

## How Does a Pre-Assessment of Off-Campus Students' Information Literacy Affect the Effectiveness of Library Instruction?

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### Abstract

This study investigates the impact pre-tests have on the effectiveness of library instruction when students are given feedback on their pre-test performance. Librarians and academic faculty partnered to measure library instruction outcomes in two Master's degree classes. The Research Readiness Self-Assessment (RRSA) was used as a pre-test (before instruction) and a post-test (after instruction) in Class 1 and as a post-test only in Class 2. Students who completed both tests performed significantly better on a post-test, earning higher scores on *obtaining information* and *overall information literacy*. They reported greater *library/research experience* and less *reliance on browsing*. Compared to students who did not take a pre-test, students who received pre-test-based feedback had higher scores on *library/research experience* and lower scores on *reliance on browsing*. To enhance the effectiveness of library instruction students can be given pre-test-based feedback that compares their actual and perceived literacy and encourages the use of library databases.

### Introduction

Academic librarians are constantly concerned about how effective library instruction might be. No matter how well librarians prepare for classes or how interesting they make them, they perceive that many of the students just don't listen or have a strong interest. Professors often share this concern. This perception probably represents reality. With the wealth of material and human resources that the average academic library makes available to its students, a recent study revealed that 89% of college students start their electronic information searches in a general Web search engine and only 2% begin at a library Website (OCLC, 2005, p. A13).

Librarians and faculty expect students to have a certain level of effective information literacy skill after being exposed to a library instruction class. Yet students often seem to think they know how to research and do not demonstrate their motivation to learn as much as they can from library instruction classes. This situation may be more pronounced in an off-campus setting where students are working on their research projects independently, without the convenient access to library facilities and resources that is available to on-campus students.

Instruction librarians have employed pre-tests and post-tests for many years to determine student research skills prior to library classes and to measure learning outcomes after. A pre-test, especially when it is combined with feedback, may also be a powerful means of motivating students to pay attention in class. Although there is a significant amount of literature on using pre-tests and post-tests to determine students' research skills before and after the instruction session and to evaluate teaching methods, there is very little on using these measures to motivate students. The purpose of the study is to investigate whether a pre-test that provides norm-referenced feedback on students' skills and perceptions related to information literacy enhances the effectiveness of a library instruction class. Specifically, the aim of the study is to examine if students who receive feedback on a pre-test prior to library instruction demonstrate greater improvement on subjective and objective measures of information literacy than students who are exposed to library instruction without a pre-test.

There are many teaching methods an instruction librarian can employ to try to motivate students to pay better attention during library instruction classes. However, if students perceive their research skill levels to be higher than they actually are, they may pay little attention to a session where they feel they already have all of the information they need. Recently, the availability of powerful Web search engines that take a split second to produce millions of hits lead many students to believe that library instruction is unnecessary. This study may assist instruction librarians in their curriculum development because it investigates whether students can be motivated to learn in a library instruction class after they are made aware of deficiencies in their information literacy skills.

## **Literature Review**

### ***Library-Instructor Partnership to Build Information Literacy***

Students come into university programs now mostly computer literate; however, "...with the availability of information resources outpacing the student's ability to sort and evaluate them" (Emmons & Martin, 2002, p. 546), team teaching by faculty and librarian "may offer students the best opportunity to apply information literacy within the context of a specific discipline" (Mackey & Jacobson, 2005, p. 141). Roldan and Wu's (2004) study determined that "intensive interweaving of course content and library instruction is an effective means of improving student's information literacy" (p. 326).

Librarians are now expected to work closely "with academics to develop effective learning environments both face-to-face and online" (Bridgland & Whitehead, 2005, p. 54). This can be accomplished if the classroom faculty invite librarians to join the class as part of an integrated assignment. Using a term 'knowledge worker' coined by Peter Drucker (1995), faculty members can introduce librarians as experts who can "identify, locate, evaluate, and use information effectively, legally and ethically" (p. 58). To help students improve their information literacy skills, it is important that a course instructor not only partners with a librarian but also stresses the importance of finding and evaluating information as part of a class assignment.

### ***Use of Pre-tests and Post-Tests in Library Instruction***

There are a number of studies in the LIS literature that describe the outcomes of pre-tests and post-tests in library instruction classes. Some of them focus on measuring the effects of different instruction formats, such as comparing student learning through Web-based tutorials versus classroom instruction (Bren, Hillemann, & Topp, 1998; Germain, Jacobson, & Kaczor, 2000; Nichols, Shaffer, & Shockey, 2003) and a computer assisted instruction module versus a library tour (Lawson, 1989).

Instruction librarians also have used pre- and post-testing to measure learning outcomes in their classes as well as to compare instructional delivery methods. Kaplowitz (1984) administered pre- and post-tests to one group of students in a library instruction class at UCLA to measure skills and behaviors. Other groups in the same class did not take the pre-test. She learned that students who participated in the pre-test "appeared to use the library more often, had a more positive attitude toward the library and its staff and were more knowledgeable about the organization of information in a library and its staff and how to access that information" than students who did not take a pre-test (p. 6). Several instructors of a one-credit library course at Central Michigan University used the Research Readiness Self-Assessment as a pre-test and post-test to measure student outcomes and found students' research skills to be higher and their reliance on general Web resources to be lower on the post-test (Mathson & Lorenzen, in press).

In her Web-based tutorial on plagiarism, Jackson (2006) developed a pre-test that students take prior to engaging in the instruction. Upon completion of the tutorial, students take a test that measures their learning. Results show that their knowledge of plagiarism is far stronger in the post-test. In another study, librarians charged with developing a library instruction course for ESL students, used a pre-test to measure gaps in knowledge among international students and tailored their instruction to concentrate on those areas of instruction. Post-tests showed that students understood library research methods far better after participating in the special library instruction sessions (Koehler & Swanson, 1988).

Woodworth and Markwell (2005) made an interesting observation of student learning motivation in their courses. As librarians in a hospital library, they designed a course to teach MEDLINE searching skills to hospital residents. They developed a pre-test to satisfy their own curiosity about skill levels of incoming residents. They found, however, that the pre-test proved to be a “wonderful wake-up call to residents who do not score well on the pre-test” (p. 85). Most residents seem to have an inflated sense of their searching skills and are surprised at how poorly they do on the pre-test. It is now administered before all MEDLINE searching classes and the result is a group of students who are primed to learn and engage actively with the instructors.

## **Methodology**

### ***An Overview of Research Design***

Central Michigan University has a large and long-standing off-campus program. It also has a strong tradition of library instruction in both the off-campus and on-campus settings. Founded as a teachers' college in 1892, it has grown to become the fourth largest public university in Michigan with a 2006-2007 student enrollment of 27,452, of which 7,075 are enrolled in off-campus programs (Central Michigan University, 2007b, ¶1).

Off-Campus programs and courses are delivered in a compressed format to students at program centers in the United States, Canada and Mexico, and online to students worldwide. The primary degree programs are Master of Science in Administration (MSA) and Master of Arts in Education (MAE). In addition, the university offers several undergraduate degrees off-campus, primarily within the state of Michigan. A separate library department, Off-Campus Library Services (OCLS), delivers library services and documents to students in off-campus programs. OCLS librarians provide a library instruction component to the required research class in both the MSA and MAE programs as well as in many of the undergraduate courses. Librarians provide in-class instruction to students in traditional classes that are delivered face-to-face. In addition, they deliver Web-based instruction to students enrolled in online classes.

Student information literacy and library research skills are a critical and embedded part of the curriculum in the off-campus Master of Science in Administration (MSA) program at Central Michigan University. Students enrolled in two sections of a required core class for the MSA Program, Administrative Research and Report Methods (MSA 600), participated in this study. This course was chosen because it was designed to educate students about research processes (Central Michigan University, 2007a). As students formulate research questions and develop a research proposal, they must be able to obtain and evaluate resources from scholarly journals available to them through library databases. That is why a collaborative partnership between a librarian and a faculty member is particularly valuable in this course. It is suggested that the MSA 600 class be taken as one of the first three in a graduate student's program; however, as student schedules vary, it may be taken at any time in the Master's sequence prior to writing the Capstone (MSA 685) project.

Both MSA 600 class sections studied were taught in the spring of 2007. The classes were offered at the Livonia Center and at the Clinton Township Center in a compressed format one night a week from 5:30 p.m. to 10:00 p.m. over an eight-week time period. Both classes incorporated a library instruction session taught by the same OCLS librarian at the beginning of the course.

The students in Class 1 were required to complete the Research Readiness Self-Assessment (RRSA) before coming to the class where the librarian would be conducting the library instruction session. Prior to the librarian's presentation, the students in Class 1 also completed a brief in-class questionnaire about the value of library instruction. Both classes took the RRSA as a post-test. The RRSA is an “online application that provides students with an opportunity to check their [information literacy] skill level by completing an assessment that combines a [subjective] survey and a skill test, to receive immediate feedback on strength and weakness...” (Ivanitskaya, Laus, & Casey, 2004, p. 177). This assessment measures objective skills and knowledge based on the *Information Literacy Competency Standards for Higher Education* (American Library Association, 2000). The following objective skills and knowledge are

assessed: Ability to find information, ability to evaluate information, and understanding of plagiarism (see Table 1). In addition, RRSA asks for self-reports about one's propensity to use general Internet browsing, perceptions of his or her own research abilities, as well as library and research experience. Upon completion of the RRSA, students immediately receive feedback, which includes an assessment of their skills and suggestions for resources that might improve their skills. Students do not get the answers to individual questions that measure objective skills. The number of these questions is sufficiently large to make it hard or impossible for the students to memorize the material they have already seen on the pre-test.

The feedback that students receive upon completing the questionnaire is tailored to each of the areas the RRSA measures. Depending on where students' scores fall in each of the areas measured, they receive different types of feedback. In the information literacy skills areas measured objectively with true/false and multiple choice questions, they receive feedback that lets them know whether their skills are in the high, medium or low range (based on established norms). If in the latter two, they also receive a list of resources they can turn to in order to improve these particular skills. In addition, students receive detailed feedback commenting on their perceptions of their own skills and on their reliance on general Web search engines.

In Class 1, the RRSA was administered before and after library instruction to evaluate if there was a significant improvement on objective and subjective measures. Specifically, did students improve their *skills in finding and evaluating information*? Did they improve their *understanding of plagiarism*? Has their *reliance on Internet browsing* changed in favor of using library databases? Did the students perceive that their *research skills* and *library/research experience* improve as a result of library instruction?

In Class 2, students completed the RRSA after the library instruction session only. The investigators compared Class 1 and Class 2 performance on the RRSA administered as a post-test to investigate if library instruction led to similar outcomes in both groups. RRSA feedback on objectively measured skills and knowledge is not detailed, therefore, students are not expected to significantly improve their skills by simply completing RRSA twice. Therefore, we expected that post-test performance by Class 1 and Class 2 students on multiple choice and true/false questions would be similar, thus providing evidence that it was library instruction rather than exposure to the same test twice that caused a change in students' objective skills and knowledge. On the other hand, we expected that exposure to RRSA feedback on a pre-test would cause Class 1 students to perform differently than Class 2 students on subjective (self-reported) RRSA measures. Feedback is likely to influence students to re-examine their perceptions of information literacy and the value of Internet browsing (versus searches in library databases), motivating them to actively participate in a library instruction session.

### **Sample**

Fourteen Master's students in Class 1 (7 males and 7 females) took the Research Readiness Self-Assessment (RRSA) as both a pre-test and a post-test. Eighteen Master's students in Class 2 (6 males and 12 females) took it as a post-test only. Both classes had similar course content and composition of the student body, however, students in Class 1 completed fewer credits toward their Master's degree. About 64% of students in Class 1 completed less than 24 credit hours as compared to 39% of students in Class 2. The majority of students in both classes were between 30 and 45 years old. On average, students took between 36 and 38 minutes to complete the RRSA assessment.

### **Library Instruction Sessions**

The Librarian met with the students in their classrooms and provided PowerPoint presentations. Students received packets with handouts of the PowerPoint presentation; the OCLS brochure, instructions on how to use the on-line catalog CENTRA, research guides for using each database explained in the presentation, and additional literature providing research support.

The instruction sessions started with an overview of the reference assistance provided by the Off-Campus Librarians, the services of the Document Delivery Office, and highlights of the OCLS Website.

Next, the librarian discussed search strategies with the students by asking them for examples of keywords, subject headings, and Boolean Operators that they could utilize later for their own projects.

The librarian provided instruction on how to find books using CENTRA, the on-line catalog, and emphasized the use of the keywords that the students had suggested to locate the correct subject headings to search for additional books. In an effort to market the E-book collection, the librarian also noted their availability and the search strategies for locating them in the on-line catalog. Following this discussion, the students were quizzed on the methods available for requesting copies of the books.

The presentation continued with instruction on how to find journal articles. The librarian demonstrated searching strategies using the ABI/Inform Database. Student participation was encouraged by using classroom examples of identifying and searching for scholarly journals, searching for articles using the appropriate journal database for the topic, refining the search, evaluating the article, and downloading or ordering the full-text of the article. The availability of the step-by-step instruction guides included in the student packets and on the OCLS Website was emphasized.

Students also received an overview of helpful tools found on the OCLS Website. These included Websites listed by subject that could be helpful for course assignments, and Web links to the CMU Writing Center and other on-line writing labs for assistance with the APA writing style required by the Off-Campus Programs at Central Michigan University.

The students were again quizzed on how to contact a librarian and the methods used to contact the Document Delivery Office. The session concluded with questions and answers. At the end of library instruction in each of the classes, the students were required to take the RRSA at some point before the end of the course. The average time between a pre-test and a post-test was about 2 weeks.

### ***Measurement***

The RRSA was used to obtain objective and subjective measures of information literacy. Objective RRSA measures—*ability to obtain information* (a maximum of 30 points), *ability to evaluate information* (a maximum of 10 points), and *understanding of plagiarism* (a maximum of 14 points)—were based on multiple choice and true/false questions, many of which required problem solving by manipulating library databases, document reviews, evaluation of Web pages, etc. The objective measures were combined to compute an *overall information literacy* score (a maximum of 54 points, high scores indicate high levels of information literacy). Subjective measures were students' self-reports of the level of their *research skills* (4 items, 10 points each) and *library/research experience* (a maximum of 37 points), as well as their *reliance on browsing* the Internet using general search engines (versus library databases) when completing academic research assignments. A *reliance on browsing* scale had a maximum of 50 points; higher scores indicate strong reliance on Internet browsing. Additional information on RRSA measures is presented in Tables 1 and 2.

Table 1

*Description of Objective RRSA Measures*

Measure and description	Sample item	Maximum possible points
<i>Overall information literacy:</i> A composite measure calculated as a sum of points on three objective measures that follow.	n/a	54
<i>Ability to obtain information:</i> Understanding of terminology (e.g., abstract and bibliography). Ability to conduct basic and advanced information searches. Application of Boolean operators [and, or, not] to limit searches. Ability to differentiate scholarly documents, authoritative sources, periodicals, and primary sources from other types of documents and sources.	What is the most authoritative source of current scholarly (analytical) information on a narrowly specialized topic? <ul style="list-style-type: none"> <li>• Web search engines, such as Google or Yahoo</li> <li>• Textbook</li> <li>• Newspaper</li> <li>• Book</li> <li>• Journal</li> </ul>	30
<i>Ability to evaluate information:</i> Ability to compare and evaluate the quality of different information resources, including journal articles and Internet Websites. Judgment of documents' credibility and evidence based decision-making.	You found three articles on learning disabilities. Click on the links below to examine each article and evaluate its content. Which article is most likely to serve commercial purposes? <ul style="list-style-type: none"> <li>• &lt;hyperlink&gt;<a href="#"><u>On the Lookout for Learning Disabilities</u></a></li> <li>• &lt;hyperlink&gt;<a href="#"><u>Overcoming Learning Disorders</u></a></li> <li>• &lt;hyperlink&gt;<a href="#"><u>Teaching Students with Learning Disabilities</u></a></li> </ul>	10
<i>Understanding of plagiarism:</i> Ability to detect plagiarism and copyright violations.	Which of the following can be reproduced without a proper reference? Check all that apply: <ul style="list-style-type: none"> <li>• Corporation board member's point of view</li> <li>• Spoken word</li> <li>• Common knowledge, such as "the world is not flat"</li> <li>• My classmate's ideas</li> <li>• Unpublished works</li> <li>• Someone's political opinions I read in a blog</li> </ul>	14

Table 2

*Description of Subjective RRSA Measures*

Measure and description	Sample item	Maximum possible points
<i>Perceived research skills:</i> Self-reported level of research skills.	On a scale of 0 (Very poor) to 10 (Excellent), how do you rate your research skills overall?	40
<i>Library and research experience:</i> Participation in research-related activities: writing papers; citing sources; using bibliographies, encyclopedias, periodical indexes and subject headings; summarizing ideas and other research behaviors. Use of libraries and contacts with library staff members.	During the past year, I... (check all that apply) <ul style="list-style-type: none"> <li>• Talked to a library staff member about my research topic</li> <li>• Wrote a summary of the main ideas of an article, a book or other document</li> <li>• Evaluated the quality of literature cited by the author</li> <li>• Found suggestions for additional material through prefaces, footnotes or endnotes</li> <li>• Authored a paper that put together ideas from multiple sources</li> <li>• None of the above</li> </ul>	37
<i>Reliance on browsing Internet versus on searching library databases:</i> The extent to which one relies on surfing general search engines on the open access Internet, as opposed to library Websites which provide access to more peer-reviewed literature, to obtain scholarly resources for academic research projects. Smaller scores and percentages indicate less reliance on the Internet and its Websites.	More often than not, I can find exactly what I want for my research assignments by only using Web search engines, such as Google or Yahoo. <i>Indicate your agreement or disagreement on a scale of 0 (Strongly disagree) to 10 (Strongly agree).</i>	50

Students in Class 1 also filled out a brief questionnaire after having taken the pre-test but before the librarian began her instruction session. The survey asked for information on their use of the library and their perceptions about librarians and library instruction.

### Results

First, the investigators evaluated the change in RRSA scores by students enrolled in Class 1 before and after library instruction. Fourteen students completed both a pre- and a post-test in Class 1. A paired-samples *t* test was conducted to evaluate if the mean of the difference between students' pre-instruction and post-instruction scores was significantly different from zero. Comparing students to themselves on two different occasions controls for individual differences and makes it possible to draw stronger conclusions about the impact of library instruction. The students did significantly better on a post-test, as indicated by higher scores on *obtaining information*, *overall information literacy score* (which is *obtaining*, *evaluating*, and *understanding of plagiarism* scores, combined), and on subjectively judged *library/research skills* and

*experience* (see Table 3). In addition, after the library session, the students reported a significantly lower reliance on *browsing* (using general search engines) and greater reliance on libraries. The effect size was estimated using a *d* statistic. An effect size is an indicator of impact; therefore, it can be concluded that the library information session had a significant impact on students (of medium or large magnitude) in all areas, except *information evaluation* and *understanding of plagiarism*.

Table 3

*Class 1: Results of a Paired-samples t Test*

Measures	Max.pts. possible	Before library instruction		After library instruction		Paired- samples <i>t</i>	Effect size	
		M	SD	M	SD		Cohen's <i>d</i>	Magni- tude
<b>Objective</b>								
Overall information								
Literacy	54	39.00	6.31	41.36	6.33	2.80*	0.75	Med.
Ability to obtain information	30	22.57	3.25	24.57	4.13	3.09*	0.83	Large
Ability to evaluate Information	10	6.21	2.46	6.36	1.69	0.22	0.06	Small
Understanding of Plagiarism	14	10.21	1.93	10.43	2.10	0.31	0.08	Small
<b>Subjective</b>								
Perceived research Skills	40	24.49	6.39	30.34	5.49	6.37**	1.70	Large
Library and research experience	37	14.93	6.31	17.29	6.13	2.11*	0.56	Med.
Reliance on browsing Internet	50	16.39	13.26	6.12	7.72	-3.66**	0.98	Large

Note. \* <.05, \*\* <.001, n = 14.

Next, the investigators compared post-instruction RRSA scores for students in Class 1 and Class 2. The purpose of this comparison was to examine if significant improvements in RRSA scores after library instruction can be explained by taking a pre-test (which affects how that group does on the post-test) rather than solely by the library instruction session. If taking a pre-test educates students about information literacy, then Class 1 RRSA scores obtained after library instruction would be higher than Class 2 scores. As can be seen in Table 4, 14 students in Class 1 did not significantly differ from 18 students in Class 2 on any of the objective measures of information literacy. This finding provides support for the conclusion that improvements in information skills and knowledge observed in Class 1 are unlikely to be explained by the fact that students were asked to complete the same assessment twice.

At the same time, 14 students in Class 1 provided significantly different accounts of their *experience* and *propensity to browse the Internet*. Specifically, as compared to 18 students in Class 2, Class 1 students reported greater library and research experience and much weaker reliance on browsing Internet. Although students' *perceptions of skills* were not statistically different, the effect size was of medium magnitude, indicating that Class 1 students report a higher level of skills than students in Class 2.

The results of the brief questionnaire that the students in Class 1 took in class after the pre-test and prior to the library instruction session revealed a high level of support for the advice of librarians in the research process and for the relevance of library instruction. Although the answers to the questions about skill level and library usage were scattered across the seven categories (strongly agree to strongly disagree), 21 of the 25 students agreed or strongly agreed that librarian's advice was valuable in the research process. In addition, 23 of the 25 agreed or strongly agreed that their knowledge of library resources could be improved by library instruction. Unfortunately, the same survey was not administered in Class 2. Therefore, survey responses by Class 1 and Class 2 students cannot be compared.



Table 4

*RRSA Scores after Library Instruction for Students in Class 1 (pre-tested on RRSA) and in Class 2 (not pre-tested)*

Measures	Max pts. poss.	Class 1, n = 14		Class 2, n = 18		Independent-samples <i>t</i>	Effect size	
		M	SD	M	SD		Cohen's <i>d</i>	Magnitude
<b>Objective</b>								
Overall information								
Literacy	54	41.36	6.33	40.39	4.35	0.49	0.17	Small
Ability to obtain information	30	24.57	4.13	23.56	3.01	0.77	0.28	Small
Ability to evaluate information	10	6.36	1.69	6.11	2.14	0.36	0.13	Small
Understanding of plagiarism	14	10.43	2.10	10.72	1.87	-0.41	-0.15	Small
<b>Subjective</b>								
Perceived research Skills	40	30.34	5.49	26.48	6.96	1.75	0.62	Med.
Library and research experience	37	17.29	6.13	11.89	6.43	2.42*	0.86	Large
Reliance on browsing Internet	50	6.12	7.72	13.59	10.20	-2.36*	-0.84	Large

Note. \* <.05.

### Discussion

On the questionnaire that the students in Class 1 completed, they indicated that they thought they could learn from a library instruction class. That same group of students showed improvement over most of their own pre-test scores in the post-test, as well as better post-test scores on subjective measures than the students in Class 2, who did not complete a pre-test.

No question-by-question feedback is given on any objective measures (questions with right or wrong answers), only an overall summary of one's performance on all items included in that scale, as compared to the performance of a normative group. The data show that taking the RRSA as a pre-test is unlikely to have a significant effect on students' skills and knowledge, unless it is also combined with library instruction.

The fact that students from two classes differed on post-test subjective measures can be explained by the feedback given at the end of the RRSA pre-test. When completing the RRSA before library instruction, Class 1 students were provided with a narrative that explained how library and research experience was measured and the importance of this experience. This feedback may have prompted students to learn more about libraries and their resources. In addition, the RRSA feedback discouraged students from relying on general search engines and encouraged their use of library databases, which may have changed students' beliefs about browsing. Overall, there is some evidence that administering the RRSA as a pre- and post-test may affect students' beliefs about general Web browsing and even potentially increase their interest in gaining more library experience.

In sum, improvements in information literacy may be achieved by providing library instruction and feedback from the RRSA that further explains the value of libraries, academic databases, and librarians. Such feedback is likely to reinforce messages communicated by the librarian and motivate students to take library instruction seriously.

### Limitations of the Study

The sample size of this study was small and cannot be considered generalizable to the entire population of non-traditional students who are enrolled in off-campus Master's programs. In addition, since the two classes were taught by different professors, it is not clear whether one may have included more instruction on information literacy skills than the other. It is also important to note that *evaluation of information* and *understanding of plagiarism* were measured using a small number of items, therefore, these measures did not have much variance. Small variance and a small sample size ( $n = 14$ ) may have made it impossible to find statistical significant change in pre-test and post-test scores by Class 1 students. However, the students did demonstrate significant improvement in the overall information literacy scores, which have greater variance because they are calculated as a sum of the three objective measures.

### Conclusion

Despite the small sample size, there is evidence that the effectiveness of the library instruction session can be enhanced by using an assessment such as RRSA that is administered before library instruction and that generates immediate feedback to students. The RRSA pre-test serves to inform students about their initial level of information literacy but without giving out any answers to objectively measured questions, thus making it possible to administer the same assessment as a post-test. The data show that library instruction significantly improves students' overall information literacy and, specifically, their ability to obtain information. Given prior to library instruction, an RRSA pre-test with feedback is associated with even stronger outcomes.

Students exposed to the pre-test library instruction and post-test intervention are subsequently more likely to indicate stronger propensity to use libraries, as opposed to Internet browsing, and to report higher levels of library/research experience. For many students, RRSA feedback may serve to highlight the discrepancy between their perceived information literacy (which is often inflated) and objectively measured information literacy, thus motivating them to learn. Designed to explain the value of searching library databases rather than conducting simplistic searches in general Internet browsers, RRSA feedback may motivate students to access and search proprietary databases with scholarly, peer-reviewed resources. Finally, RRSA also provides norm-referenced feedback on students' research and library experience, which helps students understand how their own experience compares to other students' experience. If such feedback is received prior to library instruction, students may be more inclined to seek librarians' guidance, actively participate in library instruction sessions, and engage in self-study to learn new skills.

In sum, an assessment of students' perceptions and objective skills related to information literacy conducted prior to a library instruction class is likely to enhance the value of library instruction by motivating students to learn in the library instruction class and beyond. There is certainly room for a larger study on this topic.

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