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Students' Information Needs and Behavior

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Abstract
Students' information behavior is affected by their physical and cognitive developmental stage. Current students are widely understood to be experienced and confident in using online information and communication technologies, although their skill levels commonly are considered to be insufficient. Significant opportunity exists to develop more sophisticated searching skills, as well as the ability to critically evaluate information. Information literacy instruction is key to developing these skills. Library use mostly occurs virtually, for both on campus and distance students, and students strongly prefer information available online in full text.

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INTRODUCTION

This entry describes current understanding of students' information needs and information behavior, based on recent research in library and information science. Students are defined as people at secondary and postsecondary school age (including high school, college, and university students); young children are therefore not included. In addition, students are not necessarily homogeneous in their age groupings. For purposes of this entry, student age groups are assumed to be generally homogeneous; that is, high school students are assumed to be in their mid- to late-adolescence (e.g., 15–18 years of age), undergraduates or college students are assumed to be in late adolescence and early adulthood (e.g., 18–23 years of age), and graduate students are in early adulthood (e.g., 21–25 years old).

In addition, this entry focuses on young people in their role as students, rather than in any other everyday life role (e.g., employee, family member, and leisure group member); the context of interest is the school or academic context. It is important to keep in mind, however, that often these life roles intermingle, so clear separation of information behavior in terms of the student role may not always be differentiated clearly from a person's role as a friend or family member. Information behavior is defined broadly and holistically as including cognitive, behavioral, and affective aspects of active and passive information seeking and information use. The entry makes generalizations about students' information behavior. Clearly, some students will not think and behave in ways which are typical for their age group.

DEVELOPMENTAL CHARACTERISTICS

Because the group of people under consideration in this entry are mid- to late-adolescents and young adults, developmental issues are relevant to understanding their information behavior. Students are in the process of developing their reasoning skills; some are able to think more abstractly, logically, and rationally than others. Some are able to consider multiple possibilities and consider the world hypothetically. The ability to "think about thinking" or to think "metacognitively" is also developmental; students will have varying abilities to reflect on their feelings, and their thinking. These abilities typically improve as students grow older. Biologically, the brain's frontal lobe development is not complete until people are in their 20s; this part of the brain is responsible for planning and judgment. Thus, age-related physical development also will affect information behaviors.

Developmental approaches to cognition recognize that thinking develops from a stage where relying on received authority is typical, to more active meaning-making and conscious decision-making among many possible alternatives. Implications for information behavior may include passive acceptance of online information as inherently authoritative at earlier cognitive stages, with increased ability for critical evaluative analysis of information at later stages. Therefore, high school students may uncritically rely on information found on the open Web through general search engines to a greater degree than more experienced, and developmentally more mature, graduate students. It is also commonly accepted that as people develop they become more cognitively flexible and reflective. These changes may lead older students to greater openness toward new information, and motivate more active information searching, as well as reflection about the credibility and value of information that is found. It is quite possible that a wide range of cognitive ability and flexibility, tendency toward reflection, and epistemological orientation will exist among any group of high school or postsecondary students, making it unwise to draw strict conclusions about cognitive developmental stage.

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However, it is prudent to recognize that among students as a group, a wide range of cognitive characteristics will exist, including thinking that is not as advanced developmentally as many adults' thinking. And, ability to think and plan will necessarily and profoundly affect information behavior.[1]

THE NET GENERATION

Currently, it is widely recognized that most students in North America belong to a generation variously labeled as the "net" generation, or as "millennial" generation. While this label undoubtedly generalizes, an understanding of how it may describe many students can be helpful in developing appropriate information services for this user group. The "net" generation label connotes a number of attributes, many of which relate directly to information behavior. Most basically, the vast majority of students use the Internet regularly, and the majority report that they access the Internet in their school setting, in addition to home or other access.[2] In the United States, as of March 2007, 87% of 18–29-year-old people used the Internet; a significantly larger proportion of White, urban, and higher-income persons were Internet users.[3] Net generation students are flexible with respect to media format; they are open to seeking and receiving information in a variety of formats, although they express a clear preference for electronic formats, such as the Internet, the Web, and cell phone technology. Instant messaging is preferred to e-mail, and multimedia social computing software such as MySpace or Facebook is very popular. There is significant confidence in using electronic technologies, although for complex information searching situations, there may be a large gap between confidence and actual skill level. Indeed, testing for search skills and ability to evaluate credibility of information reveals these gaps, and is generating widespread concern about general skill levels among student populations. This concern relates to students' actual ability to locate and evaluate information appropriate for academic purposes, but also relates to information sought and used for personal decision-making (e.g., for sexual health). Students' weaknesses when judging credibility may relate to a drop in respect for authority, perceived by some observers, along with increased emphasis on social computing and democratic principles of collective effort, so that "authority" of information may be less important for this generation than was the case for older generations. The well-known popularity of democratic information sources such as Wikipedia is a good example.

Another common trait among the net generation is little tolerance for print formats, which may be viewed as old-fashioned, unwieldy and too slow; timely information retrieval is of the essence. There is also a preference for multimedia, so there is a predilection for information contextualized by music and images. These students are also skilled multitaskers, apparently able to simultaneously attend to multiple sources of information. Their preferred learning style is experiential, so that active and enjoyable and entertaining methods of learning are favored over reading print or listening to lecture material alone. An inclination for collaborative learning also affects information behavior, increasing a focus on group information sharing. Speed and convenience, as well as habitual use of the Web for information seeking in general, are key variables in information source preference. Thus, quick, and very possibly relatively ineffective, general Web searches (e.g., using Google) often suffice to provide information for many purposes, including school assignments. Libraries and librarians may be viewed as associated with a dated institution, and there is often little understanding that academic databases used to complete assignments are likely provided by libraries rather than simply existing on the open Web.

This set of generational characteristics presents a multitude of challenges for information service providers, in terms of meeting expectations and preferences for information format, and in communicating with students whose learning styles and communication preferences differ substantially from those of service providers who identify with an older generation.

INFORMATION SEARCHING BEHAVIOR

Information searching specifically means the active, typically online, searching for information that students do as they seek to fulfill assignment requirements. One of the most influential theories of information searching by students, which is user-centered and has proven to be very robust, is the information search process (ISP), developed by Carol Kuhlthau.[4] The ISP is based on the principle of uncertainty, and assumes that students search for information in order to make meaning. The ISP describes information searching along three continuums: thoughts, feelings, and actions; thus, it is holistic in its approach, and is particularly noted for including affect, or emotion as integral to information behavior. According to the ISP, students progress relatively predictably through a series of stages in their information searching, beginning with initiation, moving to selection, exploration, formulation, collection, and presentation. Each of these stages is characterized by affective experiences (such as relative anxiety or confidence), thoughts (e.g., vague or interested), and physical actions. Each stage is associated with a particular goal related to the ISP, and specific tasks related to achieving that goal. Understanding where a particular student might be on this continuum can help information services providers to give assistance appropriate

to the stage. In addition, when students themselves understand that information searching is a process, and that their feelings and experiences are shared by others, anxiety can be reduced, and search effectiveness can be improved.

Like most searchers, students' searching behavior is constrained by time limits (especially when meeting assignment deadlines), and information overload. Many students make choices about what information to use based on expedience, or convenience, which is a "satisficing"[5] approach. Convenience supersedes quality as a criterion for information source selection. Timeliness is a key factor for information selection; students prefer information that can be found quickly. One result is that when quickly-identified information is found, searching may be brought to a premature close, with the result that better quality, more detailed, or more topically relevant information may not be found. Research across many institutions, with students of a wide age range and who are studying in a variety of disciplines, consistently demonstrates that students generally are challenged while selecting appropriate databases, constructing effective search strategies, and evaluating information found. Search strategies are often ad hoc and incoherent. There is a tendency to believe that all online information is equally valuable. More sophisticated searching is observed from students with greater domain knowledge; thus, students who are more experienced with subject content (e.g., graduate students) will be more sophisticated searchers than novices. Improved searching skills demonstrated by more senior students also results from greater experience and from more information literacy skills training. In general, the open Web is much preferred over formal online sources such as databases or specialized portals. Google is the most used Internet search engine, and is favored because it is perceived as easy to use. In addition, many students use it out of habit, because it is the search engine of choice for personal information needs. Naturally, that habit develops because these users experience success; that is, they find information that, in their judgment, satisfies their needs. Other search engines, such as Yahoo!, are used far less frequently than Google, and library catalogs are used very little, even for school assignments.

Among the personality characteristics which affect approach to searching behavior is self-efficacy, or the belief that one can achieve one's goals. Self-efficacy is related to confidence, but is a distinct trait that is open to development. When students feel self-efficacy about their searching skills, or even computer use in general, they are more likely to explore unfamiliar territory, and to search more deeply. Self-efficacy also has been positively correlated with library use.[6] A range of other personality characteristics, such as extroversion, neuroticism, and level of engagement (motivation), have been found to affect searching behavior, but the practical implications of this understanding for information providers are not yet clear. For example, the depth with which information searching occurs may be related more to personality than to discipline of study.[7] Other individual differences, such as gender and cognitive style, may be relevant to searching effectiveness.[8] External factors such as group dynamics may also affect information seeking, as young persons are often significantly influenced by their peers.

LIBRARY USE

In the student role, young people frequently are expected by their instructors to make use of libraries for research. Even if libraries are significantly less preferred than the Web, and even when students do not realize that access to proprietary databases is provided as a library service, libraries do play a role in students' information behavior. For most students in most educational settings, little use is made of in-person reference services, and virtual reference services are not popular. In addition, because most students prefer to use online information sources, in-person searching for information, and use of print materials are significantly less important for this user group. Indeed, many students actively avoid using the library as a physical space for information searching, although that space may be sought out for studying or socializing purposes. Many students also actively avoid consulting library staff, because staff expertise is not well understood, and sometimes because of negative experiences with library staff who lack understanding of the developmental and affective aspects of information seeking. Library anxiety is a phenomenon affecting many students; they are intimidated by the library and lack confidence in their ability to successfully negotiate its intricate and complex systems. Library anxiety is also characterized by a fear of asking for help. International students with additional language barriers may be particularly affected by library anxiety. Interestingly, and for unknown reasons, African-American graduate students appear to experience less library anxiety than do their White peers.[9] Students are largely unaware of the materials and services that libraries offer; for example, they often do not know that libraries can provide access to databases containing information directly relevant to school assignments. This points to a significant need for greater assistance to students, online and in person, as well as more training opportunities (see the section on "Information Literacy").

Attempts to increase library use, or at least help students to appreciate library services, such as knowing about licensed online databases, requires a marketing orientation informed by understanding students as a user group (see the section on "Net Generation"). There are some libraries which are central to the information seeking of their students, and the research literature does provide examples where library staff have worked closely

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with teachers to meet students' needs effectively. In particular, when library Web sites can meet students' preferences for convenient, effective access to quality online information, those libraries are valued by their student users. One of the challenges facing students who use library Web sites is the jargon that is understood by librarians but not by users. Another challenge is that, due to students' emphasis on convenience, full-text information is greatly preferred over information that must be located via a multiple step process (e.g., locating print sources on the basis of citations). Thus, information that is not made available online in full text may be underused or never used at all.

INFORMATION LITERACY

Information research requires a skill set commonly referred to as "information literacy." These skills include the ability to recognize information needs, to efficiently and effectively search for information required, and to use information ethically (e.g., to avoid plagiarism and to cite references appropriately). Information literacy includes cognitive understandings (e.g., understanding Boolean logic), behavioral skills (e.g., keyboarding), affective attributes (e.g., confidence to use databases), and attitudes such as respect for intellectual property. Relational models of information literacy emphasize information literacy as a process and as knowledge-building. Whether conceived a list of skills, or as a more complex set of concepts, there is little disagreement about the need to develop information literacy. As a group, students particularly require information literacy skills to conduct the research required to complete assignments. These skills are not innate, nor are they developed through experience alone. Explicit instruction is required in order to learn sophisticated, efficient, and effective skills to find and evaluate information. There is ample evidence that teaching information literacy skills results in increased skill level, increased confidence in using libraries and in information seeking, improvements to learning outcomes, and increased program retention rates. Indeed, college students who have graduated from high schools with librarians and library programs perform significantly better in their academics at the postsecondary level. In addition, students are able to apply information literacy skills learned in a library context to other areas of their lives, improving their information search and evaluation skills for information seeking and decision-making in personal situations.

Many students receive training in how to use their high school library; many do not. Training opportunities at the postsecondary level vary as well. At some educational institutions, mandatory training on information literacy skills ensures minimal exposure to search skills and critical evaluation skills. However, many colleges and universities do not require information literacy training for students. Most institutions offer some training opportunities, however. These range from introductory orientations and library tours, to 1 hr focused workshops, to course-integrated workshops. Logical sequences of skills training opportunities also are available at many institutions, while others offer elective credit-bearing information literacy courses. Because of this diversity of opportunity, many students receive little or no formal training in information literacy skills. In addition, many students do not feel confident to ask for help in person, or by other means, often because they are concerned about appearing stupid. If students enter a physical library they often receive informal at-need specific instruction if they ask library staff for help. This may take the form of quick database searching tips, for instance. In addition, libraries typically provide online information literacy skills training through their Web sites. This ranges from online "pathfinders" to interactive tutorials focusing on how to search particular databases or skill sets (e.g., how to avoid plagiarism, or how to accurately cite source material). A minority of students receive training in how to use the Internet, which is the most significant information source for this user group.

Teaching methods appropriate to students will vary with the specific group, but high school students may be particularly motivated by methods which incorporate contemporary themes and pop culture references. In addition, active learning methods, such as hands-on instruction in a laboratory environment, are generally more effective than more passive methods, such as lecturing. Information literacy skills are best taught in a context of close collaboration between librarians and teachers or faculty, within the context of the curriculum. Thus, the timing of development of specific skills correlates with what students are learning and with the assignments they are working on. Students learning within a problem-based curriculum, as is often the case in health-related disciplines, tend to develop more sophisticated information literacy skills, because these skills are critical to find the research- or evidence-based information for successful learning.

Despite the apparent need to develop information literacy among students, significant barriers exist for librarians who wish to undertake this work. These barriers include negative or ambivalent student attitudes toward libraries, and lack of understanding of librarians' expertise. Institutional barriers such as complex librarian–faculty relationships, which hinder collaboration on information literacy initiatives, ambivalence on the part of library administrators, and lack of funding for staff and teaching resources, are also challenging. In addition, some librarians are uncomfortable with the teaching role, and many librarians who are tasked with providing information literacy instruction are relatively unprepared for that work.

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SPECIFIC STUDENT GROUPS

Some differences in information behavior are discernable between different subgroups of students. It has already been noted that search skills and ability to critically evaluate information appears to improve over time, so older students (e.g., graduate students) are likely to be more efficient and successful information searchers than high school students. In part, this is due to increased domain knowledge as disciplinary specialization deepens, but is undoubtedly also due to biological maturation. As the brain reaches developmental maturity, judgment and planning ability improve.

Disciplinary differences among students are not as sharp as those observed among different disciplinary groupings of scholars and scientists; students in different disciplines behave far more alike than they do differently. Standard conceptions about the preferences by humanities scholars for browsing, for instance, are not necessarily applicable to students studying in those disciplines, particularly at the undergraduate level. This is the case despite the strong influence of educators, who presumably are disciplinary experts, on the information seeking behaviors of their students (especially in recommending specific databases). Thus, the typical behaviors described above apply to students across areas of study. One analysis of students grouped by broad disciplinary characteristics found that undergraduates in "soft," "pure," and "life" disciplines are more active information seekers than their peers in "hard," "applied," and "nonlife" disciplines. "Hard" disciplines included engineering and physical sciences, while the "soft" label was applied to humanities and social sciences. "Pure" referred to physical sciences, humanities, and social sciences, while engineering, business and education were considered to be "applied." Social sciences and education were considered to be "life" disciplines; the others were labeled "nonlife."[10] At best, these kinds of differences suggest that focusing library and instructional services on those students who are the least active information seekers might increase their information searching activity. However, curricular imperatives, assignment structures, and instructor expectations will all play significant roles in mediating students' information behavior.

International students are a group worthy of special attention by information services providers. Language and cultural barriers often combine to make information searching and library use particularly challenging for these students. Library anxiety may be especially acute, and lack of confidence may stand in the way of seeking much needed help. In addition, unfamiliar and complex library systems and organization, including confusing library jargon and alien physical arrangements such as open stacks, may increase anxiety. There is little doubt that providing focused information literacy and library use instruction for international students is critical to ensure effective information access.

CONCLUSION

As a user group, today's students present information service providers with a variety of opportunities and challenges. Students' information seeking habits in their academic contexts appear to be less rational, and are less effective, than information experts would like. Partly motivated by developmental stage, and partly by their unique experiences as the "net" generation, students are focused on finding full-text online information as conveniently and quickly as possible. Sophisticated search strategies, critical evaluation of information, and appreciation for intellectual property are skills and attitudes which require development. Information literacy instruction is critical if students in general are to become skilled information seekers and ethical information users. Experience using computers and general Web search engines is insufficient. More likely, experience engenders confidence which is unmatched by demonstrable skill. This situation provides librarians with significant opportunity to reimagine their services, and to fill an important instructional role. Librarians alone have the expertise required to guide students to sophisticated information seeking strategies. Students have much to gain from that expertise. The challenge will be to meet these opportunities with conviction, resources, and a clear understanding of the preferences and habits of this user group.

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