Taking Flight—Pilot Testing the Information Literacy Test

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In the fall of 2005, a team of librarians at Northwest Missouri State University (Northwest) embarked on an ambitious library instruction assessment pilot to determine if the Information Literacy Test (ILT) from James Madison University (JMU) could serve as a durable and interdisciplinary measure of student information literacy competence. In addition, these librarians at B.D. Owens Library (Owens) hoped this testing instrument could be used to establish state norms that would be the basis for meaningful benchmarking against student performance at peer institutions. Ultimately, the goal was to determine if their instruction program achieved their stated curricular goals and met the goals of the university and the state of Missouri for teaching information literacy and could offer a path for improvement if these goals were not being met.

Northwest's FTE is approximately 6,000, including both undergraduate and graduate students with the strongest enrollments in the areas of business and education. Their library instruction program is mature, with several course embedded access points in the general education curriculum and a number of upper level contacts in which students' information literacy knowledge is extended. The general education portion of the program began in the early 1990s and upper level instruction began to mature around the year 2000.

Assessment in our Culture

One major factor that has strengthened the resolve of librarians at Owens in their search for a means to assess their library instruction efforts is the ongoing commitment of Northwest to managing through a "Culture of Quality." The university's dedication to using the Seven Step process to examine the success of educational outcomes for the various colleges and departments has influenced Owens in its many attempts to measure both library instruction and reference service, as well as the outcomes of a host of other library processes. The Seven Step process requires establishing measurable benchmarks and using these measures to continually improve. The university's commitment to quality management also contributed to the university administration being

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willing to contribute both funding and staff expertise to implementing the pilot.

This predisposition to look for appropriate measures to guide a continuous cycle of improvement coincides with other trends favoring the measurement of library instruction outcomes. One such trend in higher education is the incorporation of information literacy competencies in broader educational goals. As an example of this trend, Northwest integrated several information literacy competencies in the university's Educational Key Quality Indicators used for its application to the Malcolm Baldrige Quality Award at the state and national level (even if the application did not specifically identify these competencies as such). Another trend is the establishment of recognized standards for demonstrating information literacy competencies. Owens has for many years sought to align its library instruction goals with information literacy standards set by respected authorities, such as the Association of College and Research Libraries (ACRL). One of the chief factors for choosing the ILT for its pilot is that the Owens' librarians determined the test is an effective measure of the ACRL Information Literacy Standards they had incorporated into their library instruction curriculum.

The university and the library both use customer satisfaction data as one measure for success of their educational programs. In 2004, over 74 percent of 638 students responding to an instruction survey agreed or strongly agreed that a library session helped them to complete assignments for their class. Eighty-five percent of these students agreed or strongly agreed that the material learned in the session was applicable to assignments in other classes. More than 80 percent of the students agreed or strongly agreed that the information presented helped them to compare or evaluate information sources.

Faculty were also surveyed in 2004. Eighty-three percent of the 26 responding faculty indicated that the librarians' presentation was well organized. Seventy-two percent of the faculty described the librarians as communicating well and holding the students' attention. Ninety-four percent of the faculty felt that session content was appropriate and mirrored what they had expected for their class. Eighty-nine percent of the faculty voiced the opinion that the information learned during the library session helped their students complete assignments for their class and 84 percent agreed or strongly agreed that the content of the session helped their students compare and evaluate information sources.

However, the librarians determined early on that measuring learning outcomes rather than satisfaction data and linking those outcomes to specific instruction goals was a more robust and meaningful determination of the merits of their library instruction program. Evaluating student performance on assignments related to library instruction lead to a fragmented approach to assessing their library instruction efforts. Some of these attempts at measuring student performance are summarized in the following paragraphs.

English Composition classes complete an online tutorial and quiz. The instructional goals of the tutorial are to help the students learn to construct effective search strategies, select the best databases for research needs, choose appropriate sources for a topic, and evaluate the reliability of sources. Student performance on the quiz has averaged above 85 percent since 2002. Students enrolled in Fundamentals of Oral Communication also complete an online tutorial (Searchpath[1]) and quiz. The goals of Searchpath are to help students search for, select, and critically evaluate information sources; Current performance on the quiz averages 75 percent. These two classes are part general education requirements for all students at Northwest. It should be noted that in both of these courses, following the completion of tutorial and quiz, students come to the library for hands-on active learning sessions. A third course, Computers and Information Technology, is a directed general education course for the Booth College of Business and Professional Studies. Students in this course complete two online tutorials prior to an in-class presentation, which is followed by a quiz. Performance on the quiz from 2003 to 2006 averages 76 percent.

Library instruction assessment figures are available for several upper level courses in the Booth College. Some Managerial Communication students receive instruction in searching for and selecting articles related to business communication. They write a review of an article they select. Average scores on their article reviews from 2004 to 2006 are 90 percent. Management Information Systems classes learn advanced Web searching and site evaluation techniques. Average paper scores from 2003 to 2006 are 88 percent.

Extending Evaluation

The pilot program arose as a culmination of the librarians' search for a unified, comprehensive measure of student information literacy competencies. They felt that measuring these competencies not only contributed to assessing the success of their own instruction mission

but also fit well with the university's quality management paradigm. And indeed, when several librarians mentioned their intention to expand their assessment of library instruction at a spring 2005 library meeting with the university president, Dr. Dean Hubbard, the president encouraged the librarians to pursue information literacy testing on campus. The instruction librarians began researching the known evaluation instruments. We were most interested in those that tested students' ability to demonstrate mastery of the Association of College and Research Libraries (ACRL) Information Literacy Standards.

After a literature search and discussions with several test vendors, we came to the conclusion that the ILT from JMU most closely matched our requirements. The questions for the test are based upon Standards One, Two, Three, and Five of the ACRL Information Literacy Competency Standards for Higher Education, which are shown below:

> **Standard One**
> The information literate student determines the nature and extent of the information needed. . .
> **Standard Two**
> The information literate student accesses needed information effectively and efficiently. . .
> **Standard Three**
> The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system. . .
> **Standard Five**
> The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.[2]

We were looking for a normed test. The ILT questions are vetted by a panel of librarians and assessment professionals, who have set a proficiency level for the test.[3] Students learn information related to these standards in a tutorial JMU requires them to complete prior to taking the test. JMU allows institutions of higher learning to modify their tutorial to reflect local databases, holdings, services, and resources.

The nature, format, length, and praxis-based delivery of the ILT dovetail with our hands-on, active learning style at Owens; our focus on the ACRL Standards; and our course-embedded library instruction model. DeMars, Cameron, and Erwin describe the ILT as

a web-based test of … multiple-choice items. Four content areas (Basic Reference, Database Searching, Internet Skills, Ethics) are crossed with two process areas (Knowledge, Application). Subscores are provided in each of these six areas. Application questions require students to apply knowledge by finding answers in catalogs and databases and by evaluating web sites. The computer screen is divided into two frames: one frame displays the test item, while the other frame is used for searching databases and evaluating web sites. The test takes an average of about 40 minutes; 95% of the students finish within one hour.[4]

The cost of the ILT was also attractive. At $6.00 per test administration, it was affordable for a pilot project. We felt that we could procure funding for a pilot project of this test and projected that we would be able to obtain funding for future testing of sample student populations.

Initial Campus Negotiations

Our next step was to procure funding for a pilot test of the ILT. Connie Ury contacted Dr. David Oehler, Director of the Office of Assessment, Information and Analysis at Northwest to discuss funding opportunities with him. In preparation for the meeting, she sent him the Information Literacy Test Proposal,[5] authored by the Owens Library Information Services Team. The proposal incorporated a rationale for assessing students' information literacy abilities, citing both state and international standards. The international standards listed were the ACRL Information Literacy Competency Standards for Higher Education. The proposal described Missouri information literacy standards developed by the Missouri Coordination Board for Higher Education in a goal entitled "Managing Information." Under the auspices of this goal, higher education institutions in Missouri are required to "develop students' abilities to locate, organize, retrieve, evaluate, synthesize, and annotate information from print, electronic, and other sources in preparation for solving problems and making informed decisions…"[6] The Board has provided guidance in suggested competencies, as shown below:

> **Managing Information**
> *State–Level Goal:* To develop students' abilities to locate, organize, store, retrieve, evaluate, synthesize, and annotate information from print,

electronic, and other sources in preparation for solving problems and making informed decisions.

Suggested Competencies: Students will demonstrate the ability to:

• Access and/or generate information from a variety of sources, including the most contemporary technological information services.

• Evaluate information for its currency, usefulness, truthfulness, and accuracy.

• Organize, store, and retrieve information efficiently.

• Reorganize information for an intended purpose, such as research projects.

• Present information clearly and concisely, using traditional and contemporary technologies.[7]

The proposal also listed the attributes of JMU's ILT which made its use appropriate for the Northwest technical culture and the research constraints the librarians identified as necessary for reliability. Those features include:

• a Web interface
• software, test site, and scoring residing at
      James Madison University
• 60 to 65 items on the test
• a multimedia interface
• password protection
• reliability of 0.88[8]

Dr. Oehler approved funding for a pilot with three sections of a general education course. He agreed that the cost of the test was reasonable. He also concurred with Owens' librarians that the standards measured by the ILT closely matched our objectives for assessment.

Connie Ury, Dr. Oehler, Dr. William Waters (leader of the English Composition course), and Dr. Roy Schwartzman (leader of the Fundamentals of Oral Communication course) met to discuss a possible site for administration of the test to general education students. The group agreed that the best course of action was to solicit volunteer professors from the English Composition faculty. This course was chosen because 100 percent of the English Composition faculty participate in the on-site library instruction program, while the number of Fundamentals of Oral Communication faculty participating in on-site library instruction fluctuates from 50 percent to 90 percent, depending upon the trimester and the leader of the course. English Composition classes also receive two days of library instruction, while Fundamentals of Oral Communication classes receive one day of instruction. The extra day of contact allows the librarians to provide more in-depth library instruction.

Initial Preparation

When Owens Library made the decision to adopt the ILT, our first step was to bring our online research tutorial more closely in line with skills tested by the ILT and the information covered in the JMU tutorial. We spent five months adapting the JMU Go for the Gold[9] tutorial; comparing its content with our former research tutorial; and creating a new product which we entitled In the Know.[10] We also read through the ILT questions to assure ourselves that we were providing instruction on the points covered in English Composition. Our next step was to create a quiz to be taken by all English Composition students that assessed their acquisition of knowledge from the tutorial.

Negotiations with Academic Departments

With the tutorial and quiz in place, we solicited three volunteers from among the professors in the English Department who were willing to each bring one class of students to the library to devote one day of class time to taking the ILT. We asked that they give their students credit for taking the test. These students were required to have attended the library instruction sessions prescribed for all English Composition classes and completed the tutorial and online quiz prior to taking the ILT.

We also asked the faculty who teach Management Information Systems (MIS) in the Computer Science/ Information Systems Department to bring three classes of students to the library to take the ILT. These students received library instruction prior to taking the test. They viewed an online tutorial about Web searching techniques; learned to verify information found on Web pages in periodical indexes; validated Web page information using three criteria: authority, bias, and currency; spent two classroom sessions with librarians assisting them in locating appropriate Web pages; and wrote a paper describing the reliability of their chosen Web page. The MIS faculty was also asked to give their students credit for taking the test. This course was chosen because it was a junior level course and the students at this level could be compared and contrasted with the students in the freshman level English Composition course.

Implementing the Pilot Test

All six classes received library instruction prior to the

test dates, which were scheduled in late November and early December 2005, with a cross-section of library instructors teaching the classes. Testing dates were scheduled at the convenience of the professors at a computer lab located in Owens Library. All of the testing took place in a two week time frame.

Sarah Park was the technical administrator for the Northwest pilot of the ILT. She facilitated the implementation of the multiple choice test, which includes five pilot questions, in addition to 60 multiple choice questions. The test resides on the JMU Center for Assessment and Research Studies (CARS) test server. In order for students to access the test, Ms. Park configured the computer lab hardware and software as follows:

• Windows Operating System
• Internet Explorer 5.0 or higher browser
• 1028 x 768 or higher resolution
• Default web port opened to bypass Northwest firewalls
• Pop-up blockers turned off or https://carstest.jum.edu allowed to open[11]

There were minimal worries about power outages or technical difficulties because the CARS test server retains the tester's information if an interruption during the test process occurs.[12] (This occurred in one of the testing sequences when Northwest lost Internet connection for a few minutes. As soon as Internet access was restored, students were able to resume testing.)

We were limited to 50 minute class periods in which the students could complete the test. Northwest's computing setup requires that Internet Explorer settings be adjusted after a unique user has logged on to a computer. To bypass this process, Sarah Park arranged with Computing Services to create a special user account for the test. Librarians logged each machine into this account and set the screen resolution prior to the students' arrival.

When students arrived for the test, they accessed the test by entering their first name, last name, Northwest ID number, and a test password provided by JMU. As they completed the test, students called a librarian/proctor to their computer where we recorded their score next to their name on the roll sheet they had signed as they entered the room. All students completed the test within the allotted 50 minutes.

Statistical Analysis

Two distinct groups of students at Northwest Missouri State University completed the pilot ILT. A total of 80 MIS students and 62 English Composition students

Table 1: Academic information.

Category	MIS students	English Composition students
Avg. ACT score	22.09	21.84
Avg. overall GPA	3.0	2.7
Avg. credit hours completed	100.0	55.0

Table 2: ILT (percent-correct scores) at Northwest Missouri State University

N	Minimum	Maximum	Mean	Standard deviation
142	37	87	65.94	8.95

Table 3: Information Literacy Test (percent-correct Scores) All Institutions as of February 2006*

N	Minimum	Maximum	Mean	Standard Deviation
3,289	18	98	62.90	13.48

* Data analyzed include testing data from multiple institutions as of February, 2006. (Center for Assessment and Research Studies, James Madison University, unpublished data)

participated in this study. Table 1 provides group comparisons by average ACT, average GPA, and average credit hours completed.[13] Differences in average ACT (F = 0.173, p > 0.05), and average GPA (F = 2.73, p > 0.05) were not found to be statistically significant. The average MIS student had completed 100 credit hours (senior level) while the average English Composition student had completed 55 credit hours (sophomore level).

SPSS version 11.5 was used to examine the data from the Northwest Missouri State University ILT Pilot. Table 2 illustrates that the Northwest students who took the ILT obtained an average score of 66 percent, which is above the established proficiency level and well above the national average of 63 percent, shown in table 3.

As shown in table 4, the MIS group achieved a higher mean score (66.29%) than the English Composition students (65.48%). However, the ILT performance level difference was not statistically significant at the 95 percent confidence level (F = 2.220, p > 0.05). Table 5 shows a side-by-side frequency distribution of ILT scores within the two groups. This table illustrates that 58.1 percent of the English Composition students

Table 4: Comparison of MIS students' and English Composition students' overall performance on the ILT, Fall 2005					
Course	**N**	**Mean Score**	**Standard Deviation**	**F**	**Sig.**
MIS	80	66.29	8.946	2.220	.138
English Composition	62	65.48	10.816		

Table 5: Side by side comparison of MIS and English Composition scores			
Score	MIS	English Composition	Total
37	0	1	1
42	1	0	1
43	0	1	1
45	1	2	3
47	0	2	2
48	1	1	2
50	2	0	2
52	0	1	1
53	2	2	4
55	2	0	2
57	3	2	5
58	3	4	7
60	5	3	8
62	6	2	8
63	7	5	12
65 *	6	2	8
67	6	5	11
68	4	4	8
70	5	4	9
72	3	4	7
73	8	1	9
75	2	5	7
77	4	5	9
78	5	2	7
80	2	1	3
82	0	1	1
83	0	1	1
85	2	0	2
87	0	1	1
Total	80	62	142

and 58.8 percent of the MIS students scored at or above the established 65 percent proficient range on the ILT. Considering all students who completed the ILT, 58.5 percent established scores considered to be in the proficient range.

Table 6 shows the average ILT score compared by class standing (freshman through senior). It is interesting to note that the average ILT score increases with class standing from a freshman average score of 64 percent to a senior average score of 67 percent.

Limitations

This study employed a small sample of convenience in which certain classes were chosen to participate in the study based on the instructors' willingness to work with the librarians and dedicate a class period to taking the ILT. The level of performance on the ILT was not directly tied to student grades. Students were given credit for showing up for the exam, but their course grade was not affected by their performance on the exam.

Conclusions of the Pilot Study

When the students were matched for academic ability, using overall GPA and composite ACT scores as criteria, the entire group possessed comparable abilities for the purposes of this study. Statistically significant differences between the groups were not identified for either GPA or ACT scores.

The average ILT score for the MIS students was 66.29 percent. The average ILT score for the English Composition students was 65.48 percent. These scores are statistically equivalent, resulting in no significant difference between the performances of the two groups on the ILT.

Owens librarians chose to establish 65 percent as the proficiency level for the ILT. Student performance in the proficiency range is shown in Table 7.

Several trends in the scores might be used to infer that the tiered approach to library instruction employed by Owens librarians provides value added as students progress through the curriculum. The tiered

Table 6: ILT score by class		
CLASS	N	ILT score
Freshman	6	64 %
Sophomore	33	65 %
Juniors	39	66 %
Seniors	64	67 %
Total	142	

Table 7: Student proficiency performance	
Percent of students scoring in proficient range	Group
58.1%	English Composition students
58.8%	MIS students
58.5%	All Northwest students

Table 8: Scoring trends	
MIS average ILT score–66%	English Composition average ILT score–65%
58.8% of MIS students scored above proficiency level	58.1% English Composition students scored above proficiency level
Average scores for MIS students (std. deviation 8.95) were more tightly group around the average ILT score than the average scores for English Composition students (std. deviation 10.82)*	
The average senior ILT score was 67% as compared to the average freshman ILT score of 64%	
* Standard deviation measures dispersion or variation from the average. In a normal distribution 70% of the individual scores should be found between plus or minus one standard deviation from the average, 95% between plus or minus two standard deviations from the average, and 99.9% at plus or minus three standard deviations from the average.	

approach begins with a general orientation during the first trimester in a freshman seminar course. Assuming students follow a prescribed curriculum, enrolling in general education coursework during their freshmen and sophomore years, they will experience two to three additional library instruction modules during that time in Fundamentals of Oral Communication, English Composition, and (for some) a computer literacy course. There are three colleges at Northwest. One of the colleges, the Booth College, requires that all students receive additional library instruction in an upper level course—MIS. The MIS students were included in the pilot test because they received this upper level instruction.

While the scoring trends identified are not statistically significant, the fact that the MIS students consistently scored higher than the English Composition students identifies an area for further study. These scoring trends are listed in the table 8.

These trends support the Owens librarians' view that continued library instruction throughout a student's college career continues to build information literacy and proficiency in searching for, locating, and evaluating information sources.

Recommendations for Further Study

While the average score for students at all levels was within the proficient range, only 58 percent of the students individually scored in the proficient range. For this reason, and in light of other issues raised in the previous section of this article, we are interested in investigating the following questions:

• While the ILT, and other tests designed to measure information literacy proficiency performance, assess student performance on criteria taught in library instruction, how can we be assured that student learning is a result of library instruction? Will it be possible in the future to pretest and posttest students in direct relationship to library instruction so that we are better assured that this learning is a result of library instruction?

• Will we be able to garner university support for wider testing of student populations?

• What steps should we take to increase student proficiency scores on the ILT? Should we increase the amount or detail of library instruction? Should we investigate specific areas where performance is weak and focus our efforts in those areas? Do we need to add more access points to our library instruction program?

• The difference in performance from sophomore to senior is slight. How can increase the information literacy of upper level students? What steps can we take to expand our upper level instruction program?

• Is the ILT appropriately used for benchmarking with other institutions? It was not designed for that purpose. Rather, it was designed for measuring students' performance on a single campus with a set proficiency level. We asked for the comparative data because we needed it for benchmarking purposes in the reporting environment where we function.

• Because student performance was not tied to a grade, we are concerned that they may not have performed their best for the test. While they received some credit for taking the test, the credit was the same whether they performed well or poorly on the assessment.

• The English Composition students represented a cross section of the student body at Northwest, while the MIS students were all from the Booth College. This demographic did not provide a true picture of upper level students at Northwest.

Plans for 2007

The pilot project will be extended during the spring 2007 trimester. The Office of Assessment, Information and Analysis has funded a second round of the test.

Table 9: Upper level classes participating in the Information Literacy Test—Spring 2007	
Course	**College**
Organizational Policy and Decision Making	Booth College of Business & Professional Studies
Advanced Public Relations Techniques	College of Arts & Sciences
Experimental Psychology	College of Education & Human Services

Once again, three English Composition classes will participate. This time the three upper level classes will be more representative of the entire student population, with one course from each of the three colleges included. The three upper level courses slated to participate are shown in table 9.

Each of the upper level classes is a junior/senior level course. All students will once again be compared for composite ACT and overall GPA, as well as the number of hours of college credit completed.

All classes will receive library instruction prior to taking the ILT. It will be interesting to compare the scores of the Experimental Psychology class with those of the other upper classes because that class will receive instruction in plagiarism prevention and citation styles, rather than searching and evaluating sources. The content of instruction for the Organizational Policy and Decision Making class is expected to be in the area of searching for periodical literature. The Advanced Public Relations Techniques professor has not yet designated the library instruction curriculum, but generally chooses to have students search for articles in library databases and information in library reference resources. The range of upper level library instruction may provide opportunities for comparisons of instructional modes.

Each of the six professors associated with the ILT test in the spring 2007 trimester has agreed to provide credit for the ILT that is dependent upon the students' performance on the test. Owens librarians are hoping this change will motivate students to attend closely to their answers and put forth extra effort on the test.

The results of this second iteration of the ILT will be evaluated and results will be reported to the library and university during the fall 2007 Trimester. Owens librarians will recommend future plans for testing information literacy at Northwest and suggestions for improving information literacy instruction, including possible ideas for expanding and reorganizing upper level instruction.

Notes

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2. Association of College and Research Libraries, *Information Literacy Competency Standards for Higher Education* (Chicago: Association of College and Research Libraries, 2000), 8–13.

3. Lynn Cameron, Steven L. Wise, and Susan M. Lottridge. *The Development and Validation of the Information Literacy Test* (Harrisburg, Va.: James Madison University, 2005).

4. Christine E. Demars, Lynn Cameron, and T. Dary Erwin, "Information Literacy as Foundational: Determining Competence," *Journal of General Education* 52, no. 4 (2003): 253–65.

5. Connie Ury and others, "Information Literacy Test Proposal" (Maryville, Mo.: B. D. Owens Library, Northwest Missouri State University, 2000).

6. "Credit Transfer Guidelines for Student Transfer and Articulation among MO Colleges and Universities," Missouri Department of Higher Education, http://www.dhe.mo.gov/mdhecentralgenedtransferpolicy.shtml.

7. Ibid.

8. "Information Literacy Test (ILT)," James Madison University, http://www.jmu.edu/assessment/wm_library/ILT.pdf.

9. James Madison University, "Go for the Gold," Carrier Library, James Madison University, http://www.lib.jmu.edu/gold/.

10. Information Services Team, B. D. Owens Library, "In the Know," B. D. Owens Library, Northwest Missouri State University, http://www.nwmissouri.edu/library/courses/english/intheknow/module1/1.0.htm.

11. Steven L. Wise (Senior Assessment Specialist, Center for Assessment and Research Studies, James Madison University), Telephone conversation with author, 3 December 2004.

12. Ibid.

13. We wish to thank Jon Clayton of The Office of Assessment, Information and Analysis for his work in gathering and collating the data for ACT scores, cumulative GPAs, and credit hours completed.