Journal of Information Literacy

ISSN 1750-5968

Volume 7 Issue 2

December 2013

Article

Lacy, M. and Chen, H. 2013. Rethinking library instruction: using learning-outcome based design to teach online search strategies. *Journal of Information Literacy*, 7(2), pp.126-148.

http://dx.doi.org/10.11645/7.2.1778

Rethinking library instruction: using learning-outcome based design to teach online search strategies

Meagan Lacy, Indiana University - Purdue University Indianapolis. Email: lacym@iupui.edu

Hsin-liang Chen, Indiana University - Purdue University Indianapolis. Email: chenhsin@iupui.edu

Abstract

Given the growing pressure on academic institutions and, by extension, academic libraries to establish student learning outcomes and demonstrate their impact on student learning, researchers at Indiana University – Purdue University Indianapolis (IUPUI) explored how outcome-based instructional design can be used to 1) collect student data, 2) assess student learning, and 3) improve instruction. Two surveys were distributed to 59 undergraduate students who were enrolled in an introductory composition course at IUPUI. Because previous studies (e.g. Ford, Miller and Moss 2005) have linked human individual differences with web search strategy, the first survey collected information about the students' demographic features. The second survey, a search log, collected information about the sources that students chose, the search terms they used and the strategies they employed in order to complete their research. The students submitted their first survey after the instructional session and the second survey after they completed their research project. Using this data, the researchers examined whether students' achievement could be associated with their personal characteristics and/or the librarian's instruction. In contrast to Ford, Miller and Moss's study (2005), no significant relationships were found between students' personal characteristics and their search behaviour. However, after receiving instruction, all students were able to create keywords and structure them into search queries using Boolean operators. These results suggest that outcome-based instructional design is an effective pedagogical method for gathering assessment data and that the survey instrument was a useful tool for assessing this outcome - by providing both a measurement of student learning and a means of evaluating the librarian's instruction.

Keywords

information literacy, library instruction, student learning outcomes, search strategies, undergraduate students, academic libraries, USA

---

1. Introduction

While the origins of 'information literacy' (IL) can be traced to the bibliographic instruction movements of the nineteenth and twentieth centuries, the term did not begin to catch on until Zurkowski's report to the US National Commission on Libraries and Information Science in the early 1970s (Zurkowski 1974; Weiss 2004). The adoption of the Association of College & Research Libraries (ACRL) *Information Literacy Standards for Higher Education* by institutions in the United States also raised the expectation, at least in North America, that academic libraries become more actively involved in student learning (ACRL 2000). They no longer merely support student learning; they facilitate it. In the last two decades especially, librarians have tried to advance the IL agenda by teaching for-credit IL courses, participating in first-year experience courses, implementing embedded librarian initiatives, designing collaborative assignments, and proposing campus-wide IL action plans (Jarson 2010). In addition, library-initiated proposals to integrate IL across the curriculum are becoming more and more pervasive - a sign that colleges and universities at least recognise the value of IL in higher education (Booth and Fabian 2002; Beile 2007).

In the year following their release of the *Information Literacy Standards for Higher Education*, the ACRL Board also approved the *Objectives for Information Literacy Instruction: A Model Statement for Academic Librarians* (2001). This statement defines the terminology of IL and maps objectives, performance indicators, and outcomes for IL programmes to the *Standards*. This document supports academic librarians by providing a structure on which they can build a curriculum for IL instruction. The objectives - in whole or in part - are intended for a variety of instructional environments: from comprehensive, for-credit IL courses, to 50-minute 'one-shot' classes and self-paced online tutorials. This emphasis on standards and outcomes reflects a more general trend in higher education toward evidence-based assessment to measure student learning. As accrediting organisations have become more aggressive in requiring evidence of student learning, U.S. colleges and universities have responded by establishing measurable student learning outcomes for their disciplines. The Higher Education Act was enacted in 1965 to regulate accreditation in the U.S., but only since the Higher Education Opportunity Act of 2008 recently amended this law have institutions been *required* to set standards and evaluate student achievement.

Given the fact that university libraries are a part of this accreditation process, it follows that they ought to integrate IL into the university curriculum and develop outcome assessments as well (Wolff 1995; Breivik and Gee 2006). The ACRL *Standards* and *Objectives* statements provide this guidance. However, teaching these competencies is complicated by the fact that IL programmes vary and views about pedagogical design differ. Furthermore, because information literacy instruction typically remains limited to a single 50-minute session per class, per semester - the "one-shot" - it is impossible to address all of the ACRL's competency standards and objectives. Given these constraints, librarians naturally want to focus on those standards that are of greatest relevance and significance to their students.

One of these standards is Competency Standard 2, Performance Indicator 2: "The information literate student constructs and implements effectively designed search strategies." The ability to find information is a fundamental feature of any definition of information literacy, and it is the basic goal of any information literacy programme. Although librarians and educators can agree on the essential importance of this competency, it is unclear how best to teach it. It has been widely acknowledged, ever since the publication of Christine Bruce's *The Seven Faces of Information Literacy* (1997), that any IL curriculum ought to develop based on *how* students perceive and experience information literacy. By understanding students' skills, attitudes, and needs teachers can better respond to them. As Kate Manuel (2002) concludes in her article, 'Teaching Information Literacy to Generation Y,' enabling the learner to acquire an understanding of the structure of the subject being taught - that is, the aim of teaching - "cannot be done until material is made meaningful to learners by being approached from and integrated into learners' schemata, their frameworks of background knowledge and experience" (p.209).

Certainly, exploratory studies that have examined students' web-based search strategies have shown that individual human differences - cognitive and demographic features such as cognitive styles, cognitive complexity, age, gender, and levels of experience of Boolean searching - can affect search behaviour. For example, in a study of 68 Masters' students, Ford, Miller and Moss (2005) found a link between low levels of Boolean searching and older individuals, an analytic cognitive style, female gender, and experience of Boolean searching (p.749). Other studies (e.g. Vilar and Zumer 2009; Chen and Macredie 2010; Clewley, Chen and Liu 2010; Khosrowjerdi and Iranshahi 2011) have also examined personal characteristics and information search strategies as a means of better understanding users' information seeking behaviour.

In contrast, other researchers have shifted the focus from user characteristics to the correlation between library instruction and student search performance (e.g. Ren 2000; Colaric 2003; Orme 2004; Novotny and Cahoy 2006; Houlson 2007; Furno and Flanagan 2008, Chen 2009). Surveying 85 undergraduate students before and after library instruction, Ren (2000) found links between student self-efficacy (that is, the student's belief in his or her own ability to perform certain tasks) in information seeking and search performance. For example, post-instruction self-efficacy was significantly correlated with search performance - both in terms of the students' self-assessments

and their grades. This finding suggests that instruction can enhance students' self-efficacy and, therefore, their search performance. Specifically, "This study shows that college students' self-efficacy in electronic information searching was significantly higher after library instruction, which combined lecture, demonstration, hands-on practice, and an assignment of library electronic information searching" (p.327). Yet, in Hsin-Liang Chen's (2009) study of students in a semester-long IL course, he found that "Even though the participants were able to generate more search keywords, they were not able to develop more sophisticated search keywords after receiving more instructions and search experience" (p.344).

Clearly, the knowledge generated by these previous studies - about students' information-seeking behaviour, about the impact of instruction - bears on how search skills ought to be taught. Students who are bored in a library instruction session are not likely to recall any details about it, and instructors who do not acknowledge students' pre-existing search behaviours (as in their preference for Google) will have difficulty building upon them, as Novotny and Cahoy (2006) found. Still, most of these studies do not make explicit the pedagogical methods that were used to achieve impact. In other words, what combination of lecture, demonstration, hands-on practice, and assignments led to improved student self-efficacy and better search performance in the Ren (2000) study? Why did some students report being bored during their library instruction session in the Novotny and Cahoy (2006) study? Why did students search performance improve with instruction in the Ren (2000) study and not in the Chen (2009) study?

The answer may lie in the delivery. As Webber and Johnston (2000, p.392) explain in their article about student conceptions of IL, "One area where it was increasingly felt that further research was needed was that of appropriate pedagogic methods for information searching and browsing." With the aim of discovering how best to deliver instruction - what pedagogical methods are most "appropriate" - the purpose of this research project was to examine the effect of outcome-based instructional design on students' ability to construct and implement effectively designed search strategies (ACRL Competency Standard 2, Performance Indicator 2).

2. Outcome-based instructional design

Given the culture of higher education in the U.S., institutions must establish learning outcomes and demonstrate programme effectiveness. At the instructional level, this means that educators must provide *evidence*, that is, classroom artifacts that can actually be evaluated and used to confirm student learning. Outcome-based instructional design meets this demand. Sometimes referred to as *outcome based education* (Spady 2003), *ability-centered curriculum design* (Fenno-Smith and Gilchrist 1999), *assessment-as-learning* (Earl 2003), or *learner-centered teaching* (Kaplowitz 2012), outcome-based instructional design is characterised by a learner-focus. Such an approach shifts the emphasis from the teacher presenting the content to the students and their engagement with it. As Kaplowitz explains, "Learner-centered teachers do not talk about what they are going to teach. They discuss what they want their learners to learn" (Kaplowitz 2012, p.4). Learning is achieved when students can observably demonstrate their knowledge - not merely when the teacher has recited his knowledge. In other words, outcome-based instructional design rejects a banking concept of education, in which students are viewed as containers or receptacles of knowledge that the teacher, who is assumed to know everything, is supposed to fill (Freire 2000).

Bain explains in *What The Best College Teachers Do* (2004, p.49), that the most effective educators reflect on these questions:

1) What should my students be able to do intellectually, physically, or emotionally as a result of their learning?
2) How can I best help and encourage them to develop those abilities and the habits of the heart and mind to use them?
3) How can my students and I best understand the nature, quality, and progress of their learning?
4) How can I evaluate my efforts to foster that learning?

Again, each of these questions echoes an outcome-based design approach; they centre on the learner and what she can 'do' - the final outcome - as a result of her learning. Thus, with an outcome-based approach teachers shift their focus from delivering content to instead creating experiences that ask students to apply their knowledge. Put simply, using this approach means that students do more and teachers teach less.

2.1 Writing student learning outcomes

Outcomes can be written at the campus, department, course, unit, and session levels. The language and shape of the outcome will vary depending on their level and purpose. At the instructional (session) level, when the instructor's purpose is to observe learners in action, outcomes often invoke the active language contained in Bloom's *Taxonomy of Educational Objectives* and its revisions (Bloom et al. 1956; Anderson and Krathwohl 2001; Krathwohl 2002). One revision of special relevance to librarians is the Colvin-Keene model that both maps student IL activity to Bloom's taxonomy of cognitive skills and reflects the iterative process of information gathering (Keene et al. 2010).

Using this vocabulary, outcomes are framed in terms of 1) the subject matter content and 2) a description of what is to be done with that content (Krathwohl 2002, p. 213). So, statements of objectives typically contain a noun phrase (the subject matter) and a verb or verb phrase (the cognitive process, the kind of thinking done about that content). Frequently, learning outcomes are phrased in the form, "Students will *(verb or action phrase)* in order to…*(result)*" (Gilchrist and Zald 2008, p.170; Miller 2008, p.8; Kaplowitz 2012, p.108). For example, a student learning outcome for a library instruction session might read: *Students will compare databases in order to select one appropriate for their research topic*.

In Bloom's taxonomy, cognitive processes are arranged in a spectrum by lower-order and higher-order thinking skills: *Remember, Understand, Apply, Analyse, Evaluate,* and *Create* (Anderson and Krathwohl 2001). For example, processes in the category *Remember* are less cognitively complex than processes listed in the category *Create*. Two cognitive processes are associated with the category *Remember* - *recognising* and *recalling* - while seventeen are associated with five more cognitively complex categories. The cognitive processes *recognising* and *recalling* promote the retention of knowledge, while the other seventeen processes promote transfer of knowledge. Although the retention of key concepts is clearly fundamental to understanding a discipline, focusing exclusively on retention deprives students of the ability to participate - create - within that discipline, that is, to use what they have learned. One implication for teaching is that lecturing may overemphasise retention and limit student participation. Although lecturing is an effective tool for communicating a large amount of information to students, excessive use of this strategy disengages them from the learning process, which in turn causes them to remember less. Excessive use of this strategy also produces passive learners: "agents that are incapable and, for the most part, unwilling to construct their own knowledge" (Pankl and Coleman 2010). To elicit thinking that is more cognitively complex, instructors must also incorporate strategies that require students to demonstrate their learning.

2.2 Choosing designs for active learning

Once the student learning outcome or outcomes have been identified, the instructor then uses them to structure the instruction session. The outcome guides the selection of content, active learning exercises, and assessments. Instructional activities allow students to demonstrate their attainment of the stated learning outcomes (Kaplowitz 2012, p.109). Without this demonstration, the instructor has no way of knowing (assessing) if his or her instruction has been effective or whether it needs to be modified and improved. In this way, active learning exercises and assessments are interrelated; they are "designed around the outcome" (Spady 2003, p.1827).

Active learning is defined as anything that "involves students in doing things and thinking about the things they are doing" (Bonwell and Eison 1991, p.2). In an active learning classroom, less emphasis is placed on transmitting information and more emphasis is placed on developing students' skills (Bonwell and Eison 1991, p.2). Rather than merely listening, students are involved in higher-order thinking (analysis, synthesis, and evaluation) and engaged in activities (such as reading, discussing, and writing) (Bonwell and Eison 1991, p.2). Interactive technologies - including, for example, social networks, blogs, and automated response systems ('clickers') - have expanded the possibilities for active learning, and examples of their use in library instruction abound (Schroeder 2007; Abdallah 2009; Deed and Edwards 2010; Abate et al. 2011; Eva and Nicholson 2011; Holderied 2011; Ross and Furno 2011). Active learning, however, need not require all of these trappings. What is essential is that these exercises provide "observational opportunities" (Kaplowitz 2012, p.111) so that the instructor can confirm whether or not students are learning. Small group exercises, hands-on practice, worksheets and discussions are all examples of observational opportunities.

So, to build on the earlier example, if the stated learning outcome were *students will compare databases in order to select one appropriate for their research topic*, the librarian would then select active learning techniques that would allow students to exhibit this behaviour and a measurement to assess whether or not the learning has actually been achieved. For this outcome, the librarian might ask students to explore two online databases and then require them to record their observations on a worksheet containing guiding questions.

2.3 Assessing student learning

Just as outcomes exist at many levels so does assessment. There are two different, but complementary, types of assessment: formative and summative. At the instructional level, formative assessment can be used to gather feedback from students so that the instructor can clarify or reinforce learning. Quizzes, in-class reflection and writing exercises, and question-and-answer sessions are all examples of formative assessments. They are used to help the teacher improve her teaching and student learning. Summative assessment, on the other hand, measures the level of success or proficiency the student obtains by the end of an instructional unit. Graded final examinations or classroom portfolios are examples of summative assessments. Summative assessments, however, can be used to provide formative feedback as well. To conclude the earlier example, the librarian could assess whether or not his or her students have learned how to distinguish between two databases by 1) grading their worksheets according to a defined rubric (summative) and 2) providing qualitative comments that the students can use to confirm or modify their understanding (formative). The library and education literature is rich with descriptions on how to select and develop assessment tools in academic institutions (Angelo and Cross 1993; Huba and Jann 2000; Gratch-Lindauer 2003).

Matthews states that "Assessment becomes a lens that allows an institution to focus light on how well it is doing, as evidenced by its students' work, and then make strategic responses or adjustments to improve the educational service delivery" (2007 p.36). Assessment results are used not only to gauge student learning but also to reflect upon teaching and improve programme effectiveness. Thus, a basic feature of an outcome-based instructional design is its emphasis on continuous improvement. The assessment process is not complete until the instructor has determined what she will continue to do in her teaching and what she will improve by either changing her strategy or implementing a new one (Flynn, Gilchrist and Olson 2004, p.191). In this way, the benefits of an outcome-based instructional design are twofold: by driving the creation and collection of assessment data, such an approach helps meet the demands of the accrediting bodies. By using this data to change and improve pedagogical practice, this approach also helps meet the needs of students.

3. Research questions

Since most librarians are confined to the hour-long, 'one-shot' session, they very often try to compensate for this limitation by covering as much material as possible. However understandable,

the problem with this strategy is that students are rarely able to recall and transfer this knowledge in a new context. The advantage of the outcome-based approach is that it prevents instructors from falling into the "tyranny of coverage trap," the fallacy, "if I tell them, they will know" (Kaplowitz 2012, p.4). Because learners are expected to construct their own knowledge, less demand is put on the instructor to lecture and more demand is put on him to create learning environments and experiences that lead to students' own knowledge discovery. Breadth of coverage is sacrificed for depth of learning, so outcomes are chosen selectively - depending on the audience and the time and materials available. The benefit, however, is that the learning is transferable - lasting - and thus more meaningful.

The outcome-based approach also provides a means of collecting assessment data. Given the one-shot scenario, collecting such data is a significant challenge. Most librarians do not have the benefit of a classroom context that would allow them to provide students with regular formative and summative feedback. Yet, the onus is on librarians to demonstrate to administrators and faculty (academic staff) the correlation between library instruction and improvement in students' research skills.

For this project, we set out to collect such data. We used an outcome-based instructional design in a one-shot session to teach students to construct and implement effectively designed search strategies (ACRL Competency 2, Performance Indicator 2). We surveyed students' demographic characteristics and collected their search statements in order to 1) assess their learning, 2) determine whether their achievement could be associated with their personal characteristics and/or the librarian's instruction, and 3) use this evidence to enhance the design of the instruction session, that is, improve instruction.

Specifically, our research was guided by the following questions:

1. What is the relationship between students' characteristics and their search experience?
2. What is the relationship between students' characteristics and the number of search queries they use?
3. What is the relationship between students' ratings of their search experience and the number of search queries they use?
4. What kind of search queries do students use after receiving instruction?

4. Research setting

Indiana University – Purdue University Indianapolis (IUPUI) was founded in 1969 as a partnership between Indiana University and Purdue University that brought together Indiana University and Purdue University schools to one campus in the state's biggest and most densely-populated city. Offering undergraduate and graduate programmes, IUPUI currently enrolls over 30,000 students.

The University Library, completed in 1993, is IUPUI's main library and a major centre for study, collaborative work and access to information and technology. The University Library staff is comprised of 30 librarians, 22 of whom belong to the Teaching, Learning, and Research (TL&R) Group. These librarians serve as liaisons to various academic departments, providing reference, collection development and instruction services. In addition to delivering traditional, discipline-specific IL instruction sessions, the TL&R librarians participate as part of an instructional team in IUPUI's freshman learning communities and first-year seminars by collaborating with instructors, academic advisors, and student peer mentors as well as by leading several class sessions each semester.

Although all of the librarians teach IL in the classroom, there is no centralised IL programme at the library, and there is no instruction coordinator. Librarians have largely had to take on an entrepreneurial attitude and seek opportunities to provide library instruction.

For this study, the librarian partnered with two English instructors who were teaching W231, Professional Writing Skills, a course that satisfies the School of Liberal Arts' distribution requirements for English composition. Instructors in the English department were targeted because of their existing rapport with the librarian, and this course was selected because of its research component. For the assignment, students worked in small groups (three to four students) to identify a problem in the local community, research solutions and create recommendations. Although students worked on this project throughout the entire 16-week semester, it was divided into several, separate deliverables that were graded individually - including a preliminary proposal, an annotated bibliography, a literature review and a final recommendation report (5-7 single-spaced pages, excluding references and appendices). Because this assignment required students to find articles, a librarian provided a 'one-shot' session, lasting roughly 75 minutes, which focused on searching in the library's databases.

5. Methods

The pre-existing assignment and time-constraints posed obvious limitations and shaped the study's design. Because the librarian would have contact with the students only once, the investigation lent itself to quantitative, survey methods, which permitted economy of design, quick turnaround in data collection and the ability to identify attributes of a population from a small group of individuals. The survey method also accommodates anonymity, maintaining students' privacy in order to comply with Institutional Review Board (IRB) requirements.

The session was conducted in a computer lab in the School of Liberal Arts (not the library) where each student had access to a computer.

Again, the session focused on ACRL Standard 2, Performance Indicator 2: "The information literate student constructs and implements effectively designed search strategies." As a way of helping students progress toward this competency, the librarian determined that the following outcome would be the most appropriate:

> Students will construct a search strategy using appropriate commands in order to retrieve relevant articles for their research projects.

This outcome was based on outcome 2.2.d in the ACRL's list of Standards, Performance Indicators, and Outcomes (2000) and guided the selection of instructional content. To achieve this outcome, students needed to know 1) how to select keywords from their research question, 2) how to combine these keywords into search statements using "appropriate commands" (i.e. Boolean Operators) and 3) how to apply these search statements to retrieve articles in a library database.

5.1 Procedure

After the librarian circulated the study information sheet to the students, which indicated the study's purpose and its voluntary nature, she began the session by introducing the desired learning outcomes. Next, using a word processor and a projector, she delivered the first active learning exercise. She presented two examples of research questions and asked students as a group to identify the best question and to explain why it was better. The librarian recorded their responses - also using the word processor - so that their criteria could be projected onto the screen for all of the students to see. Next, she gave the students a moment (a minute or two) to reflect and write down their own question on a piece of paper. Then, she returned to the example of the 'good' research question and asked students to deconstruct it, identifying its major concepts or the words that were most important. As the students determined the key terms, the librarian emboldened the key terms and struck out the irrelevant ones in the word document. Once all of the major concepts had been identified, the librarian then asked the students to repeat the process with their own research question, again giving them about a minute or two to complete the task. After they were finished, she returned to the key concepts that they had identified as a group and asked the students to brainstorm other words and synonyms that could express each concept. Again, she typed each

term in the word processor so that students could see them projected onto the screen and then asked the students to repeat the process using their own terms.

The next part of the session focused on composing search statements. In order to demonstrate how Boolean operators work, the librarian employed Janine Odlevak's 'Boolean Simon Says' (Odlevak 2009) active learning exercise. For this activity, students were asked to stand if they were a college student *and* male. In this way, students could visibly see how the AND operator works to refine searches. Similar exercises were used to explain the OR and NOT operators.

Finally, the librarian directed students to an online research guide, tailored to students enrolled in W231, which listed databases as they corresponded to certain topics. For example, Academic Search Premier and ProQuest Central were listed as "good starting places for all topics" and ERIC was listed under "Education-related topics." For demonstration purposes, the librarian selected ProQuest Central and then called on students to give examples of possible search statements combining the key terms they had identified as a group and Boolean operators. After two or three search statements were executed, and the librarian had a chance to briefly explain how to find full-text articles, use the citation records to identify other keywords, etc., the surveys were distributed.

5.2 Survey collection

The librarian distributed two surveys (Appendixes A and B) for the students to complete - one online, to be completed in class after the workshop and one in print, to be returned with their annotated bibliographies. Students were assigned a three-digit number on their second, printed survey, which they were then asked to input as their identification number in the online survey. This way, the first and second surveys could be compared without compromising students' anonymity. The first survey, created in Survey Monkey, gathered demographic information as well as information about the students' previous library experience. This data was collected to determine whether students' characteristics correlated with their ability to design effective searches.

The second survey (Appendix B) was a research log (in print) to be completed as they continued to search for articles - both that day at the computer lab and after the session. The second survey was submitted along with their annotated bibliographies (approximately halfway through the semester). Students were given a few extra credit points for completing the second survey, a measure taken in coordination with the instructor as a way of motivating students to actually complete and return the survey. In this survey, students were asked to identify the databases they used, record their actual search statements, and rate their satisfaction with their search experience. This survey, or research log, was the assessment tool for this instruction session. It would provide the evidence that the librarian needed to evaluate whether or not her instruction had any impact on students' search behaviour.

6. Results

Of the 59 students who completed the first survey, 30 students returned the second survey (Table 1). Most of these students were freshman (first years) (70%) and female (76.7%). They were working toward degrees in the sciences (53.3%) and spent more than 10 hours online per week, per semester (79.9%). The vast majority of the students (85%) indicated that they come to the library either to study or do homework - not to read library materials or seek help from librarians. In other words, most participants who have visited the library have used its space, not its services (Table 2).

Table 1: Participants' characteristics

Characteristics	Categories	Completed Survey One (*N* = 59)	%	Completed Survey Two (*N* = 30)	%
Academic Status	Freshman	38	64.4	21	70.0
	Sophomore	8	13.6	2	6.7
	Junior	8	13.6	4	13.3
	Senior	3	5.1	3	10.0
	Other	2	3.4	0	0
Major	Humanities	6	10.2	4	13.3
	Social Sciences	16	27.1	6	20.0
	Science	29	49.2	16	53.3
	Interdisciplinary/ Multiple Majors	1	1.7	1	3.3
	Undeclared	8	13.6	3	13.3
Gender	Male	14	23.7	7	23.3
	Female	45	76.3	23	76.7
Computer Ownership	Desktop, laptop or both	58	98.3	30	100
Time at campus computer lab	Hours				
	0	8	13.6	4	13.3
	1-5	35	59.3	19	63.3
	6-10	13	22.0	6	20.0
	11-15	2	3.4	1	3.3
	20+	1	1.7	0	0
Time on campus wireless network	Hours				
	0	11	18.6	5	16.7
	1-5	13	22.0	4	13.3
	6-10	16	27.1	10	33.3
	11-15	8	13.6	5	16.7
	15-20	7	11.9	3	10.0
	20+	4	6.8	3	10.0
Time at campus libraries	Hours				
	0	15	25.5	8	26.7
	1-5	27	45.8	12	40.0
	6-10	13	22.0	9	30.0
	11-15	2	3.4	1	3.3
	15-20	2	3.4	0	0
Time spent online for pleasure and study	Hours				
	1-5	3	5.1	1	3.3
	6-10	10	16.9	5	16.7
	11-15	15	25.4	10	33.3
	15-20	17	28.8	7	23.3
	20+	14	23.7	7	23.3

Table 2: Participants' motivations for visiting campus libraries

Motivation	*N* = 59	%	*N* = 30	%
Study	51	86.4	28	93.3
Homework	51	86.4	27	90.0
Seek help from librarians	8	13.6	5	16.7
Read library materials	7	11.9	3	10.0
Kill time	31	52.5	16	53.3
Hang out with friends	14	23.7	8	26.7

6.1 Research Question #1: What is the relationship between students' characteristics and their search experience?

Table 3 illustrates the distributions of the participants' search experience scores in terms of "Ease of Use," "Satisfaction," and "Helpfulness". According to chi-square and correlation analyses, and in contrast to Ford, Miller and Moss (2005), no significant relationships were found between the participants' rating of their search experience and their gender, academic major, computer usage or library experience. In other words, students' personal characteristics did not correlate with their assessment of their search experience.

However, the following significant correlations were identified by several Pearson analyses:

- Ease to use and Satisfactory (r=0.47, p=0.009)
- Ease to use and Helpfulness (r=0.36, p=0.048)
- Satisfactory and Helpfulness (r=0.67, p=0.000)

Those participants who reported that a database was easy to use also indicated that they were satisfied with their search results and that the database contributed to the successful completion of their project. In other words, the easier a database was to use, the more students were satisfied with their search experience and the more they believed that the resource helped them complete their assignment.

Table 3: Participants' search experience scores

	Min	Max	Mean	SD
Ease of use	1	6	3.40	1.57
Satisfaction	3	7	4.80	1.06
Helpfulness	3	7	4.87	1.66

*30 participants used 1 database; 23 participants used 2 databases; 17 participants used 3 databases

6.2 Research question #2: What is the relationship between students' characteristics and the number of search queries?

Table 4 identifies the minimum and maximum as well as the mean number of searches used in each database. A chi-square test indicated a relationship, $X^2(4, N=23) = 14.04$, $p=0.007$, between the participants' gender and the number of search queries applied to their second database. For those participants who used more than one database, males were found to employ more queries when using their second database than females.

Another chi-square test indicated a relationship, $X^2(12, N=17)=23.85$, $p=0.02$, between the participants' time spent at campus libraries and the number of the queries used with their third database. The more time students have spent in the library, the more searches they employed. These results suggest that a student's gender and library experience have bearing on their persistence in searching.

Table 4: Participants' search queries

	N	Min	Max	Mean	SD
Database #1	30	1	9	4.67	2.02
Database #2	23	1	5	2.61	1.34
Database #3	17	1	5	2.82	1.63

6.3 Research question #3: What is the relationship between students' scores of search experience and the number of search queries?

A chi-square test indicated a marginal relationship, $X^2(40, N=29)=55.09$, $p=0.057$, between the participants' ranking of their first database's helpfulness and the number of queries they used in that database. When a database was perceived as helpful, students would submit more queries.

A chi-square test also indicated a relationship, $X^2(20, N=17)=37.57$, $p=0.01$, between the participants' average ease-of-use score and the number of search queries they used with their third database. Thus, ease-of-use also correlated to whether or not students submitted more queries. When a database was perceived as easy to use, students would also submit more queries.

6.4 Research question #4: What kind of search queries do students use after receiving instruction?

When assessing students' search queries, the librarian used the following criteria to determine evidence of effective search design: 1) the use of keywords rather than sentences, 2) the correct use of Boolean operators, 3) refinement of search queries by using two to three contrasting concepts, and 4) revision of their search statements by using a synonym or alternative term for at least one concept.

After receiving instruction, all of the students used keywords and structured their searches into Boolean search queries at least once, even if they eventually reverted to natural syntax (single keywords or phrases). These search statements can be categorised as "general," "unique," "general with refiner," and "unique with refiner." Examples of these four categories would be: "nonprofits" (general), "Boys and Girls Club" (unique), "nonprofits AND fundraising" (general with refiner), and "Boys and Girls Club AND fundraising" (unique with refiner). Of the 245 total number of search queries used, 89.4% of these queries contained the AND operator at least once. Most of these queries were "general with refiner" (164) or "unique with refiner" (55). The operators OR and NOT, though discussed during instruction, were hardly used at all - likely because they were not applicable. Given the context of their research questions, most students needed to refine their results, not broaden them.

On average, students employed six unique queries in their first database, two in their second database, and two in their third database. The total average number of searches used in the first database was six, 2.5 for the second database, and 2.5 for the third database. In other words, although students refined their searches using Boolean operators, as they continued searching in other databases they employed fewer searches, often duplicating their earlier search statements.

7. Discussion

Based on the findings of the four research questions, no significant relationships were found between the participants' rating of their search experience and their personal characteristics. This observation raises an interesting question: are today's undergraduates easily satisfied by their search results regardless of their academic background, gender, etc., so long as the discovery tools are easy to use? It has been noted by several researchers that students overestimate their abilities to search for computerised information (Manual 2002, Grimes and Boening 2001, Schaffner 2001). In this case, although students found information, and were satisfied with it, the librarian could not be certain that their searches led to the best or most relevant information for their topics. In a future revision of this study, researchers might ask the students' instructors - those who read and grade their final assignments - to evaluate whether the students' search statements yielded relevant results or not.

Perhaps, though, it was the librarian's instruction that enhanced students' search experiences. In other words, students may have found searching in the database straightforward because they understood, from the instruction, the basic concepts of search. Without a control group, however, it is impossible to say that library instruction was the sole factor accounting for their positive search experiences. A future study could compare instruction methods - one using outcome-based instructional design and one using a more traditional lecture, less hands-on approach - and evaluate whether an outcome-based instructional design approach equated with more positive search experiences or not.

However, this study does show that student experience with the campus library might influence how they formulate their search queries and the number of queries that they use. Students who spent more time in the library were found to employ more searches. In addition, when a database was perceived as helpful, or easy to use, students submitted more search queries. These findings suggest the importance of students' exposure to the library - both in terms of the library as a place and as a resource. The question of how to provide this exposure, when students seldom seek it, remains a major challenge for academic librarians.

Because the librarian demonstrated library databases, and directed students to an online research guide listing relevant databases, it is not surprising that all of the students chose online databases in order to search for articles and that the databases most frequently used were ProQuest and EBSCOhost databases. However, it is interesting that students typically executed the most search queries in the first database they selected, regardless of which database it was. Of the seventeen students who used three sources, twelve of them did fewer searches in each additional database they searched in, dropping from an average of 6 unique searches in the first database to an average of 2.5 unique searches in the third database. While this result suggests that students were refining their search statements as they continue to search, it also means that they were largely duplicating their searches. This observation indicates a future research area: why do students stop searching after the first database?

Perhaps this tendency simply means that students had identified the best search statements and repeated them because they produced the most relevant results. The fact that most students reported high levels of satisfaction - in terms of the ease of use of the database, the results it provided, and its perceived contribution to the completion of the project - certainly lends evidence to this conclusion. One wonders, though, despite the students' overall satisfaction, whether the experience of Boolean searching in library databases 'sold' them on the idea of more intentional

searching. Will they transfer these skills to other contexts? Or were they merely imitating the librarian for the sake of the library assignment?

Given the nature of the assignment (its basic demands) it is also possible that students did not require more than one database to locate articles. Of the students that did use more than one database, they selected almost exclusively resources listed on the online research guide - with the exception of a few who used Google Scholar. It would have been revealing to ask students to explain why they chose the databases that they did. Do students truly understand why they are using a particular database, or are they just blindly mirroring the instructor's demonstration? What is the likelihood of their being able to locate relevant databases in other courses and contexts?

Future iterations of this survey might ask students to not only *identify* which databases they used but also *explain* why they used them. Such information could help the librarian determine whether or not students are being intentional when they choose library resources or whether they are simply mirroring her own demonstration. Also, incorporating a question that asks students to reflect on how they would choose a database in a different context (in a business or biology class, for example) might give insight into how well students would be able to transfer their search knowledge to other situations. The research log could be improved by asking students to not only record their search queries but also the number of results each of their queries produced in the database. Then, a short-essay question asking them to reflect on what worked better (which searches generated better results), and why, would give insight as to whether or not students were grasping the importance of refinement and revision in search. In future studies, researchers might also assign the first survey prior to the instruction session so that they can compare how students construct search statements before and after library instruction.

8. Conclusion

The fact that students structured their searches into Boolean search queries at least once, regardless of demographic features, is encouraging. Students were not only able to generate multiple keywords and arrange them into a Boolean search query, but they were also able, by and large, to develop more sophisticated queries (general search keywords with refiner or unique search keywords). These findings also suggest that the ease-of-use of a database may preclude students' demographic features in terms of their search success since, unlike Ford, Miller and Moss (2005), no significant relationships were found between students' personal characteristics and their search behaviour.

These results also confirm that the survey instrument/research log (Appendix B) was an appropriate and useful tool for assessment. It provided students with an opportunity to demonstrate their learning, which in turn provided the librarian with evidence to assess their knowledge and evaluate her teaching. Admittedly, though, this tool was not perfect either. Several improvements could be made to the research log to gather more data about students' thinking and process. Continuous improvement, however, is an intrinsic feature of an outcome-based instructional approach. In fact, the librarian has revised the search log and continues to use it as a formative assessment in one-shot sessions.

However, instead of giving the research log to students to complete after the workshop, she gives the students a few minutes in class to generate a list of possible searches. She then collects the students' searches, reads them, comments on them, and returns them to their instructor who then distributes them to the students. In this way, the librarian can see whether students can demonstrate their learning, and students can receive feedback, which enables them to confirm or restructure their understanding. This practice reflects how an outcome-based instructional approach encourages continuous improvement. After the assessment data is collected, the librarian uses it to determine what she will continue to do in her teaching and what she will change to improve it. This process is sometimes referred to as "closing the assessment loop" (Banta 2011; Keshavarz 2011).

Obviously, such an approach is dependent upon instructors' buy-in and cooperation. In a pilot run of this study, the researchers found that instructors would sometimes forget to collect the surveys, despite the librarian's efforts to clearly communicate the survey collection procedures. Also, many students would not return the surveys no matter what the instructor said or did. For this reason, the librarian asked the instructors to give their students incentives (in this case, extra credit points) for returning the second survey (that is, the search log). Offering an incentive was virtually the only way to get a decent response rate. It is mainly because the librarian cannot rely on the students to complete the logs outside of class that the librarian no longer requires the full version of this log to be returned to her. It is simply too cumbersome.

These challenges speak to the inherent limitation of the one-shot session: Lack of time. Lack of time to interact with students. Lack of time to cover foundational concepts in information literacy. Lack of time to gather summative assessments of students' learning. The fact that most students simply duplicated their searches in each database, rather than revised them based on search results, sets with Chen's (2009) earlier finding that students "plateau on learning how to search for information after the first search assignment" (p.344). This fact also alludes to how much more learning must take place before students become proficient searchers. Boolean searching is just one aspect of the search process. Entire one-shot sessions could be dedicated to the iterative nature of search, controlled vocabularies, the selection of databases, and the evaluation of search results. Fifty minutes might be enough time to introduce searching, a single skill, but clearly it is not enough time for students to acquire all of the abilities to search effectively.

The important takeaway is that by using an outcome-based instructional design and collecting this data, the librarian now has a way of 1) demonstrating her impact and 2) evaluating her teaching to improve student learning. With this data, she can build on it and use it to initiate conversations with faculty and administrators that will eventually – hopefully - lead to changes in IL instruction at a more programmatic level.

References

Abate, L.E., Gomes, A., and Linton, A. 2011. Engaging students in active learning: use of a blog and audience response system. *Medical Reference Services Quarterly* 30(1), pp.12-18. Available at: http://dx.doi.org/10.1080/02763869.2011.540206.

Abdallah, S. 2009. Learning with online activities: what do students think about their experience? *International Journal of Web-Based Learning and Teaching Technologies* 4(2), pp.1-25. Available at: http://dx.doi.org/10.4018/jwltt.2009040101.

Anderson, L.W. and Krathwohl, D.R. eds. 2001. *A taxonomy for learning, teaching, and assessing: a revision of Bloom's Taxonomy of educational objectives*. New York: Allyn & Bacon.

Angelo, T. and Cross, K.P. eds. 1993. *Classroom assessment techniques: a handbook for college teachers*. San Francisco: Jossey-Bass Publishers.

Association of College & Research Libraries. 2000. *Information literacy competency standards for higher education*. [Online]. Available at: http://www.ala.org/acrl/standards/informationliteracycompetency [Accessed: 24 November 2013].

Association of College & Research Libraries. 2001. *Objectives for information literacy instruction: a model statement for academic librarians*. [Online]. Available at: http://www.ala.org/acrl/standards/objectivesinformation [Accessed: 24 November 2013].

Bain, K. 2004. *What the best college teachers do*. Cambridge: Harvard University Press.

Banta, T. 2011. Closing the assessment loop. *Change* 43(1), pp.22-27. Available at: http://dx.doi.org/10.1080/00091383.2011.538642.

Beile, P.M. 2007. Assessing an institution-wide information fluency program: commitment, plan, and purposes. *Public Services Quarterly* 3(1-2), pp.127-146. Available at: http://dx.doi.org/10.1300/J295v03n01_07.

Bloom, B.S., Engelhart, M.D. Furst, E.J., Hill, W.H., and Krathwohl, D.R. eds. 1956. *Taxonomy of educational objectives: the classification of educational goals*. New York: David McKay.

Bonwell, C.C. and Eison, J.A. 1991. *Active learning: creating excitement in the classroom*. Washington DC: School of Education and Human Development, George Washington University.

Booth, A. & Fabian, C.A. 2002. Collaborating to advance curriculum-based information literacy initiatives. *Journal of Library Administration* 36(1-2), pp.123-142. Available at: http://dx.doi.org/10.1300/J111v36n01_08.

Breivik, P.S. and Gee, E.G. 2006. *Higher education in the internet age: libraries creating a strategic edge*. Westport: Praeger Publishers.

Bruce, C. 1997. *The seven faces of information literacy*. Adelaide, Australia: Auslib Press.

Chen, H. 2009. An analysis of undergraduate students' search behaviors in an information literacy class. *Journal of Web Librarianship* 3(4), pp.333-347. Available at: http://dx.doi.org/10.1080/19322900903328807.

Chen, S.Y. and Macredie, R. 2010. Web-based interaction: a review of three important human factors. *International Journal of Information Management* 30(5), pp.379-387.

Clewley, N., Chen, S.Y., and Liu, X. 2010. Cognitive styles and search engine preference: field dependence/independence vs. holism/serialism. *Journal of Documentation* 66(4), pp.585-603.

Colaric, S.M. 2003. Instruction for web searching: an empirical study. *College & Research Libraries* 64(2), pp.111-122. Available at: http://crl.acrl.org/content/64/2/111.full.pdf+html [Accessed: 24 November 2013].

Deed, C. and Edwards, A. 2010. Using social networks in learning and teaching in higher education: an Australian case study. *International Journal of Knowledge Society Research* 1(2), pp.1-12. Available at: http://dx.doi.org/10.4018/jksr.2010040101.

Earl, L.M. 2003. *Assessment as learning: using classroom assessment to maximize student learning*. Thousand Oaks: Corwin Press.

Eva, N. and Nicholson, H. 2011. DO get technical! Using technology in library instruction. *Partnership: The Canadian Journal of Library and Information Practice and Research* 6(2), pp.1-9.

Fenno-Smith, K. and Gilchrist, D. 1999. Using an abilities model in library instruction programs: improving teaching, assignment design, and disciplinary curricula. In: Anderson, K., Babbitt, E., Hull, E., Mudrock, T. and Williams, H. eds. *"LOEX" of the West: Collaboration & Instructional Design in a Virtual Environment.* Seattle, June, 1996. Stanford, Connecticut: JAI Press Inc., pp.139-143.

Flynn, C., Gilchrist, D., and Olson, L. 2004. Using the assessment cycle as a tool for collaboration. In: Miller, W. and Pellen, R. eds. *Libraries within their institutions: creative collaborations*. Binghamton: Haworth Information Press, 2005, pp.187-203.

Ford, N., Miller, D., and Moss, N. 2005. Web search strategies and human individual differences: Cognitive and demographic factors, internet attitudes, and approaches. *Journal of the American*

Society for Information Science and Technology 56(7), pp.741-756. Available at: http://dx.doi.org/10.1002/asi.20168.

Freire, P. 2000. From pedagogy of the oppressed. In: Darder, A., Baltodano, M.P., and Torres, R.D. eds. *The Critical Pedagogy Reader*. New York: Routledge, pp.52-60.

Furno, C. and Flanagan, D. 2008. Information literacy: getting the most from your 60 minutes. *Reference Services Review* 36(3), pp.264-271. Available at: http://dx.doi.org/10.1108/00907320810895350.

Gilchrist, D. and Zald, A. 2008. Instruction & program design through assessment. In: Cox, C.N. and Lindsay, E.B. eds. *Information literacy instruction handbook.* Chicago: Association of College & Research Libraries, pp.164-192.

Gratch-Lindauer, B. 2003. Selecting and developing assessment tools. In: Avery, E.F. ed. *Assessing student learning outcomes for information literacy instruction in academic institutions*. Chicago: Association of College & Research Libraries, pp.22-39.

Grimes, D.J. and Boening, C.H. 2001. Worries with the web: a look at student use of web resources. *College & Research Libraries* 62(1), pp.11-22. Available at: http://crl.acrl.org/content/62/1/11.full.pdf+html [Accessed: 24 November 2013].

Grugel, C. and Copp, M. 1999. Immersion '99: reports from the institute for information literacy program. *College & Research Libraries News* 60(9), p.723.

Holderied, A. 2011. Instructional design for the active: employing interactive technologies and active learning exercises to enhance information literacy. *Journal of Information Literacy* 5(1), pp.23-32. Available at: http://dx.doi.org/10.11645/5.1.1519.

Houlson, V. 2007. Getting results from one-shot instruction: a workshop for first-year students. *College & Undergraduate Libraries* 14(1), pp.89-108. Available at: http://dx.doi.org/10.1300/J106v14n01_07.

Huba, M.E. and Jann, E.F. 2000. *Learner-centered assessment on college campuses: shifting the focus from teaching to learning*. Boston: Allyn and Bacon.

Jacobson, T.E. and Mark, B.L. 1995. Teaching in the information age: active learning techniques to empower students. *Reference Librarian* 51, pp.105-120. Available at: http://dx.doi.org/10.1300/J120v24n51_11.

Jarson, J. 2010. Information literacy and higher education: a toolkit for curricular integration. *College & Research Libraries News* 71(10). Available at: http://crln.acrl.org/content/71/10/534.full.pdf+html [Accessed: 24 November 2013].

Kaplowitz, J.R. 2012. *Transforming Information Literacy Instruction Using Learner-Centered Teaching*. New York: Neal-Schuman Publishers.

Katz, I.R. 2007. ETS research finds college students fall short in demonstrating ICT literacy. *College & Research Libraries News* 68(1). Available at: http://crln.acrl.org/content/68/1/35.full.pdf+html [Accessed: 24 November 2013].

Keene, J., Colvin, J., and Sissons, J. 2010. Mapping student information literacy activity against Bloom's taxonomy of cognitive skills. *Journal of Information Literacy* 4(1), pp.6-21. Available at: http://dx.doi.org/10.11645/4.1.189.

Keshavarz, M. 2011. Measuring course learning outcomes. *Journal of Learning Design* 4(4), pp.1-9. Available at: http://dx.doi.org/10.5204/jld.v4i4.84.

Khosrowjerdi, M. and Iranshahi, M. 2011. Prior knowledge and information-seeking behavior of PhD and MA students. *Library & Information Science Research* 33(4), pp.331-335. Available at: http://dx.doi.org/10.1016/j.lisr.2010.04.008.

Krathwohl, D.R. 2002. A revision of Bloom's taxonomy: An overview. *Theory Into Practice* 41(4), pp.212-218. Available at: http://dx.doi.org/10.1207/s15430421tip4104_2.

Manuel, K. 2002. Teaching information literacy to Generation Y. *Journal of Library Administration* 36(1/2): pp.195-217. Available at: http://dx.doi.org/10.1300/J111v36n01_12.

Matthews, J.R. 2007. *Library assessment in higher education*. Westport: Libraries Unlimited.

Miller, S.D. 2009. Learning outcomes, instructional design, and the 50-minute information literacy session. *The Michigan Academician* 39(1), pp.31-45.

Novotny, E. and Cahoy, E.S. 2006. If we teach, do they learn? The impact of instruction on online catalog search strategies. *portal: Libraries and the Academy* 6(2), pp.155-167. Available at: http://dx.doi.org/10.1353/pla.2006.0027.

Orme, W.A. 2004. A study of the residual impact of the Texas Information Literacy Tutorial on the information-seeking ability of first-year college students. *College & Research Libraries* 65(3). Available at: http://crl.acrl.org/content/65/3/205.full.pdf+html [Accessed: 24 November 2013].

Pankl, E. and Coleman, J. 2010. "There's nothing on my topic!" Using the theories of Oscar Wilde and Henry Giroux to develop critical pedagogy for library instruction. In: Accardi, M.T., Drabinski, E., and Kumbier, A. eds. *Critical library instruction: theories and methods*. Duluth: Library Juice Press, pp.3-12.

Ren, W.H. 2000. Library instruction and college student self-efficacy in electronic information searching. *Journal of Academic Librarianship* 26(5), pp.323-328. Available at: http://dx.doi.org/10.1016/S0099-1333(00)00138-5.

Ross, A. and Furno, C. 2011. Active learning in the library instruction environment: an exploratory study. *Portal: Libraries and the Academy* 11(4), pp.953-970. Available at: http://dx.doi.org/10.1353/pla.2011.0039.

Schaffner, B.L. 2001. Electronic resources: a wolf in sheep's clothing? *College & Research Libraries* 62(3), pp.239-249. Available at: http://crl.acrl.org/content/62/3/239.full.pdf+html [Accessed: 24 November 2013].

Schroeder, R. 2007. Active learning with interactive whiteboards: a literature review and a case study for college freshman. *Communications in Information Literacy* 1(2). Available at: http://www.comminfolit.org/index.php?journal=cil&page=article&op=view&path[]=Fall2007AR2&path[]=49 [Accessed: 24 November 2013].

Spady, W. 2003. *Outcome-based education: critical issues and answers*. Arlington: American Association of School Administrators.

Vilar, P. and Zumer, M. 2009. Perceptions and importance of user friendliness of IR systems according to users' individual characteristics and academic discipline. *Journal for the American Society for Information Science and Technology* 59(12), pp.1995-2007. Available at: http://dx.doi.org/10.1002/asi.20864.

Webber, S. and Johnston, B. 2000. Conceptions of information literacy: new perspectives and implications. *Journal of Information Science* 26(6), pp.381-397. Available at: http://dx.doi.org/10.1177/016555150002600602.

Weiss, S.C. 2004. The origin of library instruction in the United States, 1820-1900. *Research Strategies* 19(3-4), pp.233-243. Available at: http://dx.doi.org/10.1016/j.resstr.2004.11.001.

Wolff, R.A. 1995. Using the accreditation process to transform the mission of the library. *New Directions for Higher Education* 90, pp.77-91. Available at: http://dx.doi.org/10.1002/he.36919959008.

Zurkowski, P. 1974. *The Information Service Environment: Relationships and Priorities*. Washington DC: National Commission on Libraries and Information Service. (ERIC Document Reproduction Service No. ED100391).

Appendix A

Survey #1

Part I: Demographic data

Class section: **Number:**

1. Academic status: ___Freshman ___Sophomore ___Junior ___Senior ___Other

2. Academic major: ___Humanities ___Social sciences ___Science

___Interdisciplinary/multiple majors ___Undeclared

3. Gender: ___Male ___Female

4. Do you own one or more computers? If so, please specify how many of each.

___Yes, ___Laptop(s) ___Desktop(s)

___No

5. How many hours do you use campus computer labs outside of class each week during the semester?

___ 0 ___1-5 ___6-10 ___11-15 ___15-20 ___ more than 20

6. How many hours do you use the campus wireless network outside of class each week during the semester?

___ 0 ___1-5 ___6-10 ___11-15 ___15-20 ___ more than 20

7. How many hours do you stay at campus libraries on your own time each week during the semester?

___ 0 ___1-5 ___6-10 ___11-15 ___15-20 ___ more than 20

8. How many hours do you go online (for school or for fun) each week during the semester?

___ 0 ___1-5 ___6-10 ___11-15 ___15-20 ___ more than 20

9. When you go to campus libraries, what do you do there? Please indicate the top three items from the following list:

__Studying

__Doing homework

__Seeking help from librarians

__Reading library materials

__Killing time

__Hanging out with friends

__Other, please specify_____

Part II: Description of search topic

Search topic:	
Why are you interested in this topic?	
List search terms or combinations of search terms ("search strings") that you plan to use. (please fill out as many as you need):	• • • • •

Appendix B

Research Logs

(Survey #2)

Class section: **Number:**

Instructions: Keep this research log handy as you are searching for articles online. Write down the actual keywords or search statements that you use for each database you choose. Remember, search statements are strings of keywords that are combined with the terms "AND," "OR," or "NOT." For example, "*tobacco-free" AND "college campuses" AND "policies"* is one search statement. If you search for only one keyword at a time, list that keyword separately. For instance, if you were to search on only the term *tobacco-free*, then write down "tobacco-free" separately on its own line.

When you have completed your research and this log, return it along with your annotated bibliographies to your instructor.

Team project issue/topic (be as specific and detailed here as possible):	

Information resource #1 (i.e., name of database):	
Record the individual keywords and search statements using "AND," "OR," or "NOT" that you used while searching in the resource you listed:	• • • • • • • • •

How would you rate the ease of use of this resource?	Easy 1 2 3 4 5 6 7 Difficult
Are you satisfied with your search results provided through this information resource?	Not at all 1 2 3 4 5 6 7 Very much
Do you think this information resource contributes to the successful completion of this project?	Not at all 1 2 3 4 5 6 7 Very much

Information resource #2 (i.e., name of database):	
Record the individual keywords and search statements using "AND," "OR," or "NOT" that you used while searching in the resource you listed:	• • • • • • • • •
How would you rate the ease of use of this resource?	Easy 1 2 3 4 5 6 7 Difficult
Are you satisfied with your search results provided through this information resource?	Not at all 1 2 3 4 5 6 7 Very much
Do you think this information resource contributes to the successful completion of this project?	Not at all 1 2 3 4 5 6 7 Very much

Information resource #3 (i.e., name of database):	
Record the individual keywords and search statements using "AND," "OR," or "NOT" that you used while searching in the resource you listed:	• • • • • • • • •
How would you rate the ease of use of this resource?	Easy 1 2 3 4 5 6 7 Difficult
Are you satisfied with your search results provided through this information resource?	Not at all 1 2 3 4 5 6 7 Very much
Do you think this information resource contributes to the successful completion of this project?	Not at all 1 2 3 4 5 6 7 Very much