of user studies, as well as information behaviour studies, has expanded and goes out of the context of library theory and practice. Since there is no comprehensive theory of information behaviour, as Case (2012, 197) states, theories originating in education, psychology, and sociology provide most of the theoretical basis for empirical work. Since the research in the field of information behaviour of university students is related to educational context, there are numerous examples of studies based on theoretical approaches arising from education such as the constructivist approach. When researching university students as well as other groups a strong influence of cognitive and socio-cognitive approach is evident. With the shift of the focus of research, there is also a methodological shift toward qualitative approach.

Urquhart's and Rowley's (2007) claim that there is a need for more holistic perspective of human information behaviour within the broader framework of social science theories and models, specifically evolutionary psychology. They also emphasize the importance of longitudinal studies specially in the field of epistemological studies because individual's beliefs are developmental and change during education. It is also important to highlight Limberg's (2000) claim that research in this field needs more phenomenographic approach, primarily to allow describing variation instead of general models or process.

Studies of university students' information behaviour published in 2012 demonstrate that there are many studies with practical implications for academic libraries as well as higher education in general, e.g. the usage of electronic information resources (Deng 2010), information services and mobile

communication (Han and Wong 2012), students' reading habits and the impact of emerging technologies on teaching and learning (Dewan 2012), etc. The Skågeby's (2012) article *The irony of serendipity: disruptions in social information behaviour* is not directly related to the university students' information behaviour but may represent an example of the relatively new topic in this field, as well as different methodological approach. Serendipity in the context of researching existing models of information literacy, and potential positive role of information encountering in information literacy instructions, as well as the need for changing of existing models has already been mentioned. This research demonstrates potential negative role of serendipity in relation to social disruption that emerge with the use of social media services. It is interesting to note that this research is based on ethnographical approach, which is not common in studies of university students' information behaviour, but is one of the approaches in researching information behaviour that is listed in Bates (2005, 12) categorization of metatheories and approaches in LIS. Also, this article may represent an example of article based on theory of media and communication science as well as information science, which it is also common in researching human information behaviour. Considering that information science is interdisciplinary in nature (Saracevic 2010), it is safe to assume that in the future there will be even more interdisciplinary studies in the field of university students' information behaviour.

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## Sažetak

**Informacijsko ponašanje studenata: pregled literature**

U radu se daje pregled literature s područja informacijskog ponašanja studenata. Postoji velik broj istraživanja o različitim aspektima informacijskog ponašanja studenata te rad prikazuje samo neke od ključnih aspekata i pristupa. Istraživanja se provode od početka 1970-ih, kada su većinom bila usmjerena na kontekst korištenja knjižničnih usluga. Tijekom posljednja dva desetljeća broj istraživanja se znatno povećao te se proširio fokus istraživanja. Pregled se odnosi prvenstvo na sljedeće aspekte: traženje i korištenje informacija u različitim predmetnim područjima, utjecaj obrazovnog konteksta i osobina ličnosti na informacijsko ponašanje, te korištenje elektroničkih izvora u obrazovanju. U radu se također navode istraživački problemi koji su istaknuti kao moguće teme za daljnja istraživanja.

**KLJUČNE RIJEČI:** informacijsko ponašanje, studenti, korisničke studije.