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An Online Competency Test for Information Literacy: Development, Implementation, and Results

Lynn Cameron and Rebecca Feind

Abstract

Librarians, faculty, and assessment specialists at James Madison University (JMU) collaborated to develop an online Information-Seeking Skills Test (ISST) to measure competencies relating to information literacy. In this paper we will report on how we developed and implemented the test as a required competency for all first-year students in General Education. We will also report on test results, challenges in implementing a competency test for all freshmen, our training program for faculty, and our remediation program.

A Competency-Based Program for Information Literacy

In 1996, information literacy was formally integrated into the new competency-based General Education curriculum at James Madison University, with the ultimate goal of making every student accountable for learning stated objectives. The General Education curriculum includes the statements that students must be able to:

1. Formulate and conduct an effective information search that includes a variety of reference sources, such as encyclopedias, library catalogs, indexes, bibliographies, statistics sources, government publications, and resources available on the Internet.

2. Evaluate information sources in terms of accuracy, authority, bias, and relevance.

In order to learn the required skills, students complete Go for the Gold, a web-based instruction program that consists of eight learning modules with online exercises that are scored electronically. Students strengthen their skills through course-related assignments, such as research papers and speeches, that require them to find, evaluate, and use information. With this instruction program solidly in place, in 1999, the University initiated a requirement that students demonstrate competency by passing the ISST before the end of their freshman year.

Development of the ISST

Librarians at JMU have a history of assessing library skills of freshmen that dates back to the late 1980s. Our first

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assessment instrument was a multiple-choice paper and pencil test developed locally by reference librarians in consultation with assessment specialists. This test, which was administered to a random sample of students annually, was revised and improved over the years to increase its reliability. In 1998, we developed an online test in a web-based format with frames. Using several questions from the paper and pencil test as a starting point, we added questions that required students to find answers in the online catalog, in databases, and on the Internet. For these application questions, the question would appear in the top frame, and the student could look for the answer in the bottom frame. In this way the online format allowed us to learn how well students could apply knowledge, something we had never been able to do with a paper and pencil test. Although librarians wrote the test items, faculty provided valuable input and feedback.

Once the 53-item online test was developed, we piloted it on several hundred students gathered by random sample from 1998 to 1999. Assessment specialists provided assistance in test construction and analyzed specific test items and reliability of the test as a whole. Pilot test results enabled us to make revisions and improvements that increased reliability.

By administering an assessment test to a random sample of students over the years, we were able to collect a great deal of interesting and useful data that helped us improve our library instruction program. But because the test results did not count on the individual student's record, we were concerned that student scores might not necessarily reflect best effort, nor were all students required to take the test. By moving to a competency test, the General Education program ensures that first-year students are held accountable individually and that students are indeed learning essential foundational skills.

Setting Standards for Passing

After the decision to make the ISST a competency test, the next step was to set a standard for passing. The Center for Assessment invited 12 faculty and librarians to get together for two half-day sessions to set a passing score for the test. Participants represented General Education, Career Library, Speech Communication, History, Business, and Writing. The group set two cut scores, one for "Meets the Standard" and one for "Advanced". Using the "Bookmark" procedure (Lewis Green, Mitzel, Baum, & Patz, 1998), participants were given the 53 test items that had been ordered by difficulty according to examinee performance on the ISST

during the 1998-99 academic year. Based on the judgments of participants, the recommended cut score for "Meets the Standard" was 42 items correct. For "Advanced", the recommended cut score was 48 items correct out of 53.

Administration of the ISST

The ISST is administered in a secure testing lab, staffed by the campus Center for Assessment. Students may come in as individuals and take the test, or General Education faculty may schedule whole classes to take the test at once. Students receive immediate feedback on their scores and sub scores.

The test resides on the Assessment server and is password protected. Test scores are stored in a database developed and maintained by the Assessment office. Periodically, these scores are sent to the General Education office, which contacts students who fail, suggesting they review Go for the Gold or take a remedial workshop and then retake the test. The General Education office also notifies freshman advisers so that they can encourage students to take and pass the test.

Maintenance of the test itself is an ongoing responsibility shared by librarians and assessment staff. Questions that require students to apply knowledge by finding answers in online sources are particularly challenging. Answers may change as databases constantly add and drop records, and access to databases changes over time. Databases may also be down temporarily, interfering with students' ability to complete the test. The library reorganizes its web page frequently, changing addresses of links to databases. Now that the ISST is a competency test, such events are more than an inconvenience; they can actually cause a student to fail. Proctors in the testing lab are usually the first to detect problems with questions, and they quickly communicate these to the librarian and assessment staff member who resolve them as quickly as possible.

Table 1. Number of Student Attempts to Pass and Number of Students who Passed ISST by Month

Month	Number of student attempts to pass	Number of students who passed
November, 1999	3	2
December, 1999	38	19
January, 2000	41	28
February, 2000	451	306
March, 2000	211	159
April, 2000	2,629	1,966
Total	3,373	2,480

Table 2. Number of Students Who Attempted and Passed the ISST in 1999–2000

	Number who passed the ISST	Males	Females
Attempted the test	2,671	960	1,711
Passed the test	2,468	N/A	N/A
Total first-year freshmen	3,277	1,256	2,021

Table 3. Distribution of Passing Scores by Level

Score	Percent of students
Failing (0-41)	8
Meets the standard (42-47)	70
Advanced (48-53)	22

Challenges in Administering a Competency Requirement

The “competency test” is a new and poorly understood concept for many faculty and students. Just because the test was officially required did not mean that students would actually take it or even understand the consequences of failing. Many faculty did not comprehend the difference between the old library assessment test, which was given to a sample of students and which did not count on the individual student’s record, and the competency test, which is required of all students and which does count on each student’s record. Test administration was further complicated by the presence of several additional new competency tests in other areas, all with different deadlines, and by the large number of students in the freshman class. Although the General Education administration informed faculty and students about the required library test midway through the Fall semester, 1999, few students took the test until late in the Spring semester. Table 1 shows the distribution of test taking by students over time.

Librarians played an important role in training faculty and communicating information about the test by teaching summer workshops funded by General Education, by sending messages using the General Education e-mail list, and by talking directly with faculty teaching in the program. Moving to a competency test requires a big institutional cultural change that may take several years. Early statistics for the class of 2000–2001 show that students are getting off to a slow start in taking the competency test this year, too, evidence that our culture has not fully changed.

Table 4. Mean Scores by Percent for Subtests and Total ISST

Subtests content area	Mean first score	Mean highest score
Reference sources	78	80
Database searching	85	87
Internet	85	87
Ethics	93	93
Cognitive level application	87	89
Knowledge	81	83
Total	83	85

Test results

The deadline established for freshmen in the 1999–2000 class to pass the ISST was April 28, 2000. Of the 2,671 students who attempted the test, 2,468 passed by the deadline. The number of first-year freshman in 1999–2000 class was 3,277, leaving about 600 who had not attempted to take the test by the deadline. (See table 2.) The reliability of the test as measured by Cronbach Coefficient Alpha is 0.77.

Of the students who passed, 70% scored at the “Meets the standard” level and 22% scored at the “Advanced level”, as shown in table 3.

The 53-item ISST is composed of four subtests that deal with different content areas: reference sources; database searching; Internet searching; and ethics. The test also deals with two cognitive levels: application and knowledge. Table 4 shows student performance on these content areas and cognitive levels.

Of those who passed eighty-one percent passed on the first attempt and ninety-five percent passed on the second attempt. Some took the test multiple times before passing.

In addition to the 53-item test students were asked to answer nine survey questions. The first two ask students to rate their level of confidence in using the Library and the Internet to gather information. Table 5 shows that students have a higher level of confidence about using the Internet than the library.

Table 5. Level of Student Confidence in Seeking Information in the Library and on the Internet

Level of confidence	Percent confident about using the library	Percent confident about using the Internet
Very confident	20	45
Confident	46	42
Somewhat confident	28	12
Not very confident	5	1
Not confident at all	1	1

Table 6. Percent of Students who Completed Online Exercises in Go for the Gold

Portion of GFTG completed	Percent of students	Number of students
All of the GFTG modules	66	1,763
Some of the GFTG modules	24	648
None of the modules	10	260

Since all General Education students are required to complete Go for the Gold, we included a survey question asking what portion of the online exercises in Go for the Gold the students completed. Table 6 shows that 90% of the students completed at least some of Go for the Gold.

Independent statistics gathered automatically on the library server when students complete an exercise show that 2315 students completed at least one set of exercises in Go for the Gold in Fall, 1999, and 1541 students completed at least one set in Spring, 2000. These statistics indicate that more students are doing Go for the Gold in the Fall, but more students are taking the ISST in the Spring, long after they received instruction. This delay may have an impact on student performance.

Student ratings of the helpfulness of an instructional intervention are one indicator that was considered in addition to actual test performance. Two thirds of the students rated Go for the Gold as being helpful or very helpful. (See table 7.) Only 9% found the program to be not helpful at all.

Students are more likely to retain new skills if these skills are reinforced through practice and repetition. General Education faculty make assignments that require students to find and use information to help students learn course content, but also to reinforce information-seeking skills. One of the survey questions asked students to report what portion of their courses require them to find information in the library or on the Internet. Table 8 shows that 59% of the students say they are required to find information in half or more of their courses.

An important question we had was whether completing Go for the Gold helped to improve test scores. We looked at

Table 7. Student Rating of Helpfulness of Go for the Gold

Degree of helpfulness of GFTG	Percent of students
Very helpful	9
Helpful	56
Not very helpful	26
Not helpful at all	9

Table 8. Student Rating of How Many JMU Courses Required Library Use or Internet Use

Portion of courses requiring library or Internet use	Percent of students
Hardly any	14
About one fourth	27
About half	31
About three fourths	14
Nearly all	14

mean test scores for students who completed all, part, or none of Go for the Gold exercises. The results show that there is no significant difference in test performance among the three groups (see table 9).

Another way we tried to answer this question, at least in part, was to look at a subgroup of test-takers. A total of 496 students took the ISST at least twice, on different days. Of those, 89% reported no additional Go for the Gold usage. The test scores of the 53 students who reported they had completed more of Go for the Gold (none to some or all, or some to all) were compared to the test scores of the other students. Both groups increased their scores by about the same amount, providing no meaningful evidence that completing Go for the Gold improved test scores (see table 10). The impact of a learning intervention is, however, difficult to measure, and these data should not be considered conclusive.

The ISST had been used as an assessment test for several years before it became a competency test. We had always assumed that students would try harder if the test counted. According to the results presented in table 11, students performed significantly better on the competency test this year than the 319 students who took it as an assessment test in 1999.

New Forms of ISST

To date students have all been taking one form of the ISST, even when they took the test multiple times. In order to increase validity and keep test items from becoming known by students, librarians developed new test items for four

Table 9. Portion of Go for the Gold Completed Compared to Mean Test Score

Portion of Go for the Gold completed	Number of students	Mean total test score
Completed all GFTG exercises	1763	43.84
Completed some of the GFTG exercises	648	43.98
Did not complete any GFTG exercises	260	43.77

Table 10. Test Score Improvement Compared to Go for the Gold Completion

Portion of Go for the Gold completed on second try	Mean Score for first taking of test	Mean score for second taking of test	Improvement
Completed more of Go for the Gold, n=53	37.4	44.7	7.3
Did not do more of Go for the Gold, n=44.3	38.2	44.2	6.0

map of the library, a list of library terminology, and a search statement worksheet.

A total of 30 students attended the ISST Review Workshops in Fall, 2000. A series of spring workshops will be offered during

the three weeks before the deadline students must meet. Students who do not successfully pass the ISST by the spring deadline will have their registration blocked for the next semester.

Remediation Program for Students Who Failed

Students who did not pass the ISST were offered the opportunity to attend small workshops led by librarians. Uncertain of how great demand would be, we scheduled six workshops and advertised them by paper flyer and e-mail messages to students who had not passed the test. The curriculum of the one-hour workshop focused on the most often-missed test questions:

- 1) Locating a journal article;
- 2) Using Boolean operators;
- 3) Understanding the difference between keyword and subject searching;
- 4) Developing effective search statements; and
- 5) Identifying different types of citations.

Knowing that students who had difficulty with the material would be the primary audience, we limited workshop attendance to ten students per session to allow for hands-on time and individualized instruction. Librarians teaching the workshops also planned to use instruction methods that would address several learning styles. Methods used included demonstration, discussion, and having students write out search statements on a marker board before trying examples on the computers. Supporting materials included a

Future Plans

Although we had some challenges in implementing the competency test for information literacy the first year, administrators view it as a successful model at JMU. Despite our early success, we find that we still have much to do to improve the test, streamline implementation, and modify instruction for better results. Our efforts will focus on three areas of improvement:

- 1) Add new forms of the test to keep items from being known and to insure continued validity;
- 2) Improve Go for the Gold to address more effectively the content areas and skills in which student performed poorly; and
- 3) Improve communication to students and faculty about the information literacy program, the competency test, deadlines, and remediation.

Conclusion

The incorporation of a competency test into our information literacy program for General Education has been an evolutionary process that has spanned more than a decade. Although the test has been time consuming and challenging to develop, administer, and maintain, we have experienced significant benefits. The relationship between the library and the General Education program has been strengthened. Librarians and faculty are collaborating more closely than ever before on delivering instruction and designing assignments. Students, knowing they will be held accountable for learning important skills, are taking information literacy seriously. The resources we have put into the competency test have been well worth the outcomes.

Acknowledgement

We would like to acknowledge the expert assistance we received from

Table 11. Comparison of Mean Scores for 1999 Assessment Test and 2000 Competency Test

	1999 Assessment Test	2000 Competency Test
Total test	77.4	85
General skills	71.5	80
Database searching	77	87
Internet	78	87
Ethics	90	93
Application	78.8	89
Knowledge	75	83

the JMU Center for Assessment and Research Studies, particularly from Christine DeMars and Steve Wise.

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