

Information Literacy and First Year Students:

Illinois Wesleyan University

Highly selective

Private

Residential

Undergraduate liberal arts school of 2,100 students

Gateway Courses

Required of all students during their first year on campus

Small, discussion-oriented class designed to develop students' critical thinking and writing skills

Library instruction sessions are not required

Approximately 2/3 of Gateway instructors request library information sessions.

We examined the learning outcomes of Gateway students using a mix of quantitative /and qualitative methods.

Information Literacy Pre-Test/Post-Test

Modified version of the Information Competency Exam developed by the Bay Area Community Colleges Information Competency Assessment Project: <http://www.topsy.org>.

26-question test

20-25 minutes

Measure students' information literacy levels in four of the five standards developed by the Association of College and Research Libraries. (use of information was not included)

Short demographic survey

Participation of Gateway courses in the information literacy study was at the discretion of the individual course instructor.

Participation by the students was also voluntary.

21 classes participated in the pre- and post-tests, representing roughly 2/3 of the 32 Gateway courses offered during the fall 2009 semester.

15 of these classes participated in library information sessions

273 students participated in the pre-test, and 272 in the post-test, representing about 53% of IWU's 2009-2010 freshman enrollment.

Research Process Interviews

To more fully contextualize the quantitative component of this study, the Gateway students who participated in the information literacy tests were also asked to participate in two qualitative interviews:

The “research process interview”: students demonstrated how they gathered information for a research assignment while accompanied by the study’s ethnographer, who asked the student to explain aloud their search process and documented the search on video. 19 students participated in the research process interviews, with each interview lasting approximately 30-45 minutes.

The retrospective research interview: students were asked to describe the step-by-step process they undertook while completing a research assignment and to document the process by drawing each step on a large sheet of paper.

Pre-/Post Test Findings

The mean score on the pre-test was 17.64 (67.8%), compared to 18.36 (70.6%) on the post-test. While this small improvement is statistically significant (at $p < .05$), its effect size is extremely small ($\eta^2 = .014$), suggesting that there is no meaningful difference between the average scores on the two tests.

The test results showed no significant variation by gender, ethnicity, major, or the number of library information sessions the student attended during the semester.

While students’ overall performance on the information literacy tests was for the most part lackluster, students consistently performed more poorly on questions addressing ACRL Standards 2 and 5, which evaluate, respectively, students’ ability to appropriately and effectively access information, and students’ understanding of the legal and ethical issues of information use.

ACRL Standard	Pre-Test		Post-Test	
	Mean Score	Percent Correct	Mean Score	Percent Correct
1	4.5/6	75.7%	4.7/6	78.8%
2	5.3/9	59.2%	5.6/9	61.7%
3	3.9/5	78.9%	4.1/5	82.1%
5	3.8/6	63.7%	4.0/6	66.0%

These results imply two possible conclusions: either the student’s information literacy skills did not significantly improve over the course of their first college semester, or the information literacy tests (and in particular the post-test) do not accurately measure improvements in students’ learning outcomes.

In terms of Standard 2 (accessing information), it appears that written tests are not the best method for understanding students’ abilities to search and find sources.

For Standard 5 (ethical use of information), librarians have limited time with students (typically only one class session, and occasionally two or three), necessitating an assignment-based focus in the sessions which often does not include specifically addressing copyright and ethical issues.

Although students performed reasonably well on Standard 3 (evaluating sources), and rated themselves highly in this area, after viewing the videos of student's research process interviews (discussed below), it nevertheless appears that they are not actually utilizing proper evaluation techniques in practice.

A question by question analysis of students' responses suggests several patterns in students' information literacy deficiencies:

- **Students are unable to correctly read citations** and identify the type of source referenced. Furthermore, students do not exhibit an adequate understanding of why it is important to cite information, or when a citation is required. Of the four questions in the information literacy tests that asked students to identify the type of source identified by a given citation, 42% of students answered 0 or 1 question correctly on the pre-test, compared to 37% on the post-test. Only 9.5% of students answered all four questions correctly on the pre-test and only 14.5% on the post-test.
- Students do not fully understand issues surrounding the **ethical use of information**, especially with respect to the meaning and implications of copyright protection, and the practical actions required to correctly observe copyright law.
- Students exhibit difficulty in **evaluating sources of information**, and are particularly confused about the differences between primary and secondary sources.
- Students do not adequately understand how **information resources are organized**, both in the library and elsewhere (e.g. on the internet). For example, students exhibit difficulties understanding the difference between the library's catalog and on-line databases, the types of resources that can be found using these tools, and the differences between library subject-specific databases.

Research Process Findings

During the 19 research process interviews conducted for this study, the research team observed 70 unique searches.¹ 60 of these searches were for unknown items (e.g. when a student was attempting to discover sources related to a research question, rather than a specific book title or journal article).

These interviews provided more details and, in conjunction with the pre/post test results, a much more nuanced insight into students' research processes and information literacy levels. After reviewing and coding the videos of the research process interviews, only 3 out of 19 students conducted what a librarian might consider a reasonably well-executed search. 48 specific problems were identified, which can be grouped into the following six areas:

¹ For the purposes of our analysis, we defined a search as anytime a student opened a new resource to search for information. If the student changed their search terms within a resource, we did not count this as a new search. Therefore, we observed 70 searches encompassing 117 separate sets of search terms.

- **Selection of database:** Using an inappropriate or less useful database was common. Of the 19 interviews, 8 students searched in databases that a librarian would most likely not recommend for their topic. In addition, students who have not had a library instruction session exhibited substantial difficulty finding their way to any library database, let alone the best one for a topic. For example, one student tried the following areas on the library's website while looking for a journal article: ILLiad (used to request journal articles not owned by IWU), Digital Commons (institutional repository), Citation Linker (used to locate journal titles owned by the library), I-Share catalog (used to request books from other Illinois libraries) and Google, where she finally gave up without locating an article.
- **Search strategy:** Students treated all search boxes as the equivalent of a Google search box.
- **Citations:** An inability to accurately read citations lead to difficulty finding a specific source and/or selecting appropriate sources.
- **Evaluation:** Evaluation of potential sources appeared cursory. Students would make rapid assessments of whether or not a source was useful or appropriate, usually based only on the title of an article or book, or sometimes by reading the abstract. Rarely did a student actually look at the subject headings or keywords associated with the document, read the text itself, or locate the book to review the table of contents. Students also did not review citations past the first or second page of their results.
- **Locating physical items:** Students often have difficulty locating books in the library stacks. When students sought help for locating a book at one of the three service points (all of which are staffed by student assistants) they were often given incomplete or incorrect information.
- **Technical:** Students encountered a variety of technical issues (e.g. dead links in the databases, slow databases, and incomplete information in an ILLiad request form) during their searches. This often resulted in the student abandoning the source in question and beginning a search for different items. In general, students were very quick to give up on finding a source, so much so, that almost any obstacle they encountered would cause them to move on to another source or to change their research topic.
- **Seeking help:** Although the majority of the students struggled with finding the correct database to use, their search terms, locating a known item, and/or technical problems, not one student sought the assistance of a librarian. However, students did ask for help at one of the three service points (all of which are staffed by student assistants) when they encountered difficulty finding a book in the stacks or a jammed printer.
- In general, students appear to have a very strong preference for selecting sources that are available online in full-text, This often leads to a student ignoring a potentially appropriate source, simply because it is not readily available.

- Conducting a successful search for scholarly sources is a complex process that requires numerous steps and considerable knowledge of the discipline and its particular jargon. Moreover, it is critical for students to understand how information is organized, how to evaluate sources, and how to use the “tools” of scholarship – online catalogs, databases, the Library of Congress Subject Headings, etc. If a student lacks sufficient knowledge in any one of these steps, the quality of their search results, and subsequently the sources on which they base their research, can be significantly diminished. For example, one student, while searching library databases for information about women in baseball, lamented the dearth of information on this topic and was seriously considering changing topics – all while her mouse was hovering over the subject heading “All-American girls professional baseball league”.
- Almost without exception, students exhibited a lack of understanding of search logic, how to build a search to narrow/expand results, how to use subject headings, and how various search engines (including Google) organize and display results. As one student mentioned, while conducting a search of library databases “Apparently you don’t have much on Rock and Roll”, obviously not realizing if she changed her search term (i.e. to rock music), she would have encountered excellent sources for her assignment.
- Students exhibit a lack of understanding of where the border is located between library resources and internet resources. For example, when a student is instructed by a professor to find “non-internet sources,” students are often unsure if the library databases, which are accessed via the internet, constitute appropriate sources. Likewise, if a student accesses library resources via Google scholar, they are often unaware that these are, in fact, made available through the library.
- Students who had participated in instruction sessions clearly knew more than those who had not done so. These students were better at locating databases, changing keywords, and using more of the library’s tools. As one student noted, the librarian “...gives us the most effective sources to use.” However, they often did not remember some basic or specific concepts, or apply them correctly.
- Students gave up on a search or changed a topic very easily. They also often searched to meet minimum expectations (e.g. three articles), not necessarily to find the most useful sources.

III. Conclusions and Next Steps

Although students appear to be “getting by” and finding sources, the results of this study indicate a lack of overall understanding of information literacy concepts and how to successfully apply them in their research. In short, students find information to read and cite for their assignments, but miss opportunities to enhance their learning and exercise their critical thinking skills.

Creating critical thinkers is one of the primary goals of the university’s mission. While IWU has identified the first-year Gateway courses as a curricular location in which to focus on developing

students' critical thinking skills, there are presently no uniform guidelines on the role library research and library instruction should play in this process. Information literacy must be seen as a component of this goal. As such, the concepts of information literacy should be woven through the curriculum – not just in the first year, but throughout the life of a student.

The following curricular considerations are presently under discussion by librarians:

- Incorporating more hands-on activities within library instruction in order to more directly address the practical problems students are having with the various library search interfaces, and to demonstrate strategies for building an effective search.
- Making information literacy a mandatory part of Gateway instruction
- Requiring all Gateway students to take an information literacy pre-test at the beginning of the academic year to provide baseline information about what students know.
- Restructuring Gateway research assignments in a more “scaffolded” format.

Based on this pre-test/post-test experience, it appears very difficult to write a quantitative assessment tool that accurately measures students' learning outcomes over the course of a semester, and whether or not they have acquired the ability to apply information literacy concepts within real-world settings, rather than simply being able to select the best response on a multiple choice question.

As an assessment tool, the information literacy test appears to be most effective for providing baseline data of students' knowledge than as a tool for making post-instruction comparisons (at least within IWU's instructional environment).

By contrast, the qualitative interviews provided a rich source of data for holistically understanding first-year students' research processes and practices, as well as a fine-grained tool for analyzing the obstacles students encounter when completing actual research assignments.