Millikin University

Student Learning in Library Research Instruction for University Seminar and Critical Writing, Reading, and Research I & II

Assessment Report for Academic Year 2015-2016

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Summary

During the 2015-2016 academic year, Staley Library continued to use a pre-test, post-test format to assess the information literacy confidence and skills of first-year Millikin University students. Between taking the pre-test and the post-test, students receive four library instruction sessions designed to address Staley Library's four CWRR learning goals (see page 2).

All students enrolled in the University Seminar/CWRR sequence (essentially all first-year students at Millikin University) were part of the assessment. While participation varied by question, approximately 200 students took the pre-test and approximately 78 students took the post-test.

Key findings from the assessment include:

- Students showed an overall increase in their confidence with the research process and with particular information literacy skills from the pre-test to the post-test assessment.
- Students' confidence and skills in the research process increased for all 4 of Staley Library's CWRR learning goals, in particular identifying information sources and evaluating information.
- Students' confidence in finding and using library resources (particularly library databases), evaluating websites, and sorting through irrelevant results increased the most, while their confidence defining a topic for research, selecting search terms, and finding sources on the web all decreased slightly.
- Students showed strong improvement in skills that are addressed in library instruction sessions such as identifying the purpose of the library databases or the characteristics of a scholarly journal article.
- Students' ability to narrow topics and identify unbiased information sources increased by the post-test, but represented the lowest scores on both the pre- and the post-test.
- Based on their comments, it appears that students appreciate library instruction, especially learning how to find articles, evaluate sources, and develop keywords, and they would like to learn even more about citations and evaluation of sources.
- A majority of students identified finding different types of resources as something that librarians can help them with, but also mentioned citation, developing keywords and topics, and evaluating sources.
- Three quarters of all students taking University Seminar completed the self-guided library tour and survey data indicate that a majority feel more comfortable and confident using the library by its completion.
- While the pre-, post-test format provides important longitudinal data across the first year of college, the low participation rate in the assessment continues to challenge the reliability of the data.

Goals

The mission of Staley Library's instruction program is to empower students to become information literate adults who are confident in their information seeking abilities and able to apply critical thinking skills in the retrieval, evaluation, and ethical use of information. The program supports the academic curriculum of Millikin University and strives to develop students who are not only successful academically, but also are prepared to critically and ethically use information throughout their lives.

The research instruction program corresponds directly with CWRR learning outcome goal 3: "Conduct research to participate in academic inquiry." The purpose of research instruction for CWRR is stated in Staley Library's four CWRR learning goals:

1. Students will identify the use and purpose of potential information sources and formats.
2. Students will develop and implement search strategies to retrieve resources using library and non-library tools.
3. Students will evaluate the information that they find to determine its context, value, and to identify bias or deception.
4. Students will understand ethical aspects of information and information technology.

These goals correspond to the University-wide learning goals:

1. Millikin students will prepare for professional success.
2. Millikin students will actively engage in the responsibilities of citizenship in their communities.
3. Millikin students will discover and develop a personal life of meaning and value.

Table 1 (below) shows how Staley Library's CWRR learning goals relate to University-wide learning goals:

Table 1. Staley Library's CWRR learning goals mapped to the University's learning goals

Library CWRR Learning Goal	Corresponding MU Learning Goal
Students will identify the use and purpose of potential information sources and formats.	1, 3
Students will develop and implement search strategies to retrieve resources using library and non-library tools.	1, 3
Students will evaluate the information that they find to determine its context, value, and to identify bias or deception.	1, 3
Students will understand ethical aspects of information and information technology.	2, 3

Snapshot

Staley Library faculty devote a majority of their in-class instructional activity to the first-year core courses – CWRR and University Seminar. The librarians use a 2:2 instruction model, with two sessions in the fall and two sessions in the spring. The fall sessions are taught in either Seminar or CWRR as the course professors see fit (2 sessions per cohort), but usually one session is taught in each of the classes; the two spring sessions are both taught in CWRR as there is no spring Seminar equivalent. The fall sessions use active learning to cover research basics and evaluating internet sources, while the spring sessions cover more advanced topics such as evaluating types of articles, advanced keyword/topic development, and appropriate source choice for an assignment. In all cases, the librarians work with the Seminar and CWRR faculty to schedule the library session(s) appropriately so that students are able to learn, practice, and apply skills in a way that makes them immediately relevant to their research needs.

During the 2015-2016 academic year, the librarians taught 61 sessions (in 45 sections) for CWRR classes, 22 sessions (in 22 sections) for Seminar classes, 8 sessions (in 4 sections) for the "off-sequence" CWRR classes (i.e., CWRR I offered in the spring rather than the fall semester and CWRR II offered in the fall), and 4 sessions (in 4 sections) for the PACE CWRR classes.

Matthew Olsen coordinates the research instruction program and shares in the instruction with library faculty Rachel Bicicchi, Cindy Fuller (Library Director), and Amanda Pippitt. All library faculty, including the Instructional Services Coordinator, report to the Director.

The Learning Story

For most Millikin University students, CWRR and University Seminar are their introduction to college-level writing and research. While many first-year students are comfortable using consumer technology and finding information on the internet, those abilities do not necessarily translate into well-developed information seeking and evaluation skills. The library faculty are the campus leaders in increasing students' information literacy skills, not only to promote academic success, but also to develop the skills necessary for life-long learning. To this end, the librarians work closely with University Seminar and CWRR faculty to tailor their instruction so that it matches the course content and provides an authentic learning experience for students. Librarians teach students to use both the specialized scholarly research resources found in the library and non-library sources and stress the importance of evaluating information sources no matter how they are discovered. They also focus on active learning and give students opportunities to practice the skills that they are learning.

Assessment Methods

Pre- and Post-Test Assessment Methods

The 2015-2016 academic year was the tenth complete year of data collected via a pre- and post-test. Over time, the assessment has used varied questions and methods (documented in prior instruction reports). As in past years, the pre-test was administered via Moodle before the students met with a librarian in the fall; the post-test was also administered through Moodle after the library instruction was complete in the spring. In both cases, the tests were taken outside of the library instruction time.

The sixteen questions in the first part of the assessment are based on the Project Information Literacy report, "Truth Be Told: How College Students Evaluate and Use Information in the Digital Age."[1] These questions are designed to measure students' confidence level with the academic research process (affective learning). The five-point scale that students use to rank their confidence assigns tasks a range from "very difficult" to "very easy." The complete list of questions is provided in Appendix A.

The second part of the assessment has seven questions that assess the students' information literacy skills. Five of the questions are selected-response questions (multiple choice) and two of the questions are constructed-response (short answer). Question 1 on the pre-test is a short answer question that asks students what they would like to learn in their library instruction sessions. On the post-test question 1 has two parts: "What was the most useful thing that you learned from the library sessions this year?" and "What do you wish that you would have learned?" Question 9 is another short answer question that asks the students about the research activities that a librarian can help them with and is intended to gauge how

[1] Head, A.J., & Eisenberg, M. B. (2010). *Truth Be Told: How College Students Evaluate and Use Information in the Digital Age* (Project Information Literacy Progress Report). Retrieved from the Project Information Literacy website: http://projectinfolit.org/images/pdfs/pil_fall2010_survey_fullreport1.pdf

well students understand the role of the librarian. The complete list of questions can be found in Appendix A.

To facilitate reporting of the range of answers to the short answer questions, responses to question 1 and 9 were coded into thirteen categories, all of which are listed in Appendix A. Each response was assigned up to three codes. The Instruction Coordinator and library faculty member Amanda Pippitt performed the coding. A norming session was held before they independently coded all of the responses. After review, for any responses the two librarians coded differently, the responses were discussed and the librarians agreed on common codes. Questions 3 and 5 were also graded by the Instruction Coordinator and Amanda Pippitt and the grades were averaged to assign a final grade to each response. The grading scale for questions 3 and 5 can also be found in Appendix A.

Other Forms of Evaluation

In addition to the library instruction sessions for the first-year core curriculum courses, new students have traditionally participated in a self-guided tour of the library during the first month of the fall semester. The goal of the library tour is to introduce students to the library "as place" and to familiarize them with some of the resources and services that are available in the library building. By making the tour self-guided, the librarians do not need to spend valuable in-class time performing this activity and the tour can be completed at a time that is convenient for the students. The tour has three learning goals:

1. Students will feel comfortable while researching, locating resources, studying, and relaxing in the library.
2. Students will know how to locate many of the resources available in the library.
3. Students will know who to ask if they have questions.

In fall 2015 the self-guided tour continued to use a mystery 'narrative' format that incorporated a worksheet and QR (Quick Response) codes scanned with a smartphone that guided students around the library. For this year, the story and the questions were the same as fall 2014. Students completed a nine question worksheet with clues that they discovered by scanning QR codes located throughout the library. The clues led participants from location to location and the worksheet had brief questions about each location. At the conclusion of the tour the worksheets were collected by library staff, graded by the librarians, and then returned to the Seminar instructors.

Academic year 2015-2016 also continued the Faculty Assessment of Library Instruction survey. This nine question electronic survey is sent to every faculty member within whose class library instruction was conducted including those outside of the Seminar/CWRR sequence. The faculty can then give anonymous or signed feedback, which the librarians use to improve library instruction. To view the survey questions please contact the Instruction Coordinator.

Assessment Data

Fall Pre-Test[2]

Part 1: Average score = 3.13 (5 point scale)
Part 2: Multiple choice: Average percentage of students answering the question correctly = 65%
Short answer: Average score = 2.33 (3 point scale)

Spring Post-Test[3]

Part 1: Average score = 3.24 (5 point scale)
Part 2: Multiple choice: Average percentage of students answering the questions correct = 75%
Short answer: Average score = 2.70 (3 point scale)

Table 2. Pre- and post-test results by library CWRR learning goal

Staley Library CWRR Learning Goals (LG)			
1. Information Sources	**2. Search Strategies**	**3. Evaluation of Information**	**4. Ethical Aspects of Information**
Part 1 **Questions 7& 8** Pre-Test Avg. = 3.0 Post-Test Avg. = 3.1 Improvement = 6%	**Part 1** **Questions 1, 2, 3, 4 & 5** Pre-Test Avg. = 3.2 Post-Test Avg. = 3.2 Improvement = 1%	**Part 1** **Questions 6, 9 & 10** Pre-Test Avg. = 3.1 Post-Test Avg. = 3.3 Improvement = 7%	**Part 1** **Questions 13, 14 & 15** Pre-Test Avg. = 3.2 Post-Test Avg. = 3.4 Improvement = 7%
Part 2 **Questions 4 & 5** Pre-Test Avg. = 73% Post-Test Avg. = 90% Improvement = 23%	**Part 2** **Question 2 & 6** Pre-Test Avg. = 69% Post-Test Avg. = 69% Improvement = 1%	**Part 2** **Questions 3 & 7** Pre-Test Avg. = 58% Post-Test Avg. = 75% Improvement = 31%	**Part 2** **Question 8** Pre-Test Avg.= 80% Post-Test Avg.= 84% Improvement = 4%
Total for LG 1 Improvement = 15%	**Total for LG 2** Improvement = 1%	**Total for LG 3** Improvement = 19%	**Total for LG 4** Improvement = 6%

Part 1 of the assessment is designed to measure students' confidence level with the entire academic research process. Students are asked to rank on a scale from 1 (very difficult) to 5 (very easy) how they feel about different stages of the research process. Table 3 (below) and Graph 1 (Appendix B) provide a question by question listing of student scores on both the pre-test and post-test.

[2] For the pre-test the number of student responses was not the same from question to question. For Part 1 the average number of responses was 221 (mode = 221). For Part 2, questions 2-8 the average was 176 (mode = 178). 434 students were enrolled in the pre-test Moodle assessment 'course.'

[3] The post-test also exhibited different numbers of responses from question to question. For Part 1 the average number of responses was 82 (mode = 82). For Part 2, questions 2-8 the average was 73 (mode = 73). 377 students were enrolled in the post-test Moodle 'course.' The participation rates in the pre- and post-test and their relation to the size of the 2019 class is discussed in the *Improvement Plan* section below.

Table 3. Comparison of student ratings pre- and post-test by question for Part 1

Question **Scale 1 - 5** **1 = very difficult** **5 = very easy**	**Pre-Test Average Points** (n=221)	**Post-Test Average Points** (n=82)	**Point Change**	**Percent Change**
1. Defining a topic for the assignment	3.14	3.09	-0.05	-2%
2. Narrowing my topic	2.95	2.94	-0.01	0%
3. Selecting search terms	3.19	3.10	-0.09	-3%
4. Finding articles in the research databases on the Library's website (EBSCO, JSTOR, ProQuest, etc.)	2.81	3.22	0.41	15%
5. Finding sources to use "out on the web" (example - Google, Wikipedia, websites)	3.72	3.62	-0.10	-3%
6. Determining whether a website is credible or not	3.19	3.43	0.24	8%
7. Figuring out where to find sources in different parts of the library	2.83	3.02	0.20	7%
8. Finding up-to-date materials	3.08	3.27	0.19	6%
9. Having to sort through all the irrelevant results I get to find what I need	2.82	3.06	0.24	9%
10. Evaluating the sources that I've found	3.20	3.39	0.19	6%
11. Reading and understanding the material	3.53	3.60	0.06	2%
12. Integrating different sources from my research into my assignment	3.21	3.28	0.07	2%
13. Knowing when I should cite a source	3.39	3.46	0.07	2%
14. Knowing how to cite a source in the right format	2.93	3.35	0.42	14%
15. Knowing whether or not my use of a source, in certain circumstances, constitutes plagiarism	3.19	3.32	0.13	4%
16. Knowing whether or not I've done a good job on the assignment	2.90	2.74	-0.16	-5%
Average	**3.13**	**3.24**	**0.11**	**4%**

Table 4. Average number of students reporting at each level of difficulty for all questions in Part 1

Rating	**Pre-Test** (n=221)	**Post-Test** (n=82)	**Percent Change**
1 – This is very difficult	4%	3%	-18%
2 – This is difficult	24%	22%	-9%
3 – This is neutral	36%	33%	-8%
4 – This is easy	28%	32%	12%
5 – This is very easy	8%	10%	27%

Table 5 (below) and Graph 2 (Appendix B) show the percentage of students who answered each question correctly on the pre- and post-test for the five multiple choice questions in Part 2.

Table 5. Pre- and post-test comparison of percentage of students answering multiple choice questions correctly

Multiple Choice Question	Pre-Test (n=177)	Post-Test (n=73)	Percent Change
2. Keywords	69%	70%	2%
4. Database	72%	89%	24%
6. Narrowing	69%	68%	0%
7. Sources	34%	62%	82%
8. Citation	80%	84%	4%
Average	**65%**	**75%**	**15%**

Tables 6, 7, and 10 (below) list the number of student responses that matched a given category for questions 1 and 9 and a representative response for each category. Student responses were coded into up to three different categories.

Table 6. Coded student responses to pre-test question 1

Pre-Test Question 1 – "What do you hope to learn from the library sessions this year?"	Number of Student Responses (n=176)
Other – "I hope to have a better understanding on the overall concept of Information Literacy."	72
Finding resources – "How to search for thing and get accurate sources."	56
Library – "Where specific research sections are in the library"	54
Citation – "I would like to see helpful ways for us to help our citing skills."	33
Finding books – "I hope to learn how to better use the system for finding specific texts in our library faster"	24
Finding articles – "How to easily locate articles for research."	15
Evaluation of sources – "I hope to learn more about finding and evaluating sources to use in my papers and assignments."	9
Don't know – "I'm unsure of what I hope to get out of the session, but I'm sure whatever they say will be useful."	4
Web – "I hope to learn how to find credible websites that will make my research process easier."	4
Topics – "I hope to find out how to narrow my choices and research options."	3
Nothing – "nothing really, i already know how to use the library and if i have any questions i would ask the librarian."	1

Table 7. Coded student responses to post-test question 1

Post-Test Question 1.1 – "What was the most useful thing that you learned from the library sessions?"	**Number of Student Responses** (n=71)	**Post-Test Question 1.2 – "What do you wish that you would have learned?"**	**Number of Student Responses** (n=62)
Finding articles – "The most useful thing that I learned was how to navigate and search different databases through Millikin's website."	25	**Citation** – "I wish I would have learned more about how to cite correctly."	15
Evaluation of sources – "Learning about the different sources (i.e., magazines, scholarly articles, journals) was helpful."	18	**Nothing** – "I do not wish I learned anything because she taught me everything I needed to know."	13
Keywords – "Learning how to use different keywords or phrases in order to gain more or better search results."	13	**Other** – "I wish I would've learned how to organize going about the research paper better."	7
Other – "The person that came to speak to us was very helpful and answered all of my questions"	8	**Evaluation of sources** – "I feel like I just don't know enough yet about determining whether the source is credible or not."	6
Finding resources – "I learned how to look up sources."	7	**Library** – "Layout of new library "	5
Library – "I learned how to navigate the library website which was very beneficial."	5	**Web** – "I wish we could have learned more about online sources."	5
Finding books – "The most useful thing I learned was knowing how to look for book online using Millikin Universiy."	3	**Finding articles** – "I wished I learned the specific combination of databases to use when searching for my obscure topic."	3
Citation – "programs to use for collecting, organizing, and citing sources."	2	**Finding books** – "I wish we had talked more about how to order physical books from the library. "	2
Interlibrary loan – "How to get an Inter-Library Loan."	2	**Don't know** – "I don't know what I wish I had learned."	2
Web – "How to find good websites to use."	2	**Finding resources** – "More outlets for research"	2
Topics – "The most useful thing from the visit was explaining and physically showing how to key search for your chosen topic and how to narrow that search."	1	**Topics** – "I wish I would have learned how to really narrow down my topic."	2

		Interlibrary loan – "how long it would take to get resources through inter-library loan."	1
		Keywords – "I wish we would have learned more about keywords and good ones to use for different research aspects."	1

Table 8 and 9 (below) show the pre- and post-test scores for the two constructed response questions in Part 2 of the assessment.

Table 8. Comparison of students' scores pre- and post-test for question 3

Question 3 – "List three criteria for deciding if a website has the credibility it needs for you to use in your research project."	**Pre-Test** (n=174)	**Post-Test** (n=72)	**Point Change**	**Percent Change**
Average (out of 3)	**2.44 (81%)**	**2.67 (89%)**	**0.23**	**9%**

Table 9. Comparison of students' scores pre- and post-test for question 5

Question 5 – "Describe three ways that scholarly journal articles differ from magazine articles or newspaper articles."	**Pre-Test** (n=174)	**Post-Test** (n=72)	**Point Change**	**Percent Change**
Average (out of 3)	**2.21 (74%)**	**2.72 (91%)**	**0.51**	**23%**

Table 10. Coded student responses to pre- and post-test question 9

Pre-Test Question 9 – "What are some research activities that librarians can help students with?"	**Number of Student Responses** (n=175)	**Post-Test Question 9 – "What are some research activities that librarians can help students with?"**	**Number of Student Responses** (n=72)
Finding resources – "Finding sources"	75	**Finding resources** – "How to find a credible source."	25
Finding books – "They can be helpful in finding books on the topic"	51	**Finding books** – "finding books about specific topic"	15
Finding articles – "make sure they have the correct database"	43	**Citation** – "How to properly cite articles and other sources in the correct manner."	14
Citation – "They can also help by explaining the ways to avoid plagiarism."	39	**Finding articles** – "How to use the database properly."	13

Other – "Librarians can help students by working with them to organize their ideas when writing."	30	**Keywords** – "helping students use the right keywords"	10
Library – "helping the student find a book needed from a shelf in the library"	24	**Other** – "How to use the photocopier, in order to have hard copies of book pages with which to write on/highlight."	10
Evaluation of sources – "identifying if a source is reliable."	23	**Topics** – "Helping to narrow down topics"	9
Web – "how to use different internet tools"	12	**Evaluation of sources** – "Figuring out if sources are credible"	8
Topics – "Helping to narrow searches and topics to be more specific"	9	**Library** – "finding physical resources in the library"	5
Don't know – "I am not sure, I have not had to write a paper yet so I don't know what they do"	6	**Interlibrary loan** – "Getting sources from Inter-Library Loan"	3
Keywords – "show how to use keywords"	2	**Nothing** – "nothing"	3
Nothing – "N/A"	2	**Don't know** – "i do not know"	1

Table 11. Student scores on the self-guided tour worksheet

Average Score (out of 10) (n=335)	9.0
Average Mean (out of 10) (n=335)	9.3

Table 12. Self-guided tour survey results

	Number of Student Responses	**Percentage of Student Responses**
How long did it take you to complete your investigation? (n=109)		
5 - 10 minutes	23	21%
10 - 15 minutes	49	45%
15 - 20 minutes	26	24%
more than 20 minutes	11	10%
Now that you have completed the investigation, do you feel more comfortable using Staley Library? (n=110)		
Yes	95	86%
No	6	5%
Not sure	9	8%
Do you feel more confident about finding library resources? (n=110)		
Yes	87	79%
No	10	9%

Not sure	13	12%
Do you know who to ask for help in the library? (n=110)		
Yes	108	98%
No	1	1%
Not sure	1	1%
How do you feel about the Dr. I.B. Smart story used in the investigation? (n=110)		
I liked it	44	40%
It was ok	45	41%
I didn't like it	7	6%
I didn't pay any attention to the story	14	13%

Similar data tables for the PACE CWRR and off-sequence CWRR classes are included in Appendices C & D below.

Analysis of Assessment Results

Looking across all of the different assessment types, students showed an improvement in every area between the pre- and post-test. In Part 1, overall student confidence in the research process increased by 0.11 points or 4%. As in past years, students showed the most improved confidence in finding articles in the library databases and knowing how to cite sources. However, the overall increase in confidence is roughly half of what it was last year (4% versus 8%), and in some areas students expressed a *decrease* in confidence. As I will discuss below, part of this may be explained by the students who responded to the pre- and post-tests. Students showed an average 15% increase in correct answers on the multiple choice portion of Part 2 and an average .37 point or 16% increase in correct answers on the short answer questions.[4]

Mapped to the CWRR Artifact Performance Indicator Scale (where Nominal (Red-Stop) = 0-52%, Adequate (Yellow-Caution) = 53-74%, and Excellent (Green-Go) = 75-100%), for the short answer portion of Part 2 the percentage of correct answers on the post-test was well in the Excellent (Green) range of the scale (short answer = 90%). Overall, the percentage of correct answers on the multiple choice portion of Part 2 of the post-test also fell in the green range (multiple choice = 75%), but there was a wide disparity in the percentage of correct responses. Questions 4 and 8 (on databases and citation) were well in the green range (89% and 84%), while questions 2, 6, and 7 (keywords, narrowing, and sources) were in the yellow range (70%, 68%, and 62%). With the exception of question 8 (citation), all of the multiple choice post-test scores were equal to or higher than academic year 2014-2015 and the overall percentage change from the pre- to the post-test was higher as well (15% increase this year versus 10% last year). In part the lower score on question 8 (citation) may be explained by changes to the question, which the librarians intentionally made more difficult. As in past years, the students showed the greatest increase in their scores on questions related to material that the librarians particularly emphasize in their sessions, e.g., scholarly databases and peer-reviewed journal articles (questions 4, 5, and 7). It is puzzling that question 6 on narrowing topics showed no improvement between the pre-test and post-test. This questions had very low scores last year (57% pre-test, 59% post-test) and the librarians intentionally changed the question to

[4] Another interesting measure of the students' progress from the pre- to the post-test is to look at the *average normalized gain*, which is a measure commonly used in physics education for pre- and post-test assessments, (e.g., Hake, A. (1997). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for an introductory physics course. *American Journal of Physics, 66*(1), 64-74). Average normalized gain $\langle g \rangle$ is the average actual gain (%post − %pre) divided by the maximum possible average gain (100% − %pre). High-g courses, i.e., those with a large gain from the pre- to the post-test, are those where $g \geq 0.7$, medium-g courses are those where $0.7 > g \geq 0.3$, and low-g courses are those where $g < 0.3$. When applied to this years' assessment, for the selected response questions $g = .28$, i.e., low-g, and for the constructed response questions $g = .54$, i.e., medium-g.

make it more accessible to students. While the scores on both the pre- and post-test were about 10 percentage points higher, students again showed no improvement from the pre- to the post-test. Nonetheless, on the whole this year's assessment shows that students' information literacy confidence and abilities are increasing during their first year at Millikin University.

Analysis of Assessment Results by Library Instruction Goal

Many of the questions in Parts 1 and 2 can be mapped to particular Staley Library CWRR learning goals. Students' confidence and correct answers increased across all of the learning goals (see Table 2 above), with a particularly strong increase in goals 1 and 3 (information sources and evaluation of information).

Analysis of Assessment Results for Part 1

Students' self-assessed confidence increased on a majority of the questions in Part 1 and on the whole increased by .11 points (4%). The greatest increase in confidence was in finding articles in the library databases (question 4), determining credibility of a website (#6), figuring out where to find sources in the library (#7), sorting through irrelevant results (#9), and knowing how to cite sources in the correct format (#14). Using the library databases and evaluating websites are both covered extensively in library instruction sessions and these results reflect positively on that instruction. The increased confidence in sorting through irrelevant results is also covered in library sessions, particularly in CWRR II. Citing sources and plagiarism are covered both in library instruction and by Seminar/CWRR faculty.

As mentioned above, students' confidence in certain aspects of the research process actually *decreased* from the pre-test to the post-test, particularly in their ability to know whether or not they have done a good job on an assignment, finding sources "out on the web," selecting search terms, and defining a topic. There was essentially no change in their confidence in being able to narrow their search terms. As in past years, students' confidence in finding information on the internet was extremely high on the pre-test (3.72 out of 5) and although it decreased slightly by the post-test (3.62), it remained the highest among the post-test results. Similarly, while questions 1 (defining a topic) and 3 (selecting search terms) showed a slight decrease in confidence, the students' average score remained above 3 by the post-test (3.09 and 3.10). Students also showed a decreased confidence in knowing whether they've done a good job on an assignment. If we consider this decline along with the students' lack of confidence in defining a topic, this may indicate an increased awareness of the difficulty of college level assignments, where students are typically given much more freedom to establish their own topics and direction for research and writing and grading standards are higher.

Table 4 (above) lists the percentage of students who provided each of the five ratings (1-5) across all of the questions on Part 1 for both the pre- and post-test. This comparison shows that fewer students responded with 1s and 2s (low confidence) and 3s (neutral) from the pre-test to the post-test, while the number of students who found tasks "easy" or "very easy" (4 or 5) increased. Overall, it does seem that students are more confident throughout the research process by the end of their second semester at Millikin University.

Analysis of Assessment Results for Part 2

Multiple Choice Questions

Question 2 asks students to determine the best keywords to use to enter a query into Google. Students showed a modest increase (2%) in their scores between the pre- and post-tests, which is the same as what we saw last year. While the pre-test score was relatively high (69%), as it was last year, it would be nice to see a greater increase in correct reponses by the post-test. Identifying keywords is covered in library instruction both in the fall and the spring, and it is an important skill that students can use to search effectively in library databases and on the open web.

Question 4 on the types of resources available in library databases showed a significant improvement (24%) between the two tests; 89% of students responded to this question correctly by the post-test. Knowing what library databases are and what can be found in them is an essential skill for scholarly researchers. Students' success acquiring this skill (which they seem to appreciate given that they most frequently mentioned in question 1 of the post-test that learning to use the databases was the most important thing that they learned) is an indicator of the importance of library instruction.

Question 6 asks students to narrow a given topic. For this year's assessment the wording of this question was changed from an example dealing with renewable energy sources to social media and privacy. While the scores were higher than in the previous year, students continued to show no improvement from the pre-test to the post-test. The majority of the students answering incorrectly chose a response that discussed a particular social media company (Facebook), but left out the privacy aspect of the topic. While the librarians will evaluate this question to see if it can be improved, this may be an area where students need more in-class instruction.

Question 7 showed the largest increase in the number of correct answers from the pre- to the post-test (82%), but simultaneously had the lowest score on the post-test (62% correct). This question asks students to identify a non-biased information source on energy drinks. The correct answer, "a peer-reviewed article in a nutrition journal," is intended to have students identify scholarly sources as factual and free from obvious bias. While the increased number of students who were able to identify this source is encouraging, the second most popular answer for both the pre- and post-tests was "a survey conducted by the American Beverage Association." While students on the pre-test may not understand what a "peer-reviewed article" refers to, the high scores on post-test Part 2 question 5 on scholarly articles shows that by the end of their first year most students do understand about scholarly articles. Nonetheless, by the post-test over 30% of students still did not recognize the potential bias of an industry group conducting a survey of its own industry. Identifying bias in information sources is an advanced ability, but one that will benefit students throughout their lives. The librarians will continue to try to inculcate this difficult skill in the short time that they have with the students during their first year.

Question 8, which asks about the best time in the research process to record a citation, showed a minor increase (4%) in the number of correct responses from pre- to post-test. In the past, students' scores were very high for this question, and for this year's assessment the librarians intentionally made the question slightly harder by reordering the possible responses and replacing one of the responses. Students continued to do well with 84% answering the questions correctly by the post-test. Perhaps most encouragingly no students responded that they should first record citation information for a source "when the teacher asks you for proof that you did not plagiarize the information in the paper," which indicates that students recognize the need to keep track of their sources before they are accused of plagiarism.

Short Answer Questions

Question 1 in the pre-test provides important insights into their understanding and expectations of the library and scholarly research as they begin their college careers. For this reason, responses to this question were shared amongst the librarians early in the fall semester prior to meeting with the students. On the pre-test the responses tended to be rather general. Students expressed an interest in learning about the library, information literacy, and finding resources overall, e.g., "I hope to have a better understanding on the overall concept of Information Literacy," or "how to search for thing and get accurate sources." Sadly, given that students are increasingly coming from high schools with limited library facilities and no high school librarian, they simply may not understand the variety of resources and services offered by a university library.

By the time of the post-test, students have a more defined conception of what the library and librarians can offer them as researchers. As in past years, a majority of students identified finding articles/using the databases as the most valuable thing that they learned in their library instruction. Students also identified evaluating sources and formulating keywords as important skill that they learned in the sessions.

For post-test question 1.2, which asks what they wish they had learned, a majority of students claimed that they wanted to learn more about citations, which has historically been a topic that students want to learn more about. The second most popular response was nothing. While it may be flattering to think that we have taught them everything that they need to know about information literacy in three to four class sessions, this is clearly not true, but may indicate their satisfaction with the sessions.. The third most popular response, "other," usually dealt with the writing process and incorporating sources into a paper, e.g., "I wish I would have maybe learned more on tips for how to reduce your research load and decide what is good to be cited within the paper and what is irrelevant and should be left out."

Question 3 asks students to identify three criteria for deciding if a website is credible. Website credibility is a topic that is addressed directly in one of the fall library sessions where students develop criteria for evaluating websites. Students showed a 9% increase in their average score from pre- to post-test for this question. The high initial scores on this question (2.44 out of 3) indicate that students are probably receiving some instruction on website evaluation before entering college. However, their pre-test responses show that their initial criteria tend to be overly focused on the URL of a website and to be binary, e.g., all .org sites are good or all .com sites are bad. One of the goals of our website evaluation instruction is to encourage students to think more deeply in their evaluation and apply the criteria with a more nuanced understanding.

Question 5 asks students to describe three ways that scholarly journal articles differ from magazine or newspaper articles. Part of a spring library instruction session is devoted specifically to this topic and students are given criteria for distinguishing scholarly journals from other periodical types. Student scores increased from the pre- to the post-test by 23% to 2.72 out of 3 (91%). These results indicate that by the post-test students better understand the characteristics of scholarly journals, which are a major source of scholarly information across the disciplines.

Question 9, which asks about research activities that a librarian can help with, is intended in part to give a better sense of students' perceptions of the librarians both before and after the instruction sessions. The variety of activities that students identified both on the pre- and the post-test is noteworthy. Students may see finding different types of resources as the librarians' principal activity, but they also recognize that librarians can help them navigate the physical library, retrieve materials from other libraries, develop keywords for searches, cite correctly, and evaluate sources.

Analysis of Survey Results for Self-Guided Tour

There were 110 unique responses to the survey that students could complete after taking the self-guided tour, which is approximately 33% of the 335 students who completed the tour. This was down slightly from the 38% participation rate the previous year. Still, a large majority of respondents claimed to have met the tour's learning goals of making students feel more comfortable in the library (86%), more confident using library resources (79%), and more knowledgeable about who to ask for help in the library (98%). For most students, it took them 10-15 minutes to complete the tour, which was the target time range. All of the results from the survey can be seen in Table 12 (above). It is important to note that the survey was optional and these self-selected responses may not represent the majority of students who completed the tour.

This year the librarians again recorded the scores for the worksheet that students complete during the tour. 335 worksheets were collected by the librarians and the average score was 9.0 out of 10. Based on a

class of 426 this means that approximately 79% of first year students completed the self-guided tour (the results are in Table 11 above). A self-guided tour is a very efficient way to introduce students to the physical library. The challenge is making the tour engaging enough that students actively seek out new areas of the library and remember the areas that they visited. The high average score on the worksheet shows that most students were able to answer the questions posed at each stop on the tour.

Analysis of Assessment Results for PACE and Off-Sequence CWRR classes

This year data were collected from three PACE CWRR classes (one CWRR I and two CWRR II classes), two off-sequence CWRR I sections, and two off-sequence CWRR II sections. Collecting reliable data from these classes is challenging for a number of reasons. Not all PACE students who take CWRR II have taken CWRR I, which undermines the design of the pre- and post-test. Also, the off-sequence CWRR sections are a mix of transfer students, international students, and students retaking CWRR. The pre-test is designed to be taken prior to any library instruction, which is challenged by the composition of these classes. Finally, the brief PACE semester sometimes makes scheduling the pre- and post-test challenging. For example, Matthew Olsen held a library instruction session in the fall 2015 PACE CWRR I class and he administered the pre-test prior to the session, but only one student participated, thus the data were not included in this report.

Typically, the results from the PACE CWRR classes are similar to those of the traditional classes, although they tend to score lower throughout the assessment. This year the results from pre-test to post-test were essentially the same when reporting their confidence in the research process (1% increase), there was a very slight increase on the multiple choice questions in Part 2 (5% increase) and for the open-ended questions in Part 2 (questions 3 & 5) they showed a 34% decrease in their results from the pre-test to the post-test. While the PACE students had roughly similar overall averages in their confidence in different aspects of the research process on the post-test (3.24 for the traditional sections versus 3.18 for the PACE sections) their confidence by the post-test decreased on 9 of the 16 questions. They did have the largest increase on questions dealing with finding articles in the research databases, finding sources "out on the web" and evaluating sources, all of which largely tracks with the traditional sections. However, their confidence was 4.2 out of 5 on question 11 (reading and understanding the material), which was higher than any of the scores for the traditional students. Overall, these results are certainly skewed by the small sample size, particularly on the pre-test (5 students), and, as mentioned above, many of the students in the CWRR II PACE classes do not take the CWRR I PACE class, which undermines the pre- and post-test design. Nonetheless, it continues to be worthwhile to administer the pre- and post-test to the PACE students, if for no other reason than to see similar trends in the results and to read through their responses to the open-ended questions.

Students in the off-sequence CWRR classes declined in their confidence in the research process on 12 out of the 16 questions from the pre-test to the post-test for a 5% decrease overall. They showed the sharpest declines on the questions on defining and narrowing a topic (questions 1 & 2) and on knowing whether they had done a good job on the assignment (question 16). They did show substantial increases in finding articles in the library databases (question 4) and knowing how to cite sources (question 14). On the multiple choice questions students also showed an overall decrease in their scores from an average of 76% correct to 70% (a 7% decline). Although the scores decreased on each of the questions, they were all in the yellow or green range with the highest score on Question 8 (citation) on the pre-test (84% correct) and the lowest on question 7 (sources) on the post-test (63% correct). On the open-ended questions for Part 2 (questions 3 & 5) students showed an overall 22% increase, with a 38% increase on question 5 dealing with the characteristics of scholarly articles. While the sample sizes were larger for the off-sequence classes (approximately 19 for the pre-test and 17 for the post-test), as mentioned above, the composition of the off-sequence CWRR classes is extremely varied and typically yield results on the pre- and the post-test that are different than the other groups.

Improvement Plan

An ongoing challenge with the library assessment is the lack of participation, especially in the post-test. This year, only 46% of the students enrolled in CWRR I completed the pre-test and only 21% of the students enrolled in CWRR II completed the post-test. What was unusual this year is the drop-off in participation from Part 1 to Part 2 of the assessment. On the pre-test participation declined from 51% to 41% and on the post-test from 22% to 19%. While it is possible to make comparisons across the two tests, these low participation rates do challenge the overall confidence in the results. Because the test is administered outside of class there is also a danger that participation is self-selecting and the results do not represent an authentic sampling of the class of 2019. For example, the participation rate may be higher from the honors sections of CWRR, which would certainly skew the results. The advantage of this format is that the assessment can be administered without sacrificing instruction time and on balance this factor may outweigh the lack of participation. Nonetheless, the Instruction Coordinator continues to stress the importance of the assessment to both students and faculty.

As mentioned above, capturing data from the PACE and off-sequence CWRR classes is always challenging, but this year all of the off-sequence CWRR sections participated and all of the PACE classes participated as well, although only one student participated in the fall 2015 PACE CWRR I pre-test. The Instruction Coordinator will continue his efforts to have all CWRR classes participate in the assessment.

The self-guided tour retained the same format and story from the previous year and although the participation rate decreased slightly the tour was successful in meeting its learning goals, and 82% of the students said that they either liked the story or thought it was Ok. The tour and worksheet will need to be changed substantially for the fall 2016 semester since Staley Library is temporarily located in New Hall 3 during the University Commons construction, and this space does not lend itself to groups of students touring through the building. The Instruction Coordinator is exploring creating a virtual tour of the library so that students can continue to learn about the library and its services.

This assessment report continued the practice of having multiple people coding/grading the constructed response questions in Part 2. This year librarian Amanda Pippitt worked with Matthew Olsen to grade and code the responses. Before doing the grading/coding they held a norming session and then worked with the questions independently. The scores of questions 3 and 5 were averaged[5] and for questions 1 and 9 any disagreements in the coding of questions were discussed and an agreed coding established. Having multiple people work through the results of the assessment also helps to diagnose problems with the assessment and to suggest fruitful improvements. This format with multiple coders/graders and a norming session continues to be successful and will be maintained in the future.

A few of the questions in Part 2 of the assessment were revised last year. As mentioned above, question 6 on narrowing topics used a different example this year (privacy and social media), the possible responses for question 8 on citation were revised to make the question slightly more difficult, and for question 9, the question was reworded to make it clearer that we were asking what activates a librarian can help any student with. While these changes to the questions did have largely the desired effect, a few students continued to be confused by question 9 and seemingly thought the question was asking about in-class activities, rather than research activities more generally. The responses to questions 3 and 5 in Part 2 also continue to receive frustratingly brief responses. Without more context, it is often difficult to discern what exactly students mean by their answers, which subsequently makes grading the responses very difficult.

Overall, students continue to have difficulties with the questions that ask about narrowing topics or identifying bias free information sources. Several questions show that students have a very black and white assessment of information sources, e.g., all scholarly journal articles are good while all newspaper articles

[5] The standard deviation between the two coders was quite low, 0.10 for Question 3 and 0.13 for Question 5.

express only opinions and bad. This summer the librarians are working on ways to introduce the Association of College & Research Libraries' *Framework for Information Literacy for Higher Education*[6] into our instruction. This document, which was formally adopted in January 2016, introduces a more conceptual approach to information literacy instruction through the use of "threshold concepts." Our hope is that this will help to provide students with a more nuanced understanding of information searching and evaluation.

Conclusion

On the whole, the assessment of library instruction in Seminar/CWRR indicates that students are learning important information literacy skills over the course of their first year at Millikin University. Finding, evaluating, and using information effectively and ethically are important 21st century skills and are skills that library faculty are uniquely qualified to develop in students throughout the curriculum. The close relationship that library faculty enjoy with faculty members across campus allows them to provide instruction in a way that is most beneficial to students. In particular with Seminar/CWRR, the opportunity to meet with cohorts on several occasions allows the librarians to introduce and then reinforce multiple concepts with the students. The librarians continue to stress the idea of research as a process and to develop higher order information literacy abilities while reinforcing the more fundamental skills. The library faculty look forward to working again with their CWRR and Seminar colleagues during the 2016-2017 academic year.

[6] Association of College and Research Libraries. (2016). *Framework for Information Literacy for Higher Education*. Retrieved from the ACRL website: http://www.ala.org/acrl/standards/ilframework

Appendix A

Pre- and Post-Test Questions

Part 1

When you think about the ENTIRE research process—from the moment you get the assignment until you turn in your research paper—what is the level of difficulty for the following tasks? [Scale of 1 to 5: 1 = Very difficult, 2 = Difficult, 3 = Neutral, 4 = Easy, 5 = Very easy]

1. Defining a topic for the assignment.
2. Narrowing my topic.
3. Selecting search terms.
4. Finding articles in the research databases on the Library's website. (EBSCO, JSTOR, ProQuest, etc.)
5. Finding sources to use "out on the web" (using Google, Wikipedia, or other search sites).
6. Determining whether a website is credible or not.
7. Figuring out where to find sources in different parts of the library.
8. Finding up-to-date materials.
9. Having to sort through all the irrelevant results I get to find what I need.
10. Evaluating the sources that I've found.
11. Reading and understanding the material.
12. Integrating different sources from my research into my assignment.
13. Knowing when I should cite a source.
14. Knowing how to cite a source in the right format.
15. Knowing whether or not my use of a source, in certain circumstances, constitutes plagiarism.
16. Knowing whether or not I've done a good job on the assignment.

Part 2

(Correct answers are indicated in italics)

1. (Pre-Test) This year, a librarian will visit your CWRR and Seminar classes to begin talking about Information Literacy.
   What do you hope to learn from the library sessions this year?

1. (Post-Test) This year, a librarian visited your CWRR and Seminar classes to begin talking about Information Literacy.
   1. What was the most useful thing that you learned from the library sessions?
   2. What do you wish that you would have learned?

2. You are asked to write a research paper addressing the following question: "Should colleges be allowed to restrict student speech?"
   You have decided to do a Google search using two keywords.
   Which **two keywords** will get the best results?
   College and censorship
   College and student
   College and speech
   College and restriction

3. List **three** criteria for deciding if a website has the credibility it needs for you to use in your research project.

4. If you are searching in the database "Academic Search Premier" as seen in the image below, what type of research resources should you expect to find in your results?
    Journal Articles
    Books

5. Describe **three** ways that scholarly journal articles differ from magazine articles or newspaper articles.

6. You have been assigned to write a research paper on a current events issue and you have decided to write about privacy on the Internet. Your professor tells you that your topic is too general. Of the following, which is the best way to narrow your Internet privacy topic?
    Focus on the relationship of Facebook use and self-esteem.
    Focus on methods that schools are using to prevent online bullying.
    Focus on social media companies and how they use personal data to make money.
    Focus on whether e-books affect student learning.

7. You are doing research for a speech on the potential health benefits and drawbacks of energy drinks (Monster, Red Bull, etc.). Which source is most likely to have **objective and accurate** information on this topic?
    A discussion of energy drinks on Yahoo! Answers.
    A survey conducted by the American Beverage Association.
    A website for one of the energy drink manufacturers.
    A peer-reviewed article in a nutrition journal.

8. When is the best time in the research process to make note of the details about your sources (author, title, date, etc.), so that you can cite them properly?
    The first time you access a source you might want to use.
    After you have finished writing the section of the paper that uses information from a source.
    When you are working on your reference list.
    When the teacher asks you for proof that you did not plagiarize the information in the paper.

9. What are some research activities that librarians can help students with?

Categories for Part 2, Questions 1 & 9

A = Finding articles (also using databases)

B = Finding books (and other print materials, also using the catalog)

C = Citation (also plagiarism)

D = Don't know

E = Evaluation of sources

I = Interlibrary loan

K = Keywords (development or selection)

L = Library – navigating the physical library or website

N = Nothing

O = Other – entire research process, writing, information literacy, etc. [use for very broad answers]

R = Finding (credible) (re)sources [use if they don't specify format or mention the library "databases"]

T = Topics – defining, narrowing, etc.

W = Web – using Google, Bing, Wikipedia, etc.

Grading Scale for Part 2, Question 3

0 = No correct criteria, "I don't know" or similar answer

1 = One correct criterion

2 = Two correct criteria

3 = Three correct criteria

Grading Scale for Part 2, Question 5

0 = No differences correctly identified, "I don't know" or similar answer

1 = One difference correctly identified

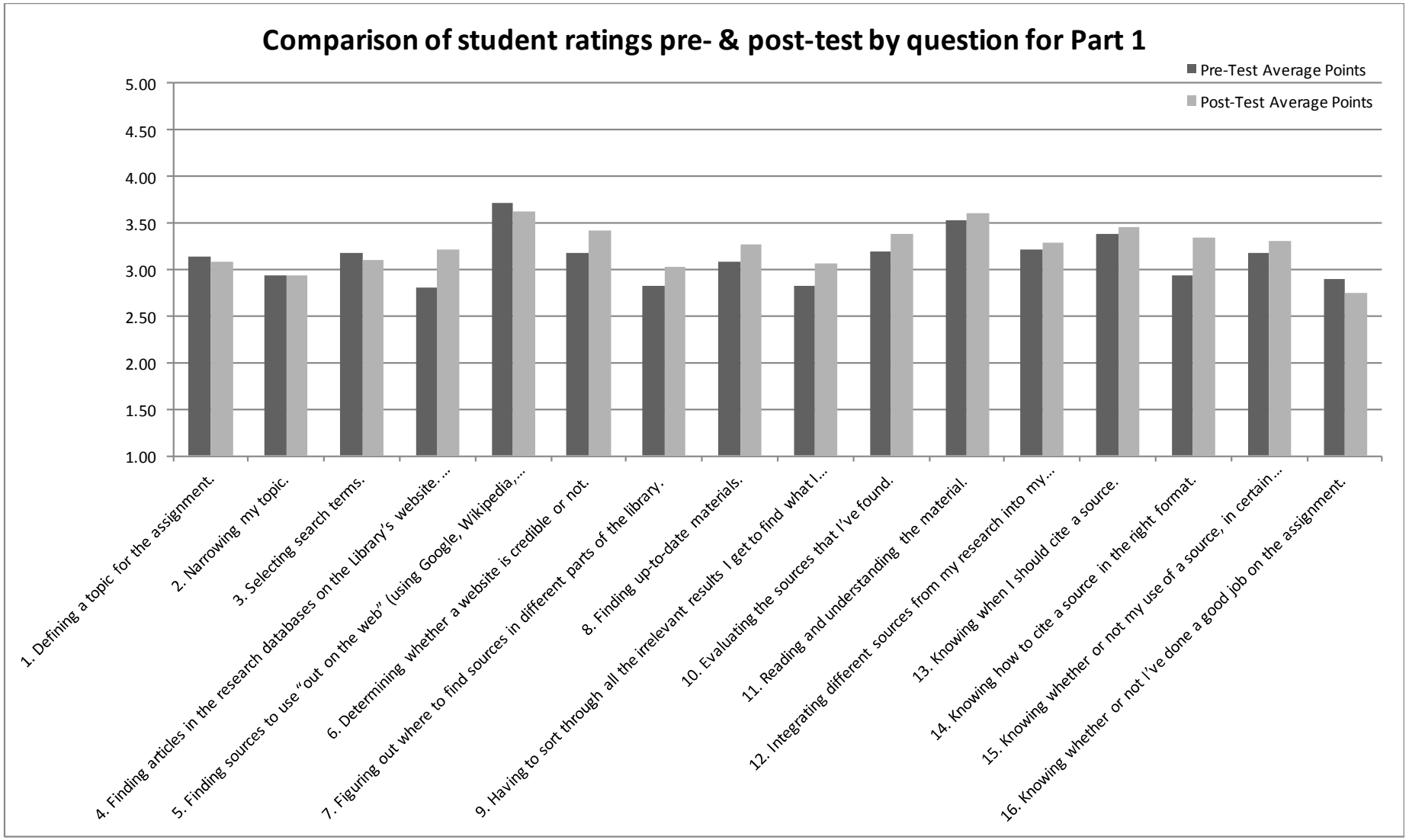
2 = Two differences correctly identified

3 = Three differences correctly identified

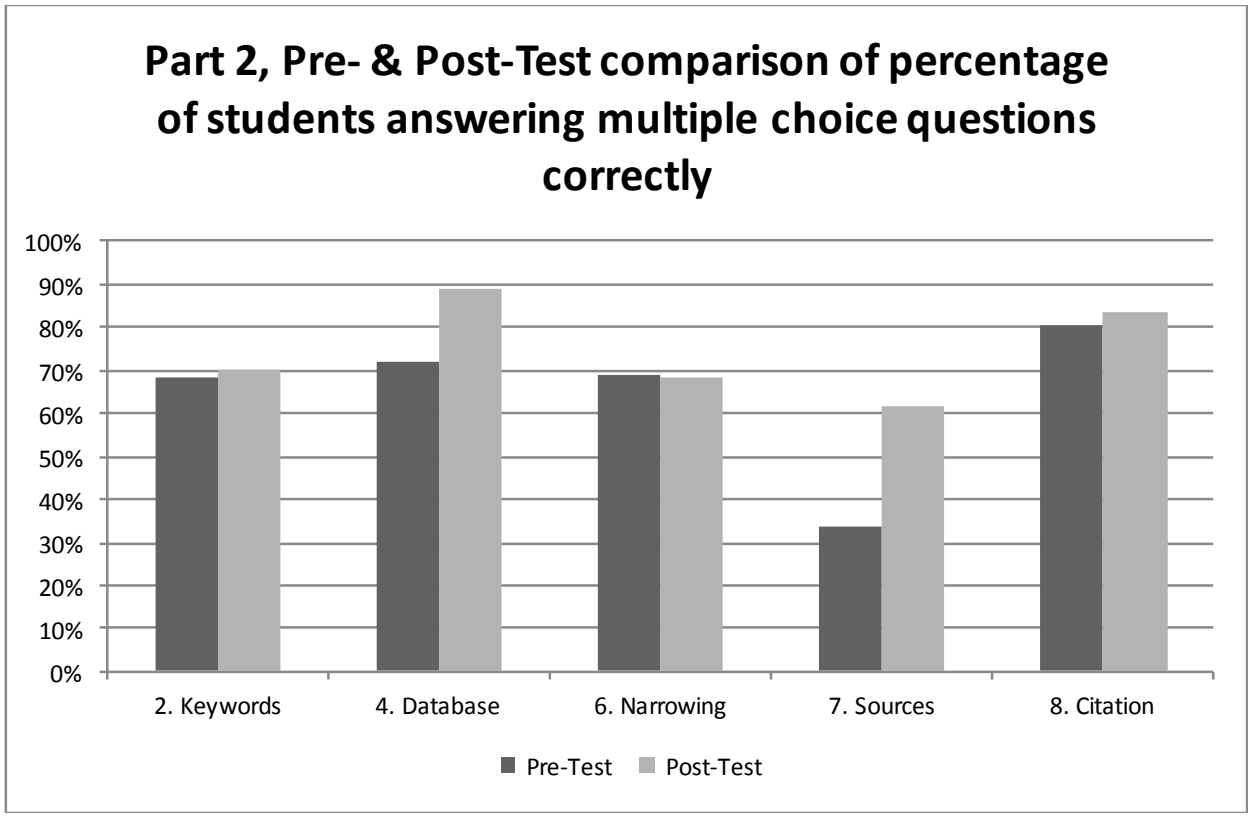
Appendix B

Graphical Representation of Pre- and Post-Test Results

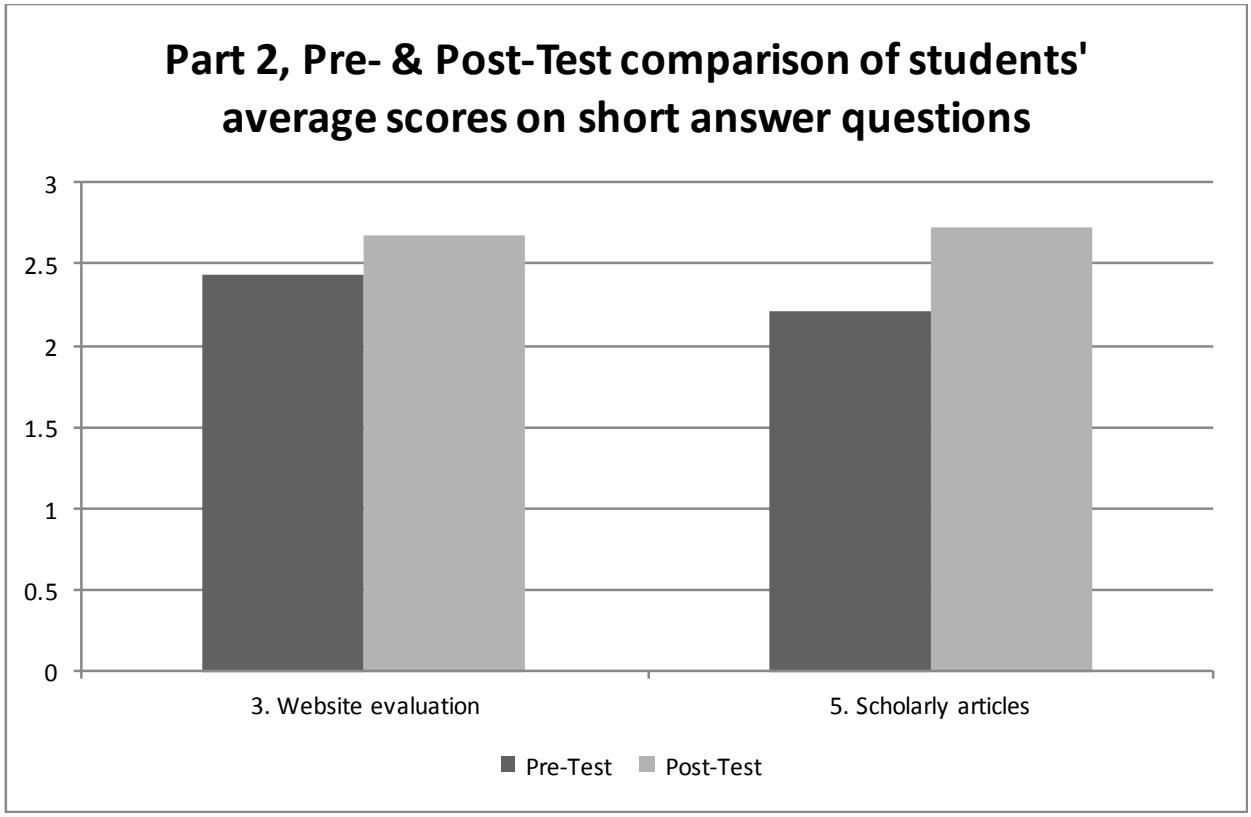
Graph 1


Comparison of student ratings pre- & post-test by question for Part 1
Pre-Test Average Points
Post-Test Average Points
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
1. Defining a topic for the assignment.
2. Narrowing my topic.
3. Selecting search terms.
4. Finding articles in the research databases on the Library's website....
5. Finding sources to use "out on the web" (using Google, Wikipedia,...
6. Determining whether a website is credible or not.
7. Figuring out where to find sources in different parts of the library.
8. Finding up-to-date materials.
9. Having to sort through all the irrelevant results I get to find what I...
10. Evaluating the sources that I've found.
11. Reading and understanding the material.
12. Integrating different sources from my research into my...
13. Knowing when I should cite a source.
14. Knowing how to cite a source in the right format.
15. Knowing whether or not my use of a source, in certain...
16. Knowing whether or not I've done a good job on the assignment.

Graph 2



Graph 3



Appendix C

PACE CWRR Results[7]

Part 1

Table C.1. Comparison of student ratings by question for Part 1

Question **Scale 1 - 5** **1 = very difficult** **5 = very easy**	**Pre-Test Average Points** (n=5)	**Post-Test Average Points** (n=21)	**Point Change**	**Percent Change**
1. Defining a topic for the assignment	3.20	2.82	-0.38	-12%
2. Narrowing my topic	3.60	3.36	-0.24	-7%
3. Selecting search terms	2.60	3.18	0.58	22%
4. Finding articles in the research databases on the Library's website (EBSCO, JSTOR, ProQuest, etc.)	2.80	3.86	1.06	38%
5. Finding sources to use "out on the web" (using Google, Wikipedia, or other search sites)	3.00	3.89	0.89	30%
6. Determining whether a website is credible or not	3.00	3.14	0.14	5%
7. Figuring out where to find sources in different parts of the library	3.20	3.46	0.26	8%
8. Finding up-to-date materials	3.60	3.71	0.11	3%
9. Having to sort through all the irrelevant results I get to find what I need	3.00	2.93	-0.07	-2%
10. Evaluating the sources that I've found	3.00	3.32	0.32	11%
11. Reading and understanding the material	4.20	3.71	-0.49	-12%
12. Integrating different sources from my research into my assignment	3.20	3.00	-0.20	-6%
13. Knowing when I should cite a source	3.00	2.79	-0.21	-7%
14. Knowing how to cite a source in the right format	2.80	2.39	-0.41	-15%
15. Knowing whether or not my use of a source, in certain circumstances, constitutes plagiarism	3.40	2.57	-0.83	-24%
16. Knowing whether or not I've done a good job on the assignment	2.80	2.71	-0.09	-3%
Average	**3.15**	**3.18**	**0.03**	**1%**

[7] The PACE CWRR results are the average of the results of post-tests from two classes (fall and spring semester) and a pre-test from one class in the spring semester.

Table C.2. Average number of students reporting at each level of difficulty for all questions in Part 1

Rating	Pre-Test (n=5)	Post-Test (n=21)	Percent Change
1 – This is very difficult	4%	5%	25%
2 – This is difficult	18%	23%	30%
3 – This is neutral	44%	31%	-29%
4 – This is easy	30%	33%	10%
5 – This is very easy	5%	8%	70%

Part 2

Table C.3. Pre- and post-test comparison of percentage of students answering each multiple choice question correctly

Multiple Choice Question	Pre-Test (n=4)	Post-Test (n=18)	Percent Change
2. Keywords	50%	63%	25%
4. Database	50%	73%	46%
5. Narrowing	75%	50%	-33%
7. Sources	50%	57%	14%
8. Citation	75%	71%	-5%
Average	**60%**	**63%**	**5%**

Table C.4. Coded student responses to pre-test question 1

Pre-Test Question 1 – "What do you hope to learn from the library sessions this year?"	Number of Student Responses (n=4)
Library – "From this Library session I hope to learn about how the library is currently operating, since the actual library is closed for re-model."	2
Other – "I've never actually taken a writing class, nor have I spent much time in the library. The time I have spent there the librarians have been great with help in locating all the resources and references needed to complete assignments I've had in the past."	2
Finding resources – "I also hope to learn, what are and are not good places to find research."	2

Table C.5. Coded student responses to post-test question 1

Post-Test Question 1.1 - What was the most useful thing that you learned from the library session this year?	**Number of Student Responses** (n=17)	**Post-Test Question 1.2 - What do you wish that you would have learned?**	**Number of Student Responses** (n=13)
Finding articles – "the most useful thing I learned was how to search for Scholarly articles."	6	**Nothing** – "I can't really think of anything."	7
Finding books – "How to navigate the library to borrow books."	4	**Other** – "How to not panic when writing a research paper."	3
Library – "how to search for items in the library"	4	**Citation** – "I wish I would have learned more about citing sources."	2
Finding resources – "I learned different ways to search for my topic."	4	**Evaluation of sources** – "I'd like to learn more about what exactly different sources are and how you know."	1
Other – "I learned many things last week that will help me write my research paper."	3		
Citation – "How to find sites to help with the APA style set up."	1		

Table C.6. Comparison of students' scores pre- and post-test for question 3

Question 3 – "List three criteria for deciding if a website has the credibility it needs for you to use in your research project."	**Pre-Test** (n=4)	**Post-Test** (n=15)	**Point Change**	**Percent Change**
Average (out of 3)	**2.63 (88%)**	**1.55 (52%)**	**-1.08**	**-41%**

Table C.7. Comparison of students' scores pre- and post-test for question 5

Question 5 – "Describe three ways that scholarly journal articles differ from magazine articles or newspaper articles."	**Pre-Test** (n=4)	**Post-Test** (n=15)	**Point Change**	**Percent Change**
Average (out of 3)	**2.63 (88%)**	**1.9 (63%)**	**-0.73**	**-28%**

Table C.8. Coded student responses to pre- and post-test question 9

Pre-Test Question 9 – "What are some research activities that librarians can help students with?"	**Number of Student Responses** (n=4)	**Post-Test Question 9 – "What are some research activities that librarians can help students with?"**	**Number of Student Responses** (n=15)

Finding articles – "Helping find the databases that might best help with the paper you are working on."	2	**Finding resources** – "Referring them to good sources in the library."	8
Other – "Any activities that involve doing research."	2	**Finding books** - "finding books relevant to their topic"	5
Finding books – "Librarians can guide the students on where to find certain books"	1	**Topics** – "Narrowing ideas."	4
Citation – "How to correctly cite sources."	1	**Finding articles** – "Finding Peer reviewed articles."	3
Evaluation of sources – "If the source your getting information from is good or not."	1	**Interlibrary loan** – "Finding books at other Universities."	2
Interlibrary loan – "How to borrow books from other libraries."	1	**Other** – "just giving us where to start"	2
Finding resources – "The Librarian can help by showing where you should look for that research"	1	**Citation** – "references"	1
		Evaluation of sources – "Credibility of websites."	1
		Keywords – "Finding more identifying words to search for."	1
		Library – "How to … work the website"	1

Appendix D

Off-Sequence CWRR Results[8]

Part 1

Table D.1. Comparison of student ratings by question for Part 1 of the pre-test

Question **Scale 1 - 5** **1 = very difficult** **5 = very easy**	**Pre-Test Average Points** (n=19)	**Post-Test Average Points** (n=18)	**Point Change**	**Percent Change**
1. Defining a topic for the assignment	3.32	2.61	-0.70	-21%
2. Narrowing my topic	3.11	2.50	-0.61	-19%
3. Selecting search terms	3.26	3.06	-0.21	-6%
4. Finding articles in the research databases on the Library's website (EBSCO, JSTOR, ProQuest, etc.)	2.68	3.44	0.76	28%
5. Finding sources to use "out on the web" (using Google, Wikipedia, or other search sites)	3.63	3.22	-0.41	-11%
6. Determining whether a website is credible or not	3.47	3.00	-0.47	-14%
7. Figuring out where to find sources in different parts of the library	3.05	2.67	-0.39	-13%
8. Finding up-to-date materials	2.84	2.72	-0.12	-4%
9. Having to sort through all the irrelevant results I get to find what I need	2.89	2.94	0.05	2%
10. Evaluating the sources that I've found	3.47	3.28	-0.20	-6%
11. Reading and understanding the material	3.53	3.78	0.25	7%
12. Integrating different sources from my research into my assignment	3.42	3.28	-0.14	-4%
13. Knowing when I should cite a source	3.74	3.72	-0.01	0%
14. Knowing how to cite a source in the right format	3.21	3.50	0.29	9%
15. Knowing whether or not my use of a source, in certain circumstances, constitutes plagiarism	3.32	3.00	-0.32	-10%
16. Knowing whether or not I've done a good job on the assignment	3.00	2.67	-0.33	-11%
Average	**3.25**	**3.09**	**-0.16**	**-5%**

[8] The off-sequence results are from two sections of CWRR I in spring 2016 and two sections of CWRR II in fall 2015.

Table D.2. Average number of students reporting at each level of difficulty for all questions in Part 1

Rating	Pre-Test (n=19)	Post-Test (n=18)	Percent Change
1 – This is very difficult	2%	7%	234%
2 – This is difficult	19%	26%	36%
3 – This is neutral	39%	30%	-24%
4 – This is easy	33%	28%	-15%
5 – This is very easy	8%	10%	33%

Part 2

Table D.3. Comparison of percentage of students answering multiple choice question correctly

Multiple Choice Question	Pre-Test (n=19)	Post-Test (n=17)	Percent Change
2. Keywords	79%	65%	-18%
4. Database	89%	76%	-15%
5. Narrowing	63%	65%	2%
7. Sources	63%	63%	-1%
8. Citation	84%	82%	-2%
Average	**76%**	**73%**	**-7%**

Table D.4. Coded student responses to question 1

Pre-Test Question 1 – "What do you hope to learn from the library sessions this year?"	Number of Student Responses (n=19)
Library – "I hope to learn more about what's going on with the library, and how things are working now that they are in a different building."	7
Finding resources – "The best ways to find information for a specific topic."	6
Finding articles – "I hope to learn how to access articles that are up to date."	4
Other – "How to use the resources at Millikin to help write a research paper."	4
Finding books – "online books"	2
Citation – "I also want to learn about how to properly cite sources."	2
Evaluation of sources – "Some tips on how to know if the source is legitimate."	1
Nothing – "I can't say that I have anything that I hope to learn."	1

Table D.5. Coded student responses to post-test question 1

Post-Test Question 1.1 - What was the most useful thing that you learned from the library session this year?	**Number of Student Responses** (n=17)	**Post-Test Question 1.2 - What do you wish that you would have learned?**	**Number of Student Responses** (n=15)
Finding articles – "How to find and use the online database."	11	**Nothing** – "The library session was extremely helpful and covered everything that was necessary to write our research paper. Therefore, I believe there was nothing else I wish to learn."	4
Interlibrary loan – "I learned that I can order a journal article if the library does not have it."	3	**Topics** – "I wish I would have learned a good way for choosing a good topic."	4
Evaluation of sources – "The most useful thing was getting to know the difference between scholarly journals, magazine articles, and newspaper articles."	2	**Finding books** – "How to find books in library."	2
Keywords –"The most useful thing that I learned was how to narrow down search terms."	2	**Citation** – "how to … cite out of books at the library."	1
Finding resources – "How to search and find more reliable sources for my research paper."	2	**Don't know** – "I don't really know what I wish I had learned because I do not know what is out there that I don't know. If I knew it, I would not have needed to learn it."	1
Finding books – "The most useful thing I have learned from the library sessions was that I can access books online through the Staley library that would not typically be found through a website such as google because google would tell people to buy the book before reading it."	1	**Interlibrary loan –** "I wish I would have learned about I share."	1
Citation – "How to find and cite sources not on an academic search cite."	1	**Keywords** – "I would have liked to learn more about … using specific key words when trying to research your topic"	1
Other – "The invitation to go to the research desk and get help from the librarian."	1	**Other** – "I wish to have learned to only include relevant information in my essays."	1

Topics – "The handout that helped me organize my thoughts."	1	**Finding resources** – "I wish I would've learned more about how to use and find other sources besides scholarly articles."	1
		Web – "I wish I would have learned more about webpages for sources such as google and wikipedia"	1

Table D.6. Comparison of students' scores pre- and post-test for question 3

Question 3 – "List three criteria for deciding if a website has the credibility it needs for you to use in your research project."	**Pre-Test** (n=18)	**Post-Test** (n=17)	**Point Change**	**Percent Change**
Average (out of 3)	**2.44 (81%)**	**2.68 (89%)**	**0.24**	**10%**

Table D.7. Comparison of students' scores pre- and post-test for question 5

Question 5 – "Describe three ways that scholarly journal articles differ from magazine articles or newspaper articles."	**Pre-Test** (n=16)	**Post-Test** (n=17)	**Point Change**	**Percent Change**
Average (out of 3)	**1.94 (65%)**	**2.68 (89%)**	**0.74**	**38%**

Table D.8. Coded student responses to pre- and post-test question 9

Pre-Test Question 9 – "What are some research activities that librarians can help students with?"	**Number of Student Responses** (n=16)	**Post-Test Question 9 – "What are some research activities that librarians can help students with?"**	**Number of Student Responses** (n=16)
Finding articles – "What databases to use."	6	**Finding resources** – "I think one of the biggest things school librarians can do for their students is to find resources."	9
Finding books – "Librarians can help us to find books on our subjects, especially when you need something more focused on a broad topic."	4	**Finding books** – "Finding real books in the library"	5
Nothing – "I couldn't tell you, personally I feel that the library does help out a lot. SO honestly I feel that there isn't anything personally that they could help me out with."	3	**Finding articles** – "How to find the best/most useful journals articles."	4

Finding resources – "Finding resources"	3	**Topics** – "help find research topics"	4
Evaluation of sources – "How to know if a source is legitimate or not."	2	**Citation** – "citing from books"	2
Keywords – "What key words to use."	2	**Keywords** – "Coming up with different topics"	2
Library – "where to look in the new library"	2	**Other** – "The research activities that the librarian did in class was very helpful."	2
Web – "show us how to find reliable websites on the library web page"	2	**Evaluation of sources** – "Librarians can help students determine the credibility of various sources."	1
Citation – "Activities can be how to easily identify the sources from the article and put that into a works cited page."	1	**Library** – "Find where books can be found within the library."	1
Don't know – "I'm not sure"	1	**Web** – "They can help with finding websites appropriate and that are credible."	1
Topics – "narrowing topics"	1		