



Article

Information Literacy Instruction Assessment and Improvement through Evidence Based Practice: A Mixed Method Study

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Abstract

Objective— This study explored first-year students' learning and satisfaction in a required information literacy course. The study asked how students understand connections between themselves and information literacy in terms of power, society, and personal relevance to assess if students' understanding of information literacy increased after taking the course. Student satisfaction with the course also was measured.

Methods—The study used pre- and post tests and focus group session transcripts which were coded and analyzed to determine student learning and satisfaction during the regular 2008-2009 academic year at California State University, East Bay.

Results— Many students entered the course without any concept of information literacy; however, after taking the course they found information literacy to be personally relevant and were able to articulate connections among information, power, and society. The majority of students were satisfied with the course. The results from analyzing the pre- and post-tests were supported by the findings from the focus group sessions.

Conclusion— The results of this study are supported by other studies that show the importance of personal relevancy to student learning. In order to fully assess information literacy instruction and student learning, librarians should consider

incorporating ways of assessing student learning beyond testing content knowledge and levels of competency.

Introduction

Being information literate can be considered one of the most important characteristics for an individual to possess in today's information driven world. As such, information literacy and the assessment of information literacy instruction are topics of great interest and discussion within many university systems, including the California State University System (Dunn, 2002). In order to support the goal of graduating students who are information literate, the librarians at California State University, East Bay (Cal State East Bay) teach a two-credit information literacy course that is required for all first-year university students.

The learning objectives for this course are the ability to: formulate a research question, develop and use appropriate search strategies, evaluate strategies and results, describe research processes and communicate results, and understand and apply principles of information ethics. All of these learning objectives are in support of the Information Literacy Learning Outcomes for Lower Division General Education at Cal State East Bay (California State University, East Bay, n.d.). All instructors must cover these course objectives and traditional assessment methods, such as exams, ensure evaluation of students' content knowledge and research skill competencies. However, little assessment has been conducted on student understanding of information ethics. This is an important facet of information literacy and supports the University's mission and values statements of helping students to become "socially responsible contributors" and critical thinkers who are able to make ethical decisions (California State University, East Bay, 2008). This study assessed information literacy instruction by evaluating student understanding of information literacy in terms of: personal relevancy, the connections between information and power, and the

connections between information and society, all of which are tied to the learning objective of understanding and applying principles of information ethics. The ultimate goal is to use the results to improve the course through increased student learning.

Literature Review

Standards, learning outcomes, and assessment tools for information literacy are not new phenomena. The American Library Association created its *Presidential Committee on Information Literacy: Final Report* in 1989. Other associations have published more recent standards: the Association of College & Research Libraries published *Information Literacy Competency Standards for Higher Education* in 2000, and the Australian and New Zealand Institute for Information Literacy created the second edition of *Australian and New Zealand Information Literacy Framework* in 2004. These definitions and standards have been considered as authoritative definitions of information literacy in various contexts (Bruce, 2000). And these standards, among others, have been adapted and used to assess students' mastery of information literacy skills and competencies at the university level (Dunn, 2002; Maughan, 2001). These standards for information literacy, much like Cal State East Bay's information literacy learning outcomes, mainly focus on the skills and competencies that individuals must master to be considered information literate.

While these skills are by no means unimportant, information literacy can be seen as more than a set of tools or skills to be used when researching (Webber & Johnston, 2000). As the field of information literacy research has expanded and matured, new frameworks for viewing information literacy instruction have been created. In these frameworks, information literacy is presented as a way of learning or interacting with information. Bruce, Edwards, and Lupton's "Six Frames for

Information Literacy Education: A Conceptual Framework for Interpreting the Relationships between Theory and Practice,” which extends Bruce’s *Seven Faces of Information Literacy* (1997), defined six ways, or frames, of learning, teaching, and understanding information literacy. The six frames are: Content, Competency, Learning to Learn, Personal Relevance, Social Impact, and Relational (Bruce, Edwards, & Lupton, 2006). The “Six Frames for Information Literacy Education” is only one of the newer studies that extend the concept of information literacy beyond content and competency skills. These studies extend information literacy into sociopolitical and socioeconomic spheres (Andersen, 2006) and extend the study of variations of experiencing information literacy to focus on student perceptions (Maybee, 2006). These expanded views are important to the integration of information literacy into students’ lives outside of the university. The shift in focus from skills and competencies to integrating and internalizing information literacy into all facets of life has the possibility of transforming information literacy into something that is personally relevant to students.

This study used the “Six Frames” as a guide for examining student understanding of learning in multifaceted ways that include content and competency. It also incorporates other facets such as seeing information literacy as relevant to life outside of school and impacting social interactions. These areas were not fully assessed before this study at Cal State East Bay. This was an important, overlooked gap in the evaluation of student achievement in terms of reaching the learning objectives of the course and of fulfilling the university mandates. If instruction is seen as transformative (Bruce, 2008), then the students’ progression to more nuanced ways of experiencing and understanding information literacy becomes important in the assessment of information literacy instruction.

Aims

This study explored students’ learning and

satisfaction in a credit-bearing information literacy course that all first-year students are required to take in order to be eligible to graduate from the university. The study asked how students defined information literacy, understood connections between information and power, and understood the relevancy of information literacy in their lives. Student satisfaction with the course was also measured. The ultimate objective is to improve the course by using the results of this study to increase student learning in relation to the course objectives.

Methodology

This study used pre- and post-tests and focus group sessions for collecting data on student understanding of information literacy and satisfaction with the course. During each of the three regular academic quarters in the 2008-2009 academic year (Fall, Winter, and Spring), students in one section of the Introduction to Information Literacy course completed pre- and post tests. There were a total of 90 students in these three sections.

The Introduction to Information Literacy course covers basic information literacy concepts, skills, and applications. The content of the course includes: library skills, database searching, the research process, types of information formats, evaluation, Web 2.0, communication, information ethics issues (e.g. privacy, plagiarism, copyright, and censorship), and applications of information literacy outside of the classroom. Mastery of these skills and concepts, as noted in the learning objectives (see Introduction), are evaluated via weekly homework assignments, a reflective essay, a final project consisting of a research diary and annotated bibliography, and an experiential final exam.

The pre- and post-tests used open-ended questions (Appendix 1) and were administered anonymously in the first and last weeks of the quarters. The responses were open coded, analyzed, and categorized. Open coding was used since the categories of the responses could not be pre-determined before

the assessments as all of the questions required free-text, written responses, unlike a multiple choice questionnaire. The responses were transcribed and after careful readings of the answers, the author derived categories for each question (Auerbach & Silverstein, 2003). Student responses that conveyed the same concepts or themes were assigned to the same category. The coding of responses was checked to ensure reliable coding of responses for the three quarters. Results from the analysis of the pre-tests were compared to the post-test results for similarities and differences in categories of responses. The results were compared only in the aggregate.

Student volunteers from the course sections that completed the pre- and post-tests participated in focus groups. Students received lunch for participating. There were focus group sessions at the end of the Fall and Winter Quarters. There was no focus group in the Spring Quarter due to lack of student volunteers. The Fall Quarter focus group consisted of five students and the Winter Quarter focus group consisted of three students. The author facilitated both focus groups. These focus groups allowed for more in-depth discussion of information literacy understanding and student satisfaction with the course. Questions covered in the focus group sessions included: relevance of the course to the students, using what had been learned in the course, information and society, course improvements, and any other issues the students wanted to discuss. The author transcribed the audio recordings of each focus group session for open content analysis. These results were compared to those from the pre- and post test results as a reliability check.

Results

Results from coding responses from the pre- and post-tests and the transcripts of the focus group sessions are reported below. Table 1 shows the number of students who responded to each question on the tests. Table 2 summarizes the main categories or themes that were found after coding the student responses to the test questions. The

percentage of the responses coded to each category are reported in parentheses.

Table 1
Number of Student Responses

Question	Pre-test	Post-test
1	86	65
2	86	66
3	85	66
4	81	62
5	68	59
6	N/A	58

Pre- and Post-Tests: Defining Information Literacy

Results from coding student responses on the pre-tests showed three main categories, which together totaled 85% of the responses. These categories were: guesses about the definition of information literacy, information literacy meant finding information, and information literacy meant understanding information. The majority of the student responses fell under guesses. As one student in the Spring 2009 section wrote, *"It does not mean anything to me because I never heard of it."* Or, as another student wrote in the Fall 2008 Quarter, *"It means literacy which is...informative."*

On the post-tests, the top categories of defining information literacy were: guesses, information literacy meant finding and using information, and information literacy meant using information. The number of responses coded as guessing dropped for the post-tests and no longer formed the majority of the responses. On the post-test a student from Fall 2008 wrote that information literacy was *"Being aware of whats [sic] going on around you, getting info quickly, evaluating sources for credibility, using databases, citing sources correctly, and a lot more."* There were ways of defining information literacy in the post-tests that were not present from analysis of the pre-tests. These categories included: using information in a positive manner, the understanding that information is everywhere and everything, using information in daily life, and creating knowledge out of information.

Table 2

Summary Table of Major Categories of Coded Student Responses on Pre- and Post-tests

Question/Topic	Pre-test categories	Post-test categories
1. What does information literacy mean to you?	Guessing (60%) Finding information (15%) Understanding information (10%)	Guessing (22%) Finding and using information (12%) Using information (12%)
2. Personal relevance of course	Learn to use library/library resources (34%) Learn research skills (20%) Learn the purpose of the course (10%)	Learn to use databases (28%) Learn research skills (18%) Learn to cite sources (18%)
3. Connection between information and power	Empowerment (28%) Information/knowledge is power (25%) Get the "upper-hand" (10%)	Empowerment (20%) Applying information gives power (16%) Need information for power (15%)
4. Connection between information literacy and society	Empowerment (55%) Place self above others (19%) Help others (9%)	Empowerment (52%) Place self above others (16%) Help others (14%)
5. Modes of accessing information	Internet (41%) Books/library (19%) Media (13%)	Internet (42%) Media (14%) Someone (13%)

Pre - and Post Tests: Personal Relevance

In response to the question on the pre-tests of what students wanted to obtain from the class, the main categories included: wanting to learn to use the library and library resources, learning research skills, and learning what the course was about. These three categories consisted of 64% of the coded responses. Recurring categories also included: wanting to get a good grade, learning to cite sources, and learning better writing skills. As one student from Winter Quarter stated: *"Honestly, I want to get a good grade and get it over with."*

On the post-tests, when students responded to what they believed was the most relevant thing they learned in the course, the main categories were: learning to use research databases, learning how to research, learning how to cite sources, and learning to evaluate sources. Almost half of the responses noted that learning to use databases was most relevant.

Pre- and Post-Test Results: Information, Power, and Society

All but one of the responses on the pre-tests to the question of there being a connection between information and power were affirmative. The main themes from coding the students' explanations of the connection between information and power were: information allowed the student to empower him or herself, information or knowledge was power, and that information allowed the students to have power over others because they could gain the "upper-hand" over those who did not possess the same information.

Responses from the post-tests fell into three main categories: empowerment of the student, applying information gave the student power, and that the student needed to have information in order to have power. A student from Winter Quarter wrote on the post-test, *"Yes what you do with the information you know is what gives you power."* All students affirmed that there is a connection between information and power.

In response to the question of how being information literate impacted their place in society, the main categories from the pre-tests were: empowerment of the student, enabled the student to place him or herself above others in a social hierarchy, and enabled the student to help others. On the post-tests these same three categories were the top categories (empowerment of the student, placing the student above others, and helping others). A student from Winter Quarter wrote on the post-test, "To be able to find the information you need is important because you can use that information to make changes in society that could impact more than just yourself."

Pre -and Post Test Results: Accessing information

Students on the pre-tests indicated that they accessed information mainly through the Internet, books and the library, and media sources (such as television, radio, and newspapers). On the post-tests, students reported that they access information through the Internet, media sources, and by asking another person for help or information.

Post-Test Results: Satisfaction

The majority of the students, approximately 90%, were satisfied with the course based on responses on the post-tests. Many of the students noted that what they learned in this course would help them in other courses at the university. This sentiment is demonstrated by a student who wrote on the Fall Quarter post-test, "I am very satisfied with this course. I learned about a lot of research and so far it has helped me greatly in school."

Focus Groups

The student volunteers in the focus groups spoke about what they appreciated learning, their changes in perception about the course, and what they felt could be improved in the course. As a participant from the Fall Quarter focus group stated when asked what was most helpful, "Like for me, the databases. Like, I love using them now." Students also remarked that they helped family and friends find

information ("...she [laboratory partner] hasn't taken this class yet so I gave her tips...so you can do it all yourself"). Students also stated that their views on the course changed from their initial perceptions of the course as boring and unnecessary to their subsequent perceptions that the course was helpful and that they learned more than they thought they would from the course. As a participant in the Fall Quarter focus group said, "At first I thought it was like this class, it sounds kind of boring. Like, I don't know if it's going to help me, but it definitely really helped." As to improving the class, students wanted "hands-on more" as noted by one participant in the Winter Quarter focus group.

Discussion

Based on the results of the pre- and post-tests and the focus group sessions, students increased their understanding of information literacy and found information literacy personally relevant. Overall, student understanding of information literacy had improved by the end of the course. While the majority of the students, when asked directly to define information literacy, still saw information literacy as finding or using information, the other questions on the post-tests showed that students came to broaden their understanding. There were no noteworthy differences among the three quarters in regard to student responses to the questions on the pre- and post-tests or between focus group sessions. Differences in the number of responses received to questions on the pre-tests versus the post-tests (Table 1) are due to the number of students in class on the days the pre- and post-tests were administered.

Student Learning

There was definite growth in students' understanding of the term "information literacy"; this is vital for students to be able to apply what they learn and feel that they have a personal stake in becoming information literate. Their perceptions of information, the use of information and the impact of being

information literate, both on themselves and on society, grew and became more nuanced by the end of this course. The students still focused on competencies when asked directly what information literacy meant “*Being able to access information of all types in an efficient manner*”, but they also understood information literacy as personally important. Along with learning more about information literacy, there were changes in students’ perceptions of the course.

In contrast to the more nuanced understanding of information literacy that students demonstrated on the post-tests and in the focus group sessions, responses on the pre-tests showed that some students did not feel that information literacy instruction was important, necessary, or relevant for their academic careers. As one student on the Spring Quarter pre-test wrote, “*There isn’t anything that I want to get out of this class.*” This dismissal of information literacy instruction as unimportant or simply another requirement for graduation was prevalent in the pre-test answers. Other students noted on the pre-tests that they wanted “*To know what this class is for,*” get “*A good grade,*” or earn “*GE [General Education] credit*” by passing the course. These findings support earlier research that students underestimate their need for instruction (Freeman, 2004; Maughan, 2001). By the end of the course, the majority of the students had learned more than just “*...what this class is for.*”

The majority of students found that information literacy was personally relevant and could positively affect their lives and communities based on their responses to the post-test questions. However, a few students noted the negative uses of information in connection to power. On a pre-test in Spring Quarter, a student wrote in response to whether there is a connection between information and power, “*Yes because the more informed you are with everything the more power you have over others.*” These negative connotations of the connection between information and power were far outweighed by the positive examples written by students.

As a student in Fall Quarter wrote on the post-test, “*The smarter you are, the more things you can do. The more things you can do, the more of an impact you can make on the community.*” This is representative of student responses that focused on how becoming information literate empowered them and enabled them to help others. It also shows that students found ways of incorporating information literacy into their lives and found relevancy in becoming information literate.

It is interesting to note that while the majority of students guessed when defining information literacy on the pre-tests, they also wrote that being information literate would help them in society. This could be explained by students writing in what they thought was the “correct” answer to the question of the connection between information literacy and society on the pre-tests. This view is supported by a student’s response on the Spring Quarter pre-test, “*I don’t quite know what ‘information literate’ means but it probably can do a lot in one’s life. It can probably help us perform tasks that we find difficult, much easier.*” While the main categories did not change from the pre-test responses to the post-test responses for the question about information literacy and society (Table 2), the students’ understanding and ability to explain information literacy did change. This could mean that students did in fact grow in their understanding of the impact of being information literate in society. However, more research is needed before drawing definite conclusions in this area.

Students’ growth throughout the course showed development of a more complex and multi-faceted understanding of information literacy, which supports previous research (Johnston & Webber, 2003; Maybee, 2006). The course was a growth experience for many students. For example, one student in the Fall 2008 focus group said,

I did a lot of research papers in high school, but my teachers they never, like, they were more worried about oh, your thesis and all that, they weren’t worried like where are you getting the article or

have to evaluate the author...but this class has really helped me, how to be more accurate and look at information more in depth.

This student's way of looking at and relating to information had changed during the quarter. This view is echoed by what another student wrote on the Winter Quarter post-test, *"I learned things about obtaining information that I never knew. My idea of libraries and information has really changed."* Students themselves realized that not just their perceptions but also their understanding changed throughout the quarter.

The students expanded their conception of information, sources of information, and uses of information (Table 2). While the majority still relied most heavily on the Internet for accessing information, on the post-tests they acknowledged that information could come from other, non-textual sources. This too could be seen as an expansion of understanding and an integration of what they were learning in the course to their lives outside of the classroom; many of the students noted that they accessed information by talking with other people about current events, family history, and other topics and used this information to help their families, become more informed voters, or solve a problem.

Student Satisfaction

Contrary to anecdotal evidence from other faculty members that students dislike or are not satisfied with the information literacy course, this study showed that the majority of the students were satisfied with the course. A common response from students was that they were surprised by the helpfulness and usefulness of the class. A student noted on the Winter Quarter post-test *"I am well satisfied with the course, it ended up being more than I expected."* A student in the Winter Quarter's focus group said, *"I'm not bored. I really, really enjoy this class...I feel that I've learned so much more than pretty much most of my classes."* As their understanding of information literacy increased, so did their appreciation of the

relevancy of the course, and their satisfaction with what they learned. These results support previous research findings that relevancy is very important to student motivation in learning (Baker, 2006). While some students were convinced that they did not need the course at the beginning of the quarter, the majority were satisfied at the completion of the course and believed the course was, and would continue to be, helpful to them.

Course Improvement

While most students were satisfied with the course, they had suggestions for improvement. The most consistent comments were that students liked hands-on activities and small group work in class. They suggested increasing the number of in-class activities and time in the computer lab. As one student from the Fall Quarter focus group said, *"More hands on experience right there and then"* would improve the course. As a result of these suggestions, the course will be modified to include more group activities and work in the computer lab when possible. This should be especially helpful for those students who may be kinesthetic learners or more comfortable working in smaller groups.

As students responded well to what they believed to be personally relevant, more emphasis will be given to demonstrating how information literacy intersects with their lives. By looking at issues that directly affect the students (control of their personal information on social networks and security of data on Bluetooth-enabled devices, to name two examples), they can see how being information literate is important for everyday issues and not just in the classroom. More reflective activities (Edwards & Bruce, 2004) will also be incorporated to try to increase student engagement with processes and issues discussed. While still covering the course objectives, the course will be modified to more fully incorporate the Personal Relevance and Social Impact frames (Bruce, Edwards, & Lupton, 2006) to increase student engagement and understanding and to extend the concepts of assessment in the course to more fully

capture a picture of student learning. These changes to the course will be implemented in the coming academic years. This study will be continued to determine if the changes improve the course by increasing student learning.

Limitations and Future Research

As this study did not use a random sample and was conducted at one university, the results cannot be generalized. Future research could include expanding this study's approach to assessing information literacy instruction to other information literacy courses at Cal State East Bay and to other universities. This would increase the ability to generalize and the validity of the results this study. Conducting longitudinal studies would provide more information about the impact of information literacy instruction on students throughout their academic careers.

Conclusion

Standards for information literacy instruction and learning often place an emphasis on skills and competencies; however, additional assessments of information literacy instruction in terms of relevancy and impact for the student can be undertaken to evaluate student learning and facilitate course improvement using the results. This study showed that pre- and post-tests and focus group sessions can be used to assess information literacy instruction by gauging student learning, as well as student satisfaction. Students' reflections and evaluations are useful indicators of learning.

While some students may start an information literacy course believing that they do not need it (Gross & Latham, 2007), many will acknowledge learning something useful by the end. Information literacy instruction is not inherently boring to students and many become engaged as they see the relevance of what they are learning to present tasks and future work. Students remember what is personally relevant to them, a deceptively simple statement that should not be forgotten when planning and implementing information literacy courses. Content knowledge and skill

competencies are important for students to learn, but the ability to see relevancy and the impact of information literacy in life is equally important (Bruce, 2008).

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Appendix 1: Pre- and Post-Test Instructions and Questions

Please answer the following questions to the best of your ability. Your answers will not be graded. Please DO NOT put your name on this test. Your answers will help me make this class better.

1. What does the phrase “information literacy” mean to you?
2. What do you want to get out of this class? (For pre-test)
What did you learn from the class that was most relevant for you? (For post-test)
3. Do you think there is a connection between information and power? Please explain.
4. How do you think being information literate impacts your place in society? Please explain.
5. How do you access and use information in your life? Please explain or give an example.
6. How satisfied with the course are you? What could we do to improve the course? (For post-test)