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Abstract

This article offers a theoretical model of online, graduate student information seeking behavior. The qualitative methodology used to gather data for the development of the model included an electronic survey and semi-structured interviews conducted online using Adobe Connect Pro™. Participating in the study were 238 graduate students enrolled in at least one online course at a mid-western university. Data analysis included use of Zoomerang™ reports to interpret survey data, and content analysis of interview transcriptions. The resulting evolution of the Bates' (2002) theoretical model includes new two modes of information seeking: scrutinizing (directed, dynamic), and being alert (undirected, dynamic). The researchers conclude that the essence of online, graduate student information seeking is the gathering and processing of information by humans using computer technologies and the resulting impact on the human brain. This study shows the necessity of linking online, graduate student information-seeking research to psychological theory to examine reasons why online graduate students engage in various information behaviors.

Background

Emporia State University (ESU), located in the heart of the scenic Flint Hills, is in close proximity to the three major metropolitan areas of Kansas, Wichita, Topeka and Kansas City. ESU serves 6,500 students in nationally recognized academic programs. Founded in 1862, ESU was the first public institution of higher learning in Kansas. The university enjoys a national reputation as a leader in teacher education and student retention and as an innovative marketer through its regional distance program in the School of Library and Information Management (SLIM). Founded in 1902, SLIM is the oldest school of library and information studies in the western half of the United States and offers courses in six program sites in Colorado, Kansas, Oregon, and Utah. The SLIM, Master of Library Science, accredited by the American Library Association, offers a two-year, 36-credit-hour degree program that prepares qualified students to become information professionals in all types of libraries and information agencies, as well as a Ph.D. program that prepares scholars to teach in higher education and conduct research in library and information studies. The PhD program offers concentrations in library and information management, instructional design technology, and information systems. This study was conducted by nine SLIM, PhD students who, along with their professor, formed a research team during the spring 2011 semester.

Introduction

Rapid growth in the amount and types of available online information elevates the issue of library usage to that of a new imperative for today's society. Access to online college classes is a strong "pull" on

today's technologically modern college students while distance education becomes the fastest growing trend in higher education today. According to the 2010 Sloan Report on Online Education, online education experienced a 25% growth rate from the previous year. The 2011 Survey of Online Learning reveals that the number of students taking at least one online course has now surpassed 6 million. Now nearly one-third of all students in higher education are taking at least one online course.

Unprecedented growth in online education, and college students' related preference for online courses, presents new challenges and opportunities for college students, academic librarians and their content area faculty partners in teaching and learning, as well as for today's American society committed since the late 1800's to creating an informed citizenry through an education system including schools and libraries. What do these contemporary trends mean for the future of college education in America, particularly for the place of academic libraries and roles of professional librarianship?

Low- and Non-use of Libraries

Academic libraries and librarians are ideally positioned to provide online students with access to paper and digital resources and to teach information literacy skills necessary to find and assess, and create and effectively use content specific information. However, a growing body of research indicates that low- and non-use of college and university libraries and services of librarians exists. Studies indicate that some of the reasons for low- and non-use of university libraries are student's lack of time, student's distance from the library, and student's lack of knowledge of resources (Brick, 1999; Flowers, 1995; Green, 1994; Harris, 2001; Hider, 2008; Tenopir, Hitchcock, & Pillow, 2003; and Toner, 2008). Mirtz (2010) asserts that non-use may be associated with metaphors used by librarians such as extension, outreach, continuing, and distance, which are not well-understood by students at a distance, therefore, creating gaps between the student at a distance and the library and/or librarian. Ismail (2009) found that graduate social work students, who participated in courses through non-traditional delivery including weekend and satellite instruction and who did not visit the main campus, had difficulty effectively utilizing the resources of the library, and needed more assistance and attention with regard to access to library resources and services.

A 2006 report by the Online Computer Library Center, Inc. (OCLC) membership (Connaway & Prabha, 2006) states that "only 10% of college students indicated that their library's collection fulfilled their information needs after accessing the library Web site from a search engine" (DeRosa, Cantrell, Hawk, & Wilson, 2005, p. 6-2). It was also reported that 54% of students "do not seek assistance when using library resources" (p. 6-2). In a study of distance students using teleconference course delivery, Tipton (2001) found a need for orientation to library services based on 43.14% of students in the study who reported "they often or very often felt the need for additional training in searching for materials for research papers" (p. 400).

Other recent studies have investigated student academic achievement and the problem of low- and non-library use. Goodall and Patten (2011) in a study of undergraduate students at Huddersfield University in West Yorkshire, England, link academic library low- and non-use to student achievement. This study acknowledges that library usage varies between academic schools within institutions and that there are often pedagogic reasons for low library usage. However, this study suggests that in some subjects, students who "read" more measured in terms of borrowing books and accessing electronic resources, achieve better grades. The Huddersfield University research corroborates the research findings at the University of Cape Town (DeJager, 2002), which indicates that humanities students who do well in exams tend to borrow more books from the library than those who did not. According to DeJager (2002), "the circulation of library materials indeed correlates significantly with academic achievement in certain subjects leading to the deduction that undergraduate students who use their libraries a lot, also do well in their exams" (pp. 295-6).

According to Kolowich (2011), the issue of library non-use was studied by two anthropologists and library staff at Illinois Wesleyan, DePaul University, Northeastern Illinois University, and University of Illinois's Chicago and Springfield campuses to learn what students, librarians and professors think of the library and each other at these institutions. Through their research, librarians learned that students' study habits are likely to be worse than they thought as students' tend to overuse Google and misuse scholarly databases. Librarians and professors tend to overestimate the research skills of some of their students,

leaving students feeling intimidated and alienated from the library. At times an idealistic view of the research process is projected on students who are often not willing or able to fulfill it.

Theoretical Framework

This study builds on the theoretical model by Marcia J. Bates (2002) wherein she attempts to achieve two goals: 1) “to provide a single model that incorporates both information seeking and searching within it, and 2) to integrate the social and cultural with the underlying biological and physical anthropological layers of human experience with the underlying biological and physical anthropological layers of human experience with respect to information seeking and searching” (p. 1). Bates’ model outlines four modes of information seeking behaviors, which were used as a framework for this study: “directed and undirected” (p. 4) information seeking behaviors; and, “active and passive” (p. 4) information seeking behaviors. Basic premises of Bates’ theory used to examine findings in this study include: 1) The natural propensity of humans is to acquire information passively through elaborative social networks. 2) Information seekers encounter difficulty in accessing online information resources due to lack of information literacy skills. 3) Lack of effective supports during online information seeking cuts down on the need for active information seeking in libraries. 4) Human beings adopt the principle of least effort in seeking and searching for information. Bates’ view that the natural propensities of human beings to collect information passively through absorption from the environment or actively through sampling and selection provide the point for derivation and the evolution of a new theoretical model of online, graduate students’ academic information seeking behaviors.

Methodology

A qualitative inquiry process (Creswell, 2007) was designed to investigate gaps in the research literature about low- and non-use of libraries and librarians’ services. The focus of this project is on ESU online graduate students. The study sought to determine online graduate students’: 1) general use of computer technology; 2) use or non-use of the library and/or services of the librarian; 3) patterns and practices in undertaking assignments; 4) strategies for finding sources of information and asking for help; 5) challenges and roadblocks in accessing academic information for assignments; and, 6) connection to the university library. The goal of the study is to improve librarians’ understandings of online college students’ information needs; and, to begin a dialog using a new theoretical model of online graduate students’ information behavior about how to teach (reach) students and improve online, college students’ learning experiences.

Study Participants

Participants in the study were 238 online, graduate students at Emporia State University, Emporia, Kansas, U. S. A. Selection of this case was based on the researchers’ theoretical purpose and the relevance of this case to the purpose (Eisenhardt, 1989; Glaser & Strauss, 1967). Also, based on the view of Stake (2005), the case was selected by the research team because of its high potential for learning. Survey data (Table 1) about participant demographics indicate that participants were 61 men (26%) and 173 (74%) women (4 unknown). Range of age of participants (2 non-responders) was: 98 individuals less than 29 (42%); 93 individuals less than 45 (39%); and, 45 (19%) individuals more than 45 years of age. The majority (183, 76%) of participants reside a minimum of 50 miles from the University. English is the first language of the majority of the participants (228, 96%). Participants (166, 70%) were enrolled primarily in four ESU programs of study (Business (9, 4%); Instructional Design and Technology (27, 11%); Health, Physical Education and Recreation (19, 8%); Education Leadership (21, 9%); and, School of Library and Information Management (90, 38%); and 66 (28%) participants enrolled in other programs in English, History, Physical, Science, Mathematics, Special Education, Early Childhood, Curriculum and Instruction, School Counseling, and Teaching English to Speakers of Other Languages. There were 5 (2%) non-degree seeking participants. Participants indicated that they chose distance education for convenience (178, 75%); fit of schedule (180, 76%); and, quality of program (102, 43%).

Data Collection, Analysis, and Writing

The data collection process in two phases utilized multiple forms of data collection, electronic survey and semi-structured interviews, to incorporate detailed views of informants. During phase one, using the Zoomerang™ electronic survey tool, a 19 question survey was disseminated to the entire university population enrolled in at least one online course during the spring 2011 semester, a total of 1,477 graduate students. There were 238 (16 %) responses to the survey. All respondents participated on a voluntary basis with no compensation. A total of 34 survey participants volunteered to participate in an online, follow-up interview. During time available in phase two, it was possible to schedule 13 interviews ranging in length from 10 to 22 minutes. Interviews consisted of three, open-ended questions. Interviews were conducted and recorded using Adobe Connect Pro™. Research team members transcribed the statements of the respondents into a structured, word document that was coded to eliminate names or any other identifiable information.

Research team members analyzed the interview documents using directed content analysis (Zhang and Wildemuth, 2009). Initial coding began with a theory of information behavior and relevant research findings of low- and non-use. During the data analysis, the researchers immersed themselves in the data and allowed themes to emerge from the data. Researchers followed a 12-step, integrated approach to analysis, which was adapted by the professor from the work of Krathwoht (1998). The purpose of this was to validate or extend Bates' conceptual framework. This process is comparable to the constant comparative method (Glaser & Strauss, 1967; Lincoln & Guba, 1985), the most common method for analyzing qualitative data. The data corpus consisted of 35 pages of interview narrative and 218 separate responses to questions. Coding scheme and categories that emerged from narrative data are organized within Research Sub-questions 1-3.

Findings

Survey data (Table 2, Question 6) indicated that participants had used numerous technologies in the past two weeks including searching the Internet (232, 97%), Facebook (200, 84%), and e-mail (235, 99%), and were somewhat experienced as distance education students (Table 1, Question 2, 3, 5) with 80 (34%) participants indicating that by the end of the semester 3 courses would be completed in their degree; 148 (62%) indicated that all the courses in their degree are online; and, 118 (50%) indicated they had online learning experience prior to enrolling in their current online graduate degree. When asked about attending library orientation, 154 (65%) participants indicated that they had never attended a library orientation. More than half the participants (128, 54%) indicated that their library use (physical or virtual) was on average one time/month or less. When asked about asking for assistance, 129 (54%) participants indicated that they had never ask a librarian for assistance to locate information to use in a course assignment, and 200 (85%) indicated that they had never ask a librarian for assistance to evaluate information as to appropriateness for use in a course assignment.

When asked as a survey question who was most often asked for assistance when doing a research paper or project, 94 (39%) participants indicated course professor; 38 (16%) classmate; 38 (16%) practicing professional in the field; 14 (16%) librarians; 4 (2%) parents; and, 50 (21%) said they do not ask for assistance when doing a research paper or project. Asked about seeking information for a research assignment by using an online or electronic resource (Google, library database, library website, etc.), 92 (39%) participants indicated they find sources of information by accidentally encountering pages of interest; 168 (71%) participants followed links to pages that pique their interest; 219 (92%) participants used their own search terms to find information; 157 (66%) participants used "official" search terms or tags that they find listed; 133 (56%) found records or pages matching general, natural language terms (common sense: everyday language); 79 (33%) participants indicated they found specific pages or records using controlled terms or attributers (terms established by the Library of Congress); and 2 (1%) participants indicated they had never browsed electronic resources when doing a research assignment.

Table 3 shows interview responses by categories and topics, total number and percentage of response, and description of response topic for each of the categories of responses. In category 1, sub-question 1, informants addressed the issues of where online students go for course-related research, and why students make the choices they do. Responses (85) by category included these topics: active searching behavior including solo and assisted searching (31, 37%); passive searching behavior (47, 55%); and, no

searching behavior (7, 8%). In category 2, sub-question 2, informants addressed issues of barriers online students face when accessing information for academic assignments. Responses (55) included these topics: internal barriers (25, 46%); external barriers (26, 47%); and no barriers (4, 7%). In category 3, sub-question 3, informants addressed issues of student's perceptions of their own connection to library services. Responses (78) by topic were: belonging (12, 15%); some connection to the university or the library through service and resources (39, 50%); awareness (18, 23%); and, preference for on-line resources (9, 12%).

Findings from survey and interview data can be summarized in five hypothetical explanations for low- or non-use of library resources or librarian assistance, and are illustrated in a model of online graduate students' information seeking (Figure 1).

1. Low- and non-use of library resources and/or librarians' services is primarily the result of using only information provided by the instructor. When undertaking an academic assignment, online students engaged in four forms of academic information seeking behavior, which resulted in either use or non-use of library resources and/or librarians' services. Forms of information seeking that results in use are 1) solo searching and 2) assisted searching (i.e. Bates' "active seeking," p. 4.); 2) accessing only provided information (i.e., Bates' "passive seeking," p. 4); or 4) no information seeking behavior. Active seeking behaviors included all purposeful, intentional attempts to acquire information beyond the provided course materials, with the assistance of a course instructor, librarian or other external influence. Passive seeking behaviors included accessing only the links provided by the course instructor in the course materials or a librarian. Those exhibiting no behavior either did not need assistance, or chose not to pursue information beyond that provided in the course by the professor. Accessing links or sources provided by the instructor was considered passive behavior. Never asking for assistance by either the course instructor or a librarian is considered no searching behavior.
2. Low- and non-use of library resources and/or librarians' services is related to a combination of internal and external barriers that online students experience. When undertaking an academic assignment, online students decided to ask, or not to ask for help. Those who did not ask for help encountered barriers that can be categorized into two types: internal barriers and external barriers. Examples of internal barriers are: 1) lack of time to devote to an information need; 2) lack of content expertise; 3) lack of confidence in student's self; and, 4) lack of technical language and skills. Examples of external barriers are: 1) difficulty in evaluating to determine best sources; 2) search term confusion; and, 3) lack of what the student perceived to be up-to-date information. Those who did not ask for help from either the course instructor or a librarian felt there were not barriers to searching .
3. When undertaking an academic assignment, online students are influenced by their feelings, or lack thereof, of connectedness to the university or to the university library. Students who had completed other degrees on campus, or who were geographically located close enough to come to the campus, expressed feelings of belonging, while students who had not been there, or who had not attended any library orientation expressed lack of connection.
4. Online students who successfully complete course assignments and projects, although undirected to do so, are independently watching and alert, and dynamically scrutinizing Internet-based sources. Online graduate students in this study had a tendency to go about class directed assignments in the same passive, independent way they approached searching online for information about non-course directed topics or problems. Some online students were highly motivated and seemed to have a back-of-the-mind, undirected and dynamic alertness to things on the Internet that might be pertaining to the class assignment. It was not clear, however, that online students in this study had online social networks that contributed to their information seeking and searching, whether for course assignments or others non-course directed information need.
5. The natural propensity of humans recognized by Bates to collect information passively through absorption or actively through sampling and selection, a generic human behavior, from primarily the face-to-face environment has evolved into a different human propensity, a new brain-based activity making it mentally possible for human beings to assemble information while engaged in the online

environment. If this tendency is passive, or fraught with mental inactivity, then the human is likely to be unable to effectively engage in sampling and selection as was once done when encountering a face-to-face environment. If this tendency is active, and dynamic in scrutinizing online information, then the human is likely to be able to effectively seek, search and to find meaning. The extent to which an individual must be trained and supported in this kind of intellectual scrutiny is something to be better understood through questions that can be asked and answered using cognitive and/or social psychological theories. This hypothesis should be examined by discovering the social and cultural, along with the underlying biological and physical, layers of human experience as Bates indicates is necessary for an integrated model of information seeking and searching.

Development of the Theoretical Model

Bates (2002) asserts that active effects to acquire information, such as browsing and berrypicking, are applications of a generic human behavior known as sampling and selecting exaptation from original animal food foraging and mating behavior. Searching is one behavior within a general model of human information-related behaviors (searching, monitoring, browsing, and being aware). She suggests that “the human tendency to use the principle of least effort, and more generally to be quite passive in information seeking, may come about because so much needed information has come automatically from the social milieu of most people throughout the history of humanity” (p. 11). “People accustomed to mostly passive ways of learning new information not only have to search actively for the information, they have to master a fair amount of ancillary skills and knowledge just to be able to search for the information, with no guarantee that effort will actually lead to an answer” (p. 7). Bates points out that while much has been done to develop classification, alphabetical catalogs, subject headings and thesaurus terms, online database searching and the World Wide Web, people, even those who are educated, avoid or ignore these access points.

Findings in this study suggest a derivation of Bates’ modes of information seeking, particularly in the active role of “monitoring” (p. 4), which acknowledges the back-of-the mind alertness of things that interest a person, as well as alertness for answers to questions one may have. It appears that individuals, such as participants in this study, who have grown up browsing the Internet, for example, do not feel a pressing need to engage in an active effort to gather information, but are content to catch information as it goes by, so to speak, unless they are somehow directed to do so otherwise, for example in the case of an academic assignment about a specific topic or problem. Because the layers of understanding in Bates’ “integrated model” (p. 2) need to include psychological factors (spiritual; aesthetic; cognitive; social and historical; anthropological; biological; and chemical, physical, geological, astronomical) brought about in the last decade as a result of new technologies and the gadget-filled 21st century that is changing the ways human brains work, we emphasize them here in a new edition (Figure 1) to the Bates’ model of modes of information seeking.

The new model incorporates Bates’ four human information-related behaviors, and adds an additional dimension, *dynamic*, which refers to the behavior of the individual who not only does something actively to acquire information, but who does so with vibrant, self-motivation. We also add two more modes of information seeking: *scrutinizing*, and *being alert*. Scrutinizing is complementary to Bates’ ideas of monitoring and browsing. Bates points out that monitoring is directed and passive, while browsing is undirected and active. We believe based on the participants in this study that scrutinizing is different from monitoring and browsing. Scrutinizing is dynamic and directed because it happens when an individual using computer technology has a question arising out of a formalized topic or problem, such as an academic assignment, in mind and acts to methodically find an answer. Being alert is dynamic and sometimes productive yet undirected (without formalized purpose), the result of the experience of using the Internet on a regular and frequent basis, often daily. This revised Bates’ mode model contributes a new layer of human endeavor that takes place online where the front of the classroom is not a chalkboard where the teacher writes and points but a the computer screen, and, therefore, has new behavioral, cognitive and psychosocial implications leading to integrated model redux, restored to prominence as we try to better understand today’s online information seeking in relation to information searching.

Limitations

We acknowledge that this study is only one study with limitations in its size and duration. We also feel that the findings may be both positively and negatively impacted by the participation of School of Library and Information Studies, Master of Library Science (MLS), students (38%). The MLS students, due to their in-progress, academic and professional education have knowledge of the roles and responsibilities of academic libraries, as well as skills in accessing, evaluating and using both online and paper-based resources. For example, the MLS students in the study could explain why 33% of the participants indicated they found specific pages or records using controlled terms or attributers. While these factors may be strengths in some cases, it is possible, too, that the MLS students do not ask for assistance because they believe, either rightly or wrongly, that they do not need assistance to locate and use information.

Conclusions

This study was undertaken by a research team of professional librarians and other information professionals who recognized significant findings in the data that can be used to move toward a more complete understanding of information seeking behavior, and can inform understandings of college education in American, particularly about the place of academic libraries and roles of professional librarians in serving online students. The new theoretical models in this study can likely be useful as a framework for further investigations into online information seeking behavior involving computer technologies. The findings in this study also have implications for library services and approaches to improving student's academic achievement as we think of today's college students' online information needs and try to determine what services to offer in academic libraries. We see here how our view of online graduate students in terms of learning they must take in to develop as successful members of today's society changes our perspective on what they need, and has implications for professional practice. Therefore, we must readjust, if we have not already, understandings of our role at the university and who our students are.

Basic premises in Bates' theory examined in this study are indicated in the responses of individuals who participated. It appeared that 1) the natural propensity of humans in this study was for the most part to acquire information passively through social, online networks. 2) Online information seekers encountered difficulty in accessing online information resources because of what appeared to be low, or little information literacy skills (e.g., knowing when information beyond the course content is needed; knowing how to access, evaluation, and use information resources in a formal assignment). 3) Online graduate students experienced lack of effective supports during online information seeking and rarely came to the library, or asked librarians for assistance. 4) Online graduate students appeared to adopt the principle of least effort in seeking and searching for information except in some cases when students reported using some scholarly resources such as Google Scholar, the library's website and databases, and using technical skills such as control terms in searching.

Libraries must not expect, or wait for, students to ask for help. The saying that students will ask for help if they need it is an outdated and over-emphasized axiom. The idea of a librarian as an academic expert who is available to talk about assignments is not an ideal that students have necessarily accepted. Converting all students to this ideal, and other liberal ideals about higher education such as students should tediously and meticulously pour over texts, will require that we first connect to the sensibility of today's students. This means that librarians must communicate through many venues with students and their professors or instructors. Course professors and instructors are positioned to assess student's abilities, or inabilities, to know when information beyond the course materials is needed. There are many occasions in the context of online and face-to-face courses for libraries to help students develop information literacy skills and to be of assistance in undertaking information inquiry activities.

Librarians can use this theoretical model of online information seeking to advocate for university resources, such as personnel, time, and budgets, to support information literacy instruction that especially targets student completion of class directed assignments. This model also makes clear some topics that must be included when communicating with course professors and instructors, and in designing and implementing library orientation and information literacy skills instructional sessions. Further, the model

can be used by students to focus and better understand internal and external barriers to active efforts in sampling and selection of content to be used in class directed assignments. Students may even be reassured by this model that they are not alone in failing to effectively use libraries and the professional knowledge and skills of academic librarians.

We believe creating opportunities to reach (teach) distance students demands partnerships between course professors and instructors and academic librarians. Together, course professors and instructors, along with librarians, have opportunities within the context of online course content to teach students to find evidence to make supported claims, pose new questions, reshape theoretical perspectives, and to propose new solutions to today's problems. We all must recognize that today's students have a concept of time that is shaped by their swift experiences in "clicking" a computer mouse and getting immediate responses. Making time to look-around online or in paper documents, and to read multiple articles, is not automatically built into students' scheduled plans. Today's students may have grown up with the language of the information age, but they are not necessarily ready for the task of finding and evaluating scholarly sources. And, students' learning from professors may determine students' habits and practices in using academic librarians and libraries.

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Table 1. Summary of Participant Reported Demographics (n=238)

Responses	Raw Number	Percentage
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Question 1: What is your program of study?

Business	9	4%
Instructional Design & Technology	27	11%
Health, Physical Education & Recreation	19	8%
Education Leadership	21	9%
School of Library and Information Management	90 (Excluded from Study)	38%
I am a non-degree seeking student	5	2%
Other, please list: English, History, Physical Science, Mathematics, Special Education, Early Childhood, Curriculum and Instruction, School Counseling, Mental Health Counseling, TESOL	66	28%
Total	237	100%

Question 2: At the end of this semester, how many courses (total) in your Major or Degree Program will you have completed?

1 Course	49	21%
2 Courses	83	35 %
3 Courses	80	34%
More than 3	23	10%
Total	235	100%

Question 3: Of the courses that you have completed, how many are online courses?

All	148	62%
Some	80	34%
One	9	4%
Total	237	100%

Question 4: Why did you choose a Distance (online) Education Program?

Convenience of location(did not have to move; does not require long drives	178	75%
Fits into my schedule	180	76%
Quality of program	102	43%
Prefer online to face-to-face educational experience	15	6%
Other, please specify: cost, choice of faculty	47	20%

Questions 5: Did you have any online learning experience prior to enrolling in your current online graduate degree?

Yes	118	50%
No	120	50%
Total	238	100%

Table 1. Summary of Participant Reported Demographics (n=238) (continued)

Responses	Raw Number	Percentage
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Question 6: Where do you live?

In the city of Emporia	46	19%
In Kansas, less than 10 miles from Emporia	1	0%
In Kansas, 11-50 miles from Emporia	8	3%
In Kansas, more than 50 miles from Emporia	110	46%
In the U. S., but not in Kansas	72	30%
Outside of the United States	1	0%
Total	238	100%

Question 7: Is English your first language?

Yes	228	96%
No	10	4%
Total	238	100%

Question 8: Do you identify with male or female?

Male	61	26%
Female	173	74%
Total	234	100%

Question 9: How old are you?

Under 18	0	0%
18-29	98	42%
30-45	93	39%
Over 45	45	19%
Total	236	100%

Table 2. Summary of Survey Responses Related to Library Use and Assistance (n=238)

Response	Raw Number	Percentage
Question 1: On average, how often do you use a library (physical or virtual) for your course assignments?		
Never	15	6%
1 or 2 times per year	37	16%
1 time per month	76	32%
1 time per week	53	22%
More than 1 time per week	57	24%
Total	238	100%

Question 2: Have you ever attended a library orientation session?		
Yes	83	35%
No	154	65%
Total	237	100%

Question 3: Indicate technologies you have used within the last two weeks.		
Facebook	200	84%
Twitter	46	19%
YouTube	186	78%
Flickr	39	16%
Posted to blog	70	29%
Search the Internet	232	97%
Online library resources	173	73%
Online banking and/or bill pay	204	86%
Email	235	99%
Word processing and/or spreadsheet programs	230	97%
Smart phone (such as Android, iPhone)	97	41%
Maintained your own server	13	5%
Purchased an electronic book	38	16%
Online shopping	183	77%
Other, please specify	18	8%

Question 4: In a typical semester, what is the average number of times you ask a librarian for assistance to locate information to use in a course assignment?		
0	129	54%
2	78	33%
5	20	8%
10	7	3%
15	1	0%
16	2	1%
Total	237	100%

Table 2. Summary of Survey Responses Related to Library Use and Assistance (n=238) (continued)

	Response Raw Number	Percentage
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Question 5: In a typical semester, what is the average number of times you ask a librarian for assistance to evaluate information as to appropriateness for use in a course assignment?

0	200	85%
2	31	13%
5	2	1%
10	1	0%
15	1	0%
16	0	0%
Total	235	100%

Question 6: Do you use any of the following online features of a library website?

Library website	187	88%
Library Resource Guides	84	40%
Library Facebook	30	14%
Library on Twitter	7	3%
Library RSS Feeds	10	5%
Library iPhone app	5	2%
Library on YouTube	5	2%
Library on Flickr	0	0%
Library databases	161	76%
Library citation guides (writing style guides)	72	34%
Library FAQ	33	16%
Library instant message	28	13%
Library e-mail	41	19%
Library call (telephone)	24	11%
Other, please specify	11	5%

Question 7: When doing a research paper or project, who do you most often ask for assistance?

Course professor	94	39%
Classmate	38	16%
Parent	4	2%
Librarian	14	6%
Practicing professional in my field	38	16%
I do not ask for assistance	50	21%
Total	238	100%

Table 2. Summary of Survey Responses Related to Library Use and Assistance (n=238) (continued)

	Response Raw Number	Percentage
Question 8: When seeking information for a research assignment by using an online or electronic resource (Google, library database, library website, etc.), do you find sources of information by:		
Accidentally encountering pages of interest	92	39%
Following links to pages that pique your interest	168	71%
Using your own search terms to find information	219	92%
Using "official" search terms or tags that you found listed	157	66%
Finding records or pages matching general, natural language terms (common sense: everyday language)	133	56%
Finding specific pages or records using controlled terms or attributers (terms established by the Library of Congress)	79	33%
I never browse electronic resources when doing a research assignment	2	1%

Table 3. Responses to Semi-structured Interviews

Response Categories And Topics	Total Number and Percentage of Responses	Description of Response Topics (Statement Examples)
Category 1 (where online students go for course-related research), Sub-question 1: How did you gather information? Where did you look? Who did you ask for help?		
Active searching behavior (solo and assisted search)	31 (37%)	Google scholar; library site; encyclopedia sites; university library; independent searching. I didn't need any assistance. It was easier to get what I was looking for without assistance. It was easier to look on my own.
Passive searching behavior	47 (55%)	Access links provided by course instructor, librarian-provided instruction on searching. It was my first experience writing a research paper. I had some great guidance from course instructor who pointed me to the right direction for resources. What I usually do to get started, is I get information from my teacher you know, my instructor.
No behavior	7 (8%)	Did not need outside resources. Did not use outside assistance. I prefer to work independently. The librarians just either don't want to help or they are too busy to help, or they are not quite sure what we are looking for.
Total Responses	85 (100%)	

Category 2 (barriers online students face when accessing information for academic assignments), Sub-question 2: As an online student, when writing a paper or doing a research project, what is the biggest challenge in locating academic information?

Internal barriers	25 (46%)	Lack of: time, content expertise, student's lack of confidence; Lack of technical language and skills
External barriers	26 (47%)	Difficulty evaluating best information; search term confusion; bad links; did not feel links led to up-to-date information
No barriers encountered	5 (8%)	"I don't see any roadblocks at all." "It is not intimidating for me to look for information."
Total Responses	56 (100%)	

Category 3 (student's perceptions of their own connection to library services), Sub-question 3: Given that you are an online student, describe your connection to a university library.

Belonging	12 (15%)	Belonging to university community in terms of previous connection such as undergraduate education or current connection including enrollment in concurrent on campus courses.
Services and resources	39 (50%)	Responses included stated preferences for either library services, including assistance or library resources that were utilized without assistance.
Awareness	18 (23%)	Non-users of the library are couched into one of two groups:

		they were not aware of resources or services, or were aware and opted not to use.
Preferences for Online access	9 (12%)	Users of library services and resources who stated a clear preference for electronic access, rather than paper access.
Total Responses	78 (100%)	

Figure 1. Dow Research Team Online Graduate Student Information Seeking Model

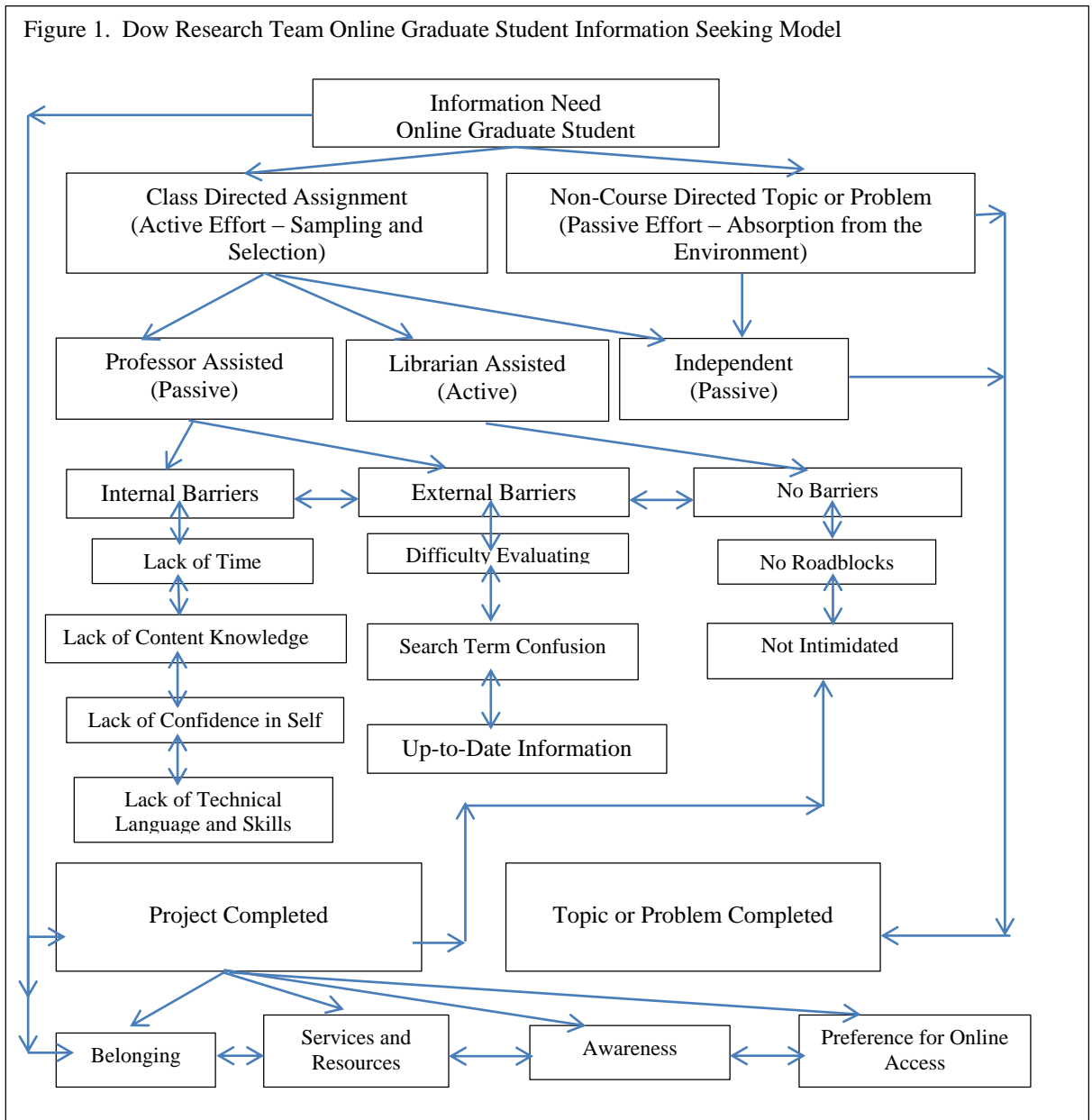


Figure 2. Modes of Information Seeking Derived from Bates' Modes (2002)

	Active	Passive	Dynamic
Directed	Searching (a)	Monitoring (b)	Scrutinizing (e)
Undirected	Browsing	Being Aware	Being Alert