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Collaboration between Librarians and Teaching Faculty to Teach Information Literacy at One Ontario University: Experiences and Outcomes

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Abstract

Purpose: In this study, we sought to describe information literacy success outcomes for students who participated in a university course where university librarians and teaching faculty collaborated in all aspects of the course including; curricular development, assignment development, in-class teaching, office hours for individual student development, and assessment activities. The authors wanted to examine student success in attaining information literacy skills following this one semester course. Further, the authors wanted to determine what difficulties in achieving expected information literacy levels persist even after intensive collaborative instruction. Finally, the authors wished to describe the challenges of these collaborations.

*Methodology***:** The focus of this study was to determine changes in first-year university students' information literacy knowledge and skill following a thirteen week university preparation course that was developed through strong collaboration between university librarians and teaching faculty. Students entering their first semester of university were tested on their information literacy skills without feedback. They then took part in the required course and were post tested in the last week of the semester.

*Findings***:** Student showed strong increases in information literacy from this collaborative approach. In addition, teaching faculty and librarians felt positive about the collaborative experience. However, some students showed misunderstandings about information literacy that requires further research.

Originality and Practical Implications: Our unique contribution here is our description, experiences and detailed outcomes with a collaborative process to teach information literacy. Based on our experiences here, we believe that collaboration will work best if it is planned at a curricular level, if the librarians are truly integrated into the classroom, if the librarians provide input on assignments and help with student feedback, and if targeted information literacy knowledge is tested. This planning takes time, but the librarians offer unique contributions and insight into issues surrounding information literacy that may not be obvious to faculty instructors. In our study, we also found that students confuse assignment requirements with general information literacy standards and those teaching information literacy need to be aware of these confusions. Finally, integration of librarians into college/university courses has benefits in terms of increases in student information literacy and increases in librarian knowledge of faculty expectations.

1. Introduction

Successful growth in collaboration between college/university librarians and teaching faculty has resulted in more students receiving information literacy instruction, better integration of librarians into classroom settings, increases in faculty knowledge of the library and increases in information literacy content in college/university courses (Lindstrom & Shonrock, 2006; Evans, 2001). Yet, it is still rare that librarians are included in most courses as an integral part of the course (Lindstrom & Shonrock, 2006). In this study, we sought to describe information literacy success outcomes for students who participated in a university course where university librarians and teaching faculty collaborated in all aspects of the course including curricular development, assignment development, in-class teaching, office hours for individual student development, and assessment activities.

Hearn (2005) describes improvements in student research papers following short (< 30 minute) sessions where a librarian participated in class discussions. However, Hearn reports that students may not have seen the librarian as an instructor because of the small amount of time allocated to the librarian within the course structure. Indeed, librarians often express frustrations with faculty collaborations (McGuinness, 2006). While faculty do recognize students' poor competence in information literacy (Singh, 2005), faculty comment that becoming information literate is the individual responsibility of the student and information literacy skills are something that the student will 'pick-up elsewhere' (McGuinness, 2006). In addition, teaching faculty are often reluctant to enter into a collaborative relationship with librarians for fear of losing valuable course time (Mackey and Jacobson, 2005).

Several studies do show that undergraduate students have limited information literacy skills such as difficulties defining problems, finding resources and using library systems (Ellis and Salisburg, 2004; Flashpolier, 2003; Hepworth, 1999; Lombardo and Miree, 2003; Seamons, 2002). Yet, these skills are an important contributor to student success (Dunn; 2002; Geffert and Christenson, 1998; Mark and Borruf-Jones, 2003). Unfortunately, many first year students are not able to evaluate their own information literacy skill level (Gross, 2004) and may fail to recognize errors in information seeking when they have not been given feedback. Thus, information seeking errors may persist when information literacy is not fostered within the teaching environment.

Many colleges and universities have instituted information literacy skills courses or sessions. The effectiveness of these courses is related to the learning/teaching environment (Johnston and Webber, 2003), and the specific skills taught (Small, Zakaria and El-Figuigui, 2004). One model of teaching that has met with some success is collaborative teaching between librarians and teaching faculty. Boff and Johnson (2002) reviewed university preparation courses across the United States. They note that the majority of these courses have librarian/teaching faculty collaboration and information literacy components. Most collaborations focus on learning to use databases and library systems (search techniques). Positive student outcomes have been reported for these classes. Flashpolier (2003) found that students who had been taught information literacy scored better on an information literacy skills tests, more often used library resources to retrieve information, and more readily found appropriate sources for their projects compared to a control group of students.

Even with the positive outcomes of teaching information literacy through collaboration, some studies show that problems often persist for students. For example, Brown and Krumholz (2002) note that students often stop searching for information if they cannot find it within their own library, have difficulty in defining keywords and do not fully understand the ethical use of information. In addition, Lombardo and Miree (2003) report that even after instruction, students complain about the inconvenience of library databases compared to the Internet. One of the benefits of collaboration is that university and college librarians are on the front-line in dealing with information

seeking problems. Because of their experiences, university and college librarians are in a unique position to identify and deal with the information literacy short-comings of students. While teaching faculty may realize students have a problem (i.e. sources are not relevant to the argument), they might not understand the source of the problem (i.e. difficulties selecting appropriate keywords, developing search strategies or choosing databases). However, the outcomes of collaboration may depend on the level of collaboration between faculty and librarians. If librarians are not involved in course goals, curricular development, and feedback about student outcomes, they may be less able to identify student needs for particular courses. Further, it may not be clear to librarians how the skills they teach are integrated into student assignments (or even what skills are needed for particular assignments) and it may not be clear to students how the library 'fits' into their learning environment.

Here we describe a strong collaboration between university librarians and teaching faculty, where librarians and faculty were jointly responsible for curriculum development, assignment development, teaching, and follow-up with students following student assessment. The authors wanted to examine student success in attaining information literacy skills following a one semester course where librarians were fully integrated into the course and information literacy was highlighted. Further, the authors wanted to determine what difficulties in achieving expected information literacy levels persist even after intensive collaborative instruction. Finally, the authors wished to describe the challenges of these collaborations.

2. Methodology and Program Delivery

2.1 Librarian-Instructor Pre-Semester Collaboration

Prior to the beginning of the semester teaching faculty met with the university librarians to discuss collaboration. Three university librarians and two faculty members responsible for teaching a required first year university preparation course, entitled Learning and Development Strategies, met to discuss information literacy expectations for first year students entering the Faculty of Arts (Social Science Division). The teaching faculty members had previously met with core members of their faculty to discuss these information literacy expectations and had conducted a literature review of information literacy in first year students. The university librarians had previously met to review post-secondary expectations in information literacy and discuss the design of a questionnaire addressing these expectations. In addition, one librarian and one teaching faculty member jointly reviewed literature on the transition to university, the role of information literacy in this transition and student success. Guided by literature, experience and opinions of university faculty and librarians, the librarians and teaching faculty divided first year expectations for information literacy into four areas of focus; starting and ending the research process, search techniques, evaluation of found materials, and academic integrity for information use. The information literacy expectations for first level students in each area can be found in Table 1.

Table 1: Information literacy focus areas and desired outcomes

Area	Content	Desired First Level Information Literacy Outcomes ***First-Year Students Know*:**
Starting and Ending the Research Process	• Location of materials • Resources for topic selection • Quantity of materials needed	•Where to search for journals •Where to search for books •The role of the Reference desk •The many ways to find a topic for a research paper •Why searching many databases is helpful •Limitations of using a single source
Search Techniques	• Boolean Operators • Efficient searches • Checking all options for articles • Finding information in books • Finding bibliographic information	•The use of 'and', 'or' and truncation •Combining Boolean terms •Sometimes articles are available only in print •Where to find subject indexes in books •Where to find bibliographic information in books
Evaluation of Found Materials	•Publication Types •Internet searches •Peer Review	•How to recognize scholarly material •Limitations of Internet searches •What peer review means
Academic Integrity for Information Use	•Citing sources •Recognizing violations •Citation systems	•When to cite •What constitutes a violation of academic integrity •Bibliographies are written in particular styles (MLA, APA)

2.2 In-Class Librarian-Instructor Collaboration

Two university librarians attended class the first day of semester. These librarians were introduced to students by the course instructor as co-instructors and each talked briefly to the students about the differences between high school and university librarians, about the importance of the library to university life and about the importance of information literacy to the student success.

During the second week of semester, students were asked to volunteer to participate in a pre-test of knowledge of information literacy. One hundred and thirteen students (range 16 to 29 years; average = 18 years) consented in writing to take this pre-test, after reading a description of the study on a consent form. In addition, fifty-two of these students consented to return at the end of term for a post-test. No feedback was given to students about their performance or about the correct responses on this pre-test.

In the third week of term, all students from the course were given a different research topic, told to convert their topic into a question and to meet in the library instruction lab (each student was

seated at a computer) with the librarian instructors and one teaching assistant. During this two- to three hour session, the librarians introduced students to electronic resources (catalogue and indexes), had students explore the library (i.e. stacks, computer labs, periodicals), and taught the students how to use Boolean operators (AND, OR, truncation). In addition, the librarians explained the peer-review processes, how to identify peer-review articles, how to access full-text articles in the library databases, the process for interlibrary loans, and used an interesting example to demonstrate efficient and inefficient database searches. During the demonstration, students were encouraged to conduct the same searches as the librarian who was projecting the search using a computer projection system. The university librarians then asked students to take out their research question and introduced a research log template (see Appendix I). This template included space for writing down which database was searched, what results were found, what keywords were used, and bibliographic details of found articles. This template was intended to guide student searches and to aid them in cases where they lost or displaced bibliographic information. Students were told that they must acquire at least one book and two peer reviewed articles to answer their research question. The librarians helped students who had difficulties. Prior to leaving, students checked with the librarians to ensure that the materials they had accessed were relevant, peer reviewed and for an appropriate academic audience.

In the fourth week of class, the students were required to read a chapter of their textbook which discussed information literacy for higher education (Hadad and Reed, 2007). In addition, the university librarians and the course instructor co-taught a session on information literacy including how to cite, plagiarism, paraphrasing and quoting, academic integrity, the Internet vs. academic databases, appropriate use of Internet sources and reviewed how to conduct database searches.

During the next two weeks the faculty instructor discussed essay planning and writing with students. In addition, she reviewed citation systems and reviewed critical evaluation of information in books and articles. She also taught students how to understand research methods and statistics used in articles.

In week seven, students handed in their research paper (the answer to their research question) which was edited by the faculty instructor and returned to the students. Editing included; comments about grammar, writing, citations, critical evaluation of literature, relevance of information sources, and interpretation of sources. Students were required to address the instructor's comments on their paper. Once editing was completed, the faculty instructor met with the university librarians to discuss areas where students seemed to have some difficulties. It was decided that one of the librarians would return to class in week eight to discuss shortcomings in the research papers and to review areas where students showed difficulties. These areas included paraphrasing, citing appropriately, peer review and making a balanced argument using evidence rather than opinion.

In week twelve, students who volunteered for the post-test were asked to return to the library to take the post-test. Throughout the course, students were encouraged to meet with the university librarians individually (which many students did for this course and their other classes). Finally, students were offered an optional workshop about library referencing systems (RefWorks). Fifty-eight students took this option.

2.3 The Information Literacy Test

To determine student knowledge of the identified focus areas, an information literacy test was designed (see Appendix II) by three university librarians and one faculty instructor (a higher education researcher). Each question was developed through discussion by the university librarians and then sent to the researcher to ensure that the questions were balanced and unbiased. Each question on the twenty-three item test was meant to test knowledge of the student in one of the areas of expectations. Overall, five questions focused on starting and ending

searches, seven questions focused on search techniques, seven questions focused on evaluation of found information, and four questions focused on academic integrity for information use. The number of questions for each area varied because there was not equal emphasis on each area in the course. Once questions were finalized, they were re-categorized into areas of focus during a collaborative meeting between the course instructor and two academic librarians. After this, they were re-categorized by the university librarians to ensure consistency. This librarians' categorization was identical to the initial and team categorization. The authors are aware that the test did not cover every aspect of information literacy, however, the intent was to determine what was reasonable to expect from first year students, based on course goals, using a tool that was quick to complete.

3. Data Analysis

Descriptive statistical analyses were conducted on the test results from the full sample of entering students (113 students). To determine their entering knowledge in each of the focus areas, each student was given a composite score for questions in each area; starting and ending searches, search techniques, evaluation of found materials and academic integrity for information use. Further analyses were conducted on data from the students who volunteered to be post-tested after the transition course. These students entering knowledge scores were compared to scores from the same students at the end of the university preparation course using a dependent (two-within) ANOVA procedure, followed by confidence contrasts for each composite score. Further, descriptive statistics were also used to determine which outcomes within particular focus areas were not met.

4 Findings

4.1 Knowledge of Information Literacy for Entering Students

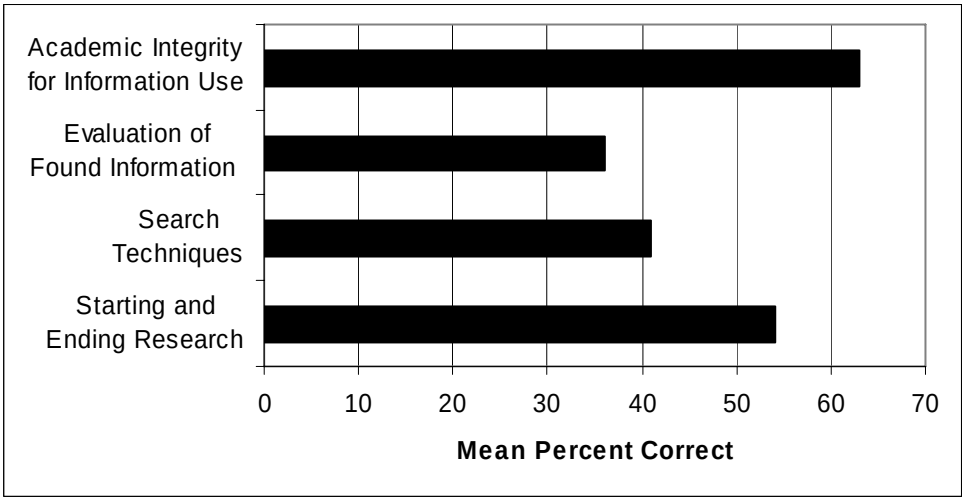
4.1.1 Overall Performance Prior to Information Literacy Instruction

Prior to information literacy instruction, the average score on the information literacy test was forty-six percent and sixty-five percent of entering students did *not* reach a passing grade (50%) on the test. Only three students received an overall information literacy score of greater than seventy percent.

4.1.2 Information Literacy Areas of Focus: Prior to Information Literacy Instruction

Test questions were divided by the information literacy areas of focus; starting and ending the research process, search techniques, evaluation of found materials, and academic integrity for information use. Figure 1 illustrates the mean performance prior to the collaborative course for each focus area.

Figure 1: Mean correct performance (in percent) of the full sample of entering students for questions surrounding each standard (n=113)



4.1.3 Performance on starting and ending the research process: Prior to Information Literacy Instruction

On average, students scored fifty-four percent correct for questions surrounding starting and ending the research process and forty-three percent of students did *not* reach a passing grade (50%). In general, students were aware that they should choose more than one source for an essay and identified that more sources increase the depth of topic. However, twenty percent of students believed that books could only represent one point of view. In addition, only forty-nine percent of students knew that they should search more than one database to find as many articles as possible on a topic. The remaining believed single database searches produce the maximum number of articles; the library catalogue should be used to find a maximum number of articles or did not know how to retrieve as many articles as possible. When asked where the best place to start looking for journal articles is, fifty percent of students realized that they should start with the library indexes/databases. Twenty-two percent thought the library catalogue would produce articles and seventeen percent did not know where to begin. When asked where in the library a student could get assistance in researching an essay topic seventy-two percent of students identified the reference desk. When asked about methods that would assist a student in choosing an essay topic, over eighty percent of students identified that the course professor could assist and that course materials would be helpful. Only fifty percent of students believed that reading newspapers could be helpful and only forty-seven percent felt that life experiences could be helpful. Thirty-five percent of students identified that encyclopedias would be helpful in essay topic selections.

4.1.4 Search Technique Knowledge: Prior to Information Literacy Instruction

On average, students scored forty-one percent correct for questions surrounding knowledge of information search techniques and seventy-one percent of students did *not* reach a passing grade (50%). Students were asked what to do if they could not find a journal article on-line. Only twenty-three percent of the students knew to check for the print version of the journal at the library. Forty-eight percent of the students felt they would find the article by checking the library catalogue for the *article title* and twenty-six percent did not know what do. Students were asked about their knowledge and use of Boolean terms. When asked to choose a Boolean operator that would allow them to search for synonyms, only thirty-one percent recognized that 'or' was the correct term. Twenty-seven percent felt the term 'and' would work and thirty-seven percent stated that they did not know. Students were shown a truncated word (Canad*) and asked to identify which expanded terms would be searched using this truncation. Fifty-five percent of students stated that they did not know which terms would be searched. Twenty percent of students were able to correctly identify all four appropriately expanded terms (Canada, Canadian, Canadians, Canadien) and the remaining students chose some terms and not others. Only six percent of students chose an incorrect expansion (French-Canadians). When asked to identify an efficient Boolean operation for an essay topic (where an efficient search would require four keywords joined by AND), forty percent of students correctly identified this operation. Thirty-five percent of students chose only one or two keywords and seventeen percent of students felt typing their topic sentence into the database would produce an efficient search. When asked about combining Boolean operators 'or' and 'and', only twenty-two percent could combine them correctly and thirty-five percent stated that they did not know how to do this. Students were also asked about book searches. Ninety-three percent of students were aware that they could find topic information in the book index and sixty percent of students knew they could find the book publication date on the back of the title page.

4.1.5 Evaluation of Found Information: Prior to Information Literacy Instruction

On average, students scored thirty-six percent correct for questions about the evaluation of found information and seventy-seven percent of students did *not* reach a passing grade (50%).

Students were asked to identify a scholarly publication following a description. Only thirty-seven percent of students recognized the described journal as scholarly. Eighteen percent felt that the

journal was a trade journal and thirty-nine percent did not know what type of publication was presented. The remaining believed the journal to be a book, a government document or a magazine. Further, students were asked to identify a magazine following a description. Fifty-seven percent of students correctly identified this publication and twenty-seven percent of students did not know how to classify this publication. The remaining students incorrectly identified this publication as a scholarly or trade journal. Students were asked to identify the term 'peer-review journal article'. Thirty-seven percent correctly knew this term. Fifty-four percent stated they did not know the meaning of the term and the remaining students suggested the term meant an article written by people who have the same research interests or an article aimed at the general public.

Students were asked to identify correct statements about Internet searches. Fifty-one percent correctly identified that the Internet (Google) searches unpublished documents and sixty-eight percent knew it searches free resources. However, ten percent of the students believed that the Internet was also searching their library databases for articles and twelve percent believed that one could find all resources for their projects through Internet searches. Students were also asked about what issues should be considered when using a web page as a resource. Fifty-nine percent of students identified the posting date as important, fifty-seven percent of students felt the argument of the author of the page should be considered and seventy-four percent felt the credentials of the author was important. In addition, forty-five percent of students felt that one should be aware of the audience the page is aimed at. Twenty percent of students did not know what they should consider when determining the value of a web page.

Students were asked about providing balance in their arguments. Fifty-six percent of students noted that an essay should include information that both supports and does not support their argument. Twenty-nine percent of students felt their papers should only include information that supports their argument and seven percent of students did not know what to include. The remaining students believed they should express only their own opinion, only include neutral information, or only include information that does not support their argument. When students were asked about including information from a popular magazine in their papers, where the professor has asked for scholarly sources, only twenty-seven percent of students recognized that the magazine was not suitable and thirty three percent did not know if this magazine article should be included. The remaining students felt the magazine could be used if it had a good reputation or contained 'up-to-date' information. Some students believed the magazine should not be used because the information will be biased.

4.1.6 Academic Integrity for Information Use: Prior to Information Literacy Instruction

On average students scored sixty-three percent correct for questions surrounding academic integrity for information use and eleven percent of students did *not* reach a passing grade (50%). Students were asked whether they need to use a citation when collecting information from a web site. Ninety-one percent correctly answered that they need to cite anything that is not their own. The remaining students suggested that they should cite only if the website is reputable, or that they do not need to cite when using a webpage. When students were asked to identify how to use an argument from a journal article in their essay, seventy-six percent of students recognized that they could quote and cite an author's argument and fifty-eight percent recognized that they could paraphrase the argument with an appropriate citation. Fifteen percent thought they could use the argument if they asked their professor for permission and seven percent of students did not know how they could use an argument from a journal article in their essay. When students were asked about creating a bibliography for their essay, eighty-eight percent were aware that they needed to keep track of the articles they used and reference them using a citation style. Four percent of students felt they would need to copy all the bibliographies from the articles they used and attach them to their essay and the remaining students did not know how to create a bibliography.

Students were asked to identify violations of academic integrity. Ninety-five percent were aware that turning in a paper that they purchased was a violation and ninety-one percent were aware that turning in a paper that a friend wrote was a violation. Sixty-eight percent correctly identified that submitting a group assignment that only one person in the group wrote was a violation and sixty-three percent identified that it is a violation to submit the same paper in two classes. Twelve percent incorrectly believed that it was a violation to paraphrase an argument and give the author credit. Only four percent did not know what a violation of academic integrity was.

4.2 Comparing Information Literacy Before and After Instruction

Fifty-two students agreed to return to be re-tested following the university preparation course. We compared the entrance information literacy test scores for these students to test scores collected from the same students after the completion of the university preparation course. Initial information literacy responses for this sub-sample of students (from the original 113 students) were similar to the original sample so pre-test data will only be discussed briefly here.

4.2.1 Pre-and Post-Test Score Comparisons

There was a significant improvement in overall information literacy scores after the one semester preparation course ($F_{1,51}$=58.62 p<.001). Mean performance on the information literacy test moved from forty-seven to sixty-five percent correct post instruction. In addition, where only twenty-nine percent of this sample received a passing test score pre-course, eighty-five percent received a passing score post instruction.

4.2.2 Changes in Performance Related to Individual Focus areas

Table 2: Pre and post mean information literacy test scores in percent by focus area

Area	Pre-test (%)	Post-test (%)
Starting and Ending the Research Process	55	61.9
Search Techniques	39.8	70.3
Evaluation of Found Materials	37.4	60.7
Academic Integrity for Information Use	65.9	69.7

Table 2 shows the pre- and post-test mean performance on the information literacy test by each focus area. Students significantly improved their performance on the information literacy test for two of the four focus areas; search techniques and evaluation of found information ($F_{3,153}$=14.79, p<.0001; 95% confidence comparisons within focus areas).

4.2.3 Starting and Ending the Research Process

Following instruction students continued to understand that they can receive help at the reference desk and that single sources do not provide enough depth of topic. However, some students (31%) still believed that books can only give one point of view. Post-course, more students showed knowledge in this focus area. In general, following the university preparation course, the majority of the students (81%) were aware that they should use the Library indexes/databases for journal article searches. Students (65%) understood that they need to conduct multiple database searches to find a maximum number of articles and students still strongly believed that their professor and course materials were the best sources for discovering essay topics. However, even after class discussions, many students still did not consider encyclopedias, life experience or newspapers as helpful in choosing an essay topic.

4.2.4 Search Techniques

In contrast to pre-course performance, after instruction, the majority of students could identify appropriate truncation (71%), identify appropriate combinations of keywords using ‘and’ (83%),

appropriately use the Boolean operator 'or' (81%) and combine 'and' and 'or' in an efficient Boolean sentence (54%). In addition, more than double the number of students (58%) now knew that some articles are only available in print format. Following instruction, some students still had difficulties locating book publication dates. Twenty-seven percent of the sample believed that this information was available on the book jacket.

4.2.5 Evaluation of Found Information

After the course, proportionally more students could identify source types (i.e. scholarly vs. magazine). However, some students still had difficulties distinguishing between scholarly and trade journals (29%) and between trade journals and magazines (12%). Encouragingly, almost twice as many students now understood that popular magazines are not good academic sources because they are written for the general public. However, some students (23%) still believed a popular magazine is a poor source because it would always give a biased viewpoint. Students continued to demonstrate that they know that Internet (Google) searches search unpublished documents and free resources. Only four percent of students identified the Internet as a good source for essay writing or believed that it searched the library's databases. In general, students still were able to identify important information to evaluate a web page. After instruction, almost all students understood that academic essays require balanced sources (90%) and all but three students (94%) understood the concept of peer review (prior to instruction only 40% of the sample identified this concept).

4.2.6 Ethical Use of Found Information

Prior to instruction, students had demonstrated that they knew to cite when quoting, that citations are always required for ideas that are not their own, that a citation style (i.e. APA, MLA) must be used in citing and that they understood violations of academic integrity. Prior to instruction, many students did not understand that they could paraphrase and cite an argument. Following instruction, over ninety percent of students understood how to paraphrase arguments with citations. Yet, after instruction, only forty percent of students now believed it was appropriate to quote an argument and cite it.

5. Discussion and Conclusions

The purpose of our study was to describe our collaborative experiences and the effect this collaboration had on the information literacy outcomes of our students. We showed that students arrive in first year with both knowledge in some areas of information literacy such as ethical use of information and lack knowledge in other areas. We also showed that collaborative efforts between university librarians and teaching faculty can lead to strong success outcomes in students but we believe these successes require planning. Finally, we found that despite our collaborative efforts, students still cling to some misconceptions about information literacy, which may be due to misunderstandings and mixed messages coming from teaching faculty.

Our collaborative approach led to clear improvements in information literacy among our students. Overall, 85% of students were able to pass our information literacy test following instruction where only 29% passed prior to instruction. Given that some studies have shown limited success in information literacy programs (Johnston and Webber, 2003), we believe that our success is due to the type of collaboration between librarians and teaching faculty. In our program, librarians were involved in all aspect of the course development. Through research, meetings and interviews with non-course faculty and librarians, the teaching librarians and faculty defined information literacy goals, methods to attain those goals and methods to decide if the goals had been met. Collaboratively, librarians and faculty developed curriculum, assignments and in-class teaching materials. In addition, librarians and faculty developed the information literacy assessment tool which targeted course goals. In many programs, students are given literacy training that is outside of course curriculum. Students are given options to attend library sessions and orientations that

focus on general information literacy skills (usually involving library tours and use of the library databases). While these programs do have merit and successes, if is difficult to discern what students take back to their classes from these optional programs and what proportion of students wisely take these options. Students, often have difficulty determining their own skill levels (Gross, 2004) without feedback and may not understand how these library orientation sessions fit with their assignments. For example, in our experience, students frequently complain that the library databases have limited information on their essay topic, when in fact; the student has limited skills in accessing that information. The unique advantage of our collaboration was that librarians and faculty determined the skills the students would need within our course and within their social science program, then required the students to acquire these skills within course sessions and tested students (through our information literacy test, course assignments and in-class quiz) to ensure that they had understood these requirements. In addition, librarians were seen by the students as instructors and as a result students began to independently consult librarians about our course work and work in other classes.

One disadvantage of collaboration is time-constraint. For collaboration to be truly successful, planning is required. Librarians and teaching faculty must agree on which information literacy skills and knowledge to target, how these skills and knowledge will be integrated into the course, and methods that indicate that the student understands information literacy components of the course. While the information literacy components worked well as part of our required first-year university preparation course, our collaborative environment might be more difficult to manage in other courses where the instructor must teach other required course content (i.e. Introduction to Psychology). However, we believe that with planning, collaborations could lead to improvement in general performance and thus may increase in value of collaboration for teaching faculty. For example, fewer information literacy errors from students could ease marking difficulties for professors.

Despite our best efforts, we found that some students still had difficulties with some skills. For example, many students believed that essay topics could not be found through experience, newspapers and encyclopedia. These beliefs may represent a miscommunication from course professors. Teaching faculty often tell students only to cite peer-reviewed, scholarly sources. Students may take this to mean that one cannot get topic ideas from other sources. In other words, they do not differentiate between research materials required and sources of inspiration for a topic (which they would not use as a research source). Some students also expressed that books only provide one viewpoint. Again, this may constitute a misunderstanding of instructions given by course instructors. When told to use scholarly journal articles, students may come to believe that in higher education, books are frowned upon. A good example of misinterpretation of an instructor's comments happened during our course. Students came to understand that they could paraphrase and cite a source but came to believe that quoting with citations is not appropriate. First level instructors had asked students to paraphrase their sources, as these instructors believed that paraphrasing would lead to deeper understanding of materials. The students interpreted this as 'quoting is not allowed in any circumstance'. These examples from our course show that what we tell students about particular assignments can be inappropriately generalized and misunderstood. One advantage of collaboration between the librarians and teaching faculty is that there are more opportunities for students to discuss these misinterpretations of information literacy and receive corrective feedback.

One area that surprised us was the knowledge that students had of ethical use of information. Clearly, this had been discussed in many secondary classrooms. Our surprise was, in part, due to the fact that many students express this knowledge but do not always show it in their work. For example, they fail to cite sources. In addition, a number of studies do show that students do intentionally plagiarize (see for example Hard, Conway, and Moran, 2006). Clearly, having knowledge does not always result in correct performance. This may be due to poor information seeking abilities. For example, while a student may know that they must cite, they may not know

where in a paper to cite or understand how to correctly use a citation system. These are areas where further collaborations between librarians and teaching faculty might improve outcomes.

It is possible that our students would have 'picked up' information literacy skills without our collaborative instruction or with instruction from their faculty instructor alone. However, from the perspective of the course instructor, the university librarians added depth and insights into the curriculum that would not have been considered without collaboration. In addition, the instructor commented that the collaboration had reduced workload because students began to visit the librarian instructors for information literacy related advice. Finally, the course instructor believed, based on past experience, that the work submitted by the students was markedly improved over previous years of teaching. This, the instructor commented, was directly due to the integration of the librarians into the curriculum and their depth of knowledge of information literacy.

Overall, our experience with collaboration has been positive for librarians, faculty and students. We believe that collaboration will work best if it is planned at a curricular level, if the librarians are truly integrated into the classroom, if the librarians provide input on assignments, help with student feedback, and if targeted information literacy knowledge is tested.

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Appendix I: Library Research Template

Topic:
Topic Question:
Content Areas of Focus (Which issues will be highlighted in your essay?)

1.
2.
3.

Type of Information Needed (i.e. book, video, journal article, etc):

1.
2.
3.

Search Log
First Search - Issue researched (what issue within your topic are you researching):

1. Data base searched:
2. Keywords used:

Results (write down all bibliographic information including, author, year, title, journal, volume, page number):

Second Search- Issue researched

3. Data base searched
4. Keywords used:

Results

Third Search-Issue researched

5. Data base searched
6. Keywords used:

Results

Continue your research using this format.
Appendix II
Information Literacy Test for ACS 102

Please read the questions carefully and answer ALL 23 questions to the best of your ability by circling the number beside the answer of your choice. If you do not know the answer to a question select "I don't know". ***Please do not guess your answer. Please follow the directions at the end of each question that tells you how many answers to choose.***

1. You are doing research for an essay and you have found an excellent book in the library exactly on your topic. Should you continue to look for additional books or articles for your essay? ***Choose only one***.

    1. No, because the book provides excellent coverage of the topic.
    2. No, because the book cover says the author is the premier authority on the subject.
    3. No, because the professor did not say how many books and articles I am supposed to use for the essay.
    4. Yes, because the book only presents one point of view on the topic.
    5. Yes, because different types of materials, (e.g. books and articles) are essential to ensure depth of coverage of my topic.
    6. I don't know

2. To locate journal articles on a specific topic, which of the following options is the best place to start? ***Choose only one***.

    1. Library catalogue
    2. Google
    3. Library index/database
    4. Browse the journals
    5. Magazine store
    6. I don't know

3. You have been assigned to write a research essay by your professor on a topic you are not familiar with, and you're not sure how to start. Where in the Library would you begin? ***Choose only one***.

    1. The Circulation Desk
    2. The Reference Desk
    3. Ask the person shelving journals
    4. Browse the shelves
    5. Ask your friends who are doing the same essay
    6. I don't know

4. If you're doing a catalogue or database search, and you add a symbol like this (*) to the end of the term, such as **Canad***, you would retrieve articles that contain which of the following keywords? ***Choose any that apply***.

    1. Canada
    2. Canadian
    3. Canadians
    4. French-Canadians
    5. Canadien
    6. I don't know

5. Which of the following online search word(s) or *keyword(s)* would be most efficient in retrieving articles or books for the following research question: **"What impact has globalization had on the Canadian economy?"** ***Choose only one.***

    1. globalization
    2. the impact of globalization on the Canadian economy
    3. globalization AND Canada
    4. impact AND globalization AND Canada AND economy
    5. impact OR globalization OR Canada OR economy
    6. I don't know

6. *American Sociological Review* "publishes work of interest to the discipline in general, new theoretical developments, results of research advancing understanding of fundamental social processes, and methodological innovations." (From the *American Sociological Review Mission Statement* http://www2.asanet.org/journals/asr/mission.html) It is published by the American Sociological Association. What type of publication is this? ***Choose only one.***

    1. Book
    2. Magazine
    3. Professional or trade journal
    4. Scholarly journal
    5. Government document
    6. I don't know

7. Which of the following searches will find as many articles as possible published on a specific topic? ***Choose only one.***

    1. Search the library catalogue

2. Search Google
3. Search several Web search engines
4. Search several Library databases in your subject area
5. Search a Library database in your subject area
6. I don't know

8. If you find a reference to a journal article library databases, but the full text (or entire) article is not available electronically, what is the best way to locate the article? ***Choose only one.***
    1. Check the library catalogue for the article title
    2. Check if the library subscribes to the journal in print
    3. Contact the author of the article
    4. Find a different article on the topic
    5. Buy it at a bookstore
    6. I don't know.

9. To search for a topic in a catalogue or database that has several synonyms or similar terms (for example, elderly, senior, geriatric, aged, older people), which operator would you use to obtain as many results as possible? ***Choose only one.***
    1. and
    2. near
    3. or
    4. not
    5. adj
    6. I don't know

10. Which of the following statements are generally true when you search using Google? ***Choose all that apply.***
    1. Searches Library indexes/databases
    2. Searches unpublished documents
    3. Searches free resources
    4. Searches most resources I need for my essay
    5. I don't know

11. You are searching a database for information on AIDS or HIV in either children or infants. Which search strategy will give you the most relevant results? ***Choose only one.***
    1. AIDS OR (HIV AND infants) OR children
    2. (AIDS OR HIV) AND (infants OR children)
    3. AIDS OR HIV AND (infants OR children)
    4. AIDS OR HIV AND infants OR children
    5. AIDS OR HIV OR infants OR children
    6. I don't know

12. You have to write an essay on Pierre Elliot Trudeau. You have found a book that mentions Trudeau. What part of the book will tell you what pages refer to Trudeau? **Choose only one.**
    1. Book jacket
    2. Book Index
    3. Bibliography
    4. Author's preface to the book
    5. It's best to browse the book for the information
    6. I don't know

13. In a book, where do you generally find its publication date? ***Choose only one***.
    1. Table of contents
    2. Index
    3. Book jacket

4. Back of title page
5. Author's acknowledgements
6. I don't know

14. You are writing an essay on global warming, and you've found an interesting argument in a journal article that supports your position on the topic and that you'd like to include in your essay. How can you use this argument in your essay in an ethical way? **Choose all that apply.**

    1. By putting the argument in quotation marks and giving the author credit for the information
    2. By using the exact wording in the article and copying it into your essay
    3. By asking your professor's permission to use the information from the article
    4. By putting the argument in your own words and giving the author credit for the information you use in your essay.
    5. It is not ethical to use the ideas of someone else in your essay
    6. I don't know

15. You have found some information on the United Nations website that you would like to use for an essay. Do you need to cite this information in your bibliography? ***Choose only one.***

    4. No, because the information is freely available on the Web.
    5. No, because I can't tell who wrote the information on the site.
    6. Yes, because it's a website from a reputable organization, and not someone's personal website.
    7. Yes, because you must credit any information that is not your own
    8. No, because I am paraphrasing the information and not copying it directly.
    9. I don't know

16. Which of the following actions are violations of academic integrity? ***Choose all that apply.***

    1. Turning in a paper to my professor that you purchased from an essay writing service
    2. Submitting an essay that you wrote on the same topic for another class
    3. Submitting a group assignment when only one person in the group wrote the report
    4. Turning in an essay to your professor that your friend has written
    5. Paraphrasing or putting a section from an article in your own words and giving credit to the author
    6. I don't know

17. Your professor is allowing you to select your own topic for an essay, and you have no ideas on what to write about. Which of the following methods would assist you in finding a topic? ***Choose all that apply.***

    1. Browsing encyclopedias
    2. Discussing topics with your professor
    3. Drawing on your own life experiences
    4. Reading of course materials
    5. Reading the newspaper
    6. I don't know

18. You are writing an essay in which you argue the benefits of private schools. In writing your essay you should: ***Choose only one.***

    1. Express only your own opinion on private schooling
    2. Include only information that is neutral on private schooling
    3. Include only information that supports private schooling
    4. Include only information that does not support private schooling
    5. Include information that both supports and does not support private schooling

6. I don't know

19. What must you do when creating the bibliography for your essay? ***Choose only one***
    1. Copy all the bibliographies from the articles you used for your essay and attach them to your essay
    2. Keep track of all the articles you used for your essay and use a "style guide" like APA or MLA to guide you in citing the articles correctly
    3. You don't need to include a bibliography in your essay if you put the information from the articles in your own words.
    4. Include the author's name and year of publication only.
    5. Attach all the articles you used to your essay.
    6. I don't know.

20. You are doing research for an essay on Canada's military involvement in Afghanistan. Your professor wants you to use scholarly material only. You find an article written in *Maclean's* magazine (a popular Canadian news magazine). Should you include this article in your essay? ***Choose only one***
    1. No, because *Maclean's* is a popular periodical written for the general public
    2. Yes, because the author of the article served in the military and spent time in Afghanistan
    3. Yes, because *Maclean's* has a good reputation in Canada as a news magazine.
    4. No, because the article may be biased towards the military's position
    5. Yes, because *Maclean's* magazine provides very up-to-date information.
    6. I don't know

21. When researching a topic for an essay and you find information from a web page that you've found through Google, which item(s) should be considered? ***Choose all that apply***.
    1. The date posted on the page
    2. The number of times the web page has been visited
    3. The credentials of the individual or organization that created the page
    4. The audience the web page is aimed at
    5. The position of author of the page is taking to present his/her/their argument
    6. I don't know

22. *Psychology Today* is published monthly. It provides a forum for popular psychology and "explores the emotional, physical and spiritual aspects of daily life." (from Ulrich's Periodical Directory). It contains advertisements and photographs. What type of publication is this? ***Choose only one answer.***
    1. Book
    2. Magazine
    3. Professional or trade journal
    4. Scholarly journal
    5. Handbook
    6. I don't know

23. Your professor has asked you to consult peer-reviewed journal articles when you do research for your essay. A peer reviewed journal article is: ***Choose only one answer.***
    1. An article written by people who have the same research interests.
    2. An article published in a magazine which is aimed at the general public
    3. An article that has been reviewed by an expert panel before being accepted for publication
    4. An article that is over 5 pages long.
    5. An article that includes a bibliography
    6. I don't know