Promoting Information Fluency

Washington and Lee University piloted a program that integrated information fluency instruction into a course curriculum, with encouraging results

By **Jeffrey Overholtzer** and **John Tombarge**

In winter 2002, Washington and Lee University piloted a program to promote information fluency among students. The program integrated information fluency instruction into the curriculum of Quantitative Models for Management and Economics, a multisection, research-intensive course. The pilot used peer mentors, a Web site, and online tutorials as the primary resources for students.

Background

Washington and Lee University is a liberal arts university with about 1,800 undergraduates and 400 graduate law students. The information fluency program originated in a series of discussions during committee meetings and a teaching and technology roundtable. During this process faculty members, librarians, technologists, and other stakeholders at Washington and Lee University discussed what information fluency means and how undergraduates should be taught information fluency skills.

In addition, we and others from Washington and Lee participated in conferences sponsored by the Associated Colleges of the South, a consortium of 16 private, liberal arts institutions, on the subject of information fluency.[1] The following findings, among others, emerged from the discussions:

- Information fluency includes thinking critically about the information needed; understanding the structure and types of information in a discipline; finding information to meet specific needs using search engines, bibliographical databases, and other tools as needed; evaluating the quality of information found; analyzing the information using electronic spreadsheets, statistical analysis tools, and other tools as appropriate; and presenting the information, selecting from among electronic and other media as appropriate.[2]
- Specific concepts and skills that students need vary somewhat among disciplines. Quantitative analysis tools are helpful for management students but perhaps not essential for French majors.
- It is often desirable to teach students information fluency skills as part of courses already in the curriculum so that those skills can be applied to "real" problems. Our experience in teaching workshops confirmed that students learn best when skills are taught in context. For instance, students quickly forget their skills in developing Web sites or performing research with Web databases if they can't apply those skills in a course that requires their use.

An opportunity to apply these findings came in the fall of 2001, when Washington and Lee received a $4,200 grant from the Associated Colleges of the South (ACS). The grant, jointly sought by Philip Cline, Lewis Whitaker Adams Professor of Management and Economics; John Tombarge, Reference Librarian; and Jeff Overholtzer, Director of Technology Education (hereafter referred to as the project coordinators), paid for student mentors and other resources in support of Cline's Economics/Management 203 course, Quantitative Models.

The course was well suited for the project for several reasons. First, the course is information-intensive and demands a variety of skills in using software and data analysis. Students work in teams on research projects that culminate in a paper as well as an oral presentation, typically accompanied by a PowerPoint presentation. They use quantitative analysis software such as Microsoft Excel and MINITAB, as well as survey software.

Second, students in the course are required to pursue a rigorous program of research. They must write a review of the literature, formulate a research question or hypothesis, collect data, and perform statistical analysis to test the hypothesis.

Finally, the course provides access to a significant number of students. Quantitative Models is required for students majoring in accounting, economics, and management, enrolling about 160–180 students a year. Thus, information fluency instruction provided in this course affects, over the long term, most of the students in Washington and Lee's Williams School, which comprises the disciplines of economics, management, politics, and accounting.

The pilot program provided assistance to Cline's three sections of Quantitative Models, involving about 60 students. These sections were taught during the 2002 winter term (January–April).

Prior to the pilot program, Cline had incorporated some technology and research training into his curriculum with

the assistance of technologists and librarians. Providing this assistance was taxing to everyone involved, however, and diverted the focus of the course from statistics concepts. The ACS-funded peer mentors program provided a scalable way to give more thorough and effective assistance in information fluency to all students in the course, without diluting other course content.

Goals

The goals of the program were to

1. Use the resources of the information fluency program—students, the <info .wlu.edu> Web site, and the online Element K tutorials—as resource multipliers, providing more extensive support and information than a faculty member, technologist, or librarian could provide in person.
2. Teach all the students in the course, in a more effective and efficient way than had been possible previously, the following information fluency skills and concepts:

- Applying critical thinking skills to research
- Learning about issues regarding copyright, ethics, and source citations
- Selecting and evaluating resources
- Learning database structure and searching skills
- Using Internet sources
- Locating and retrieving statistical data
- Mastering Excel—basic skills, statistical tools, creating graphs and charts, importing data
- Presenting information—selecting appropriate media (such as PowerPoint or the World Wide Web) and learning to use presentation tools following principles of effective visual display of information

3. Provide a model for teaching students information fluency skills that could be adopted in other information- and research-intensive courses.

Peer Mentors

The peer mentors were at the heart of the program. The four students selected for this role had completed the Quantitative Models course with distinction. In addition, they were proficient in software and research skills, and had prior experience in teaching fellow students, having worked in positions such as computing help desk worker and math tutor. We gave preference to juniors so that they would be available to serve as peer mentors in the following academic year, hiring three juniors and one senior.

The peer mentors, trained by the project coordinators, could provide out-of-class assistance similar in quality, but in much greater quantity, than had been previously possible. A further advantage of using students to teach was that it meshed well with our perception of how students like to learn software. Survey results showed that students prefer to learn software by informally consulting with their peers; they prefer this means by a significant margin to instructor-led workshops, online training, and other methods.

The peer mentors were available to students in both formal and informal settings. They each held evening "office hours" for two hours a week in the computer-equipped library of the Williams School. These hours were posted on the Web site for the information fluency program. The peer mentors also led computer lab sessions, both during and outside of regular class times, on topics such as electronic spreadsheets and statistical analysis tools. In addition, these peer mentors were available for consultation by appointment.

Although already skilled in many of the requisite areas, peer mentors met with the three project coordinators at the beginning of the semester for review of software and research skills and statistics concepts. The peer mentors also used Element K online tutorials to hone their software skills as needed. The specific charge to the peer mentors was to provide assistance with software and research skills needed to complete assignments in Quantitative Models. They were also permitted to assist in communicating the statistics concepts in the course.

Web Site and Online Tutorials

Another resource provided by the grant program was a Web site (http://info.wlu.edu/). The librarian and technologist, assisted by paid students, constructed the site with information on research (including conducting a literature review, forming a thesis, and using online databases and search engines) and the use of quantitative analysis, survey, and presentation software. These topics were customized for the particular needs of the Quantitative Models course.

A final resource for the course, and one that did not require input from the project coordinators or the peer mentors, was Element K.[3] The university licensed this tool to provide online, interactive tutorials on using electronic spreadsheets, presentation tools, and other software as needed by the students in Quantitative Models.

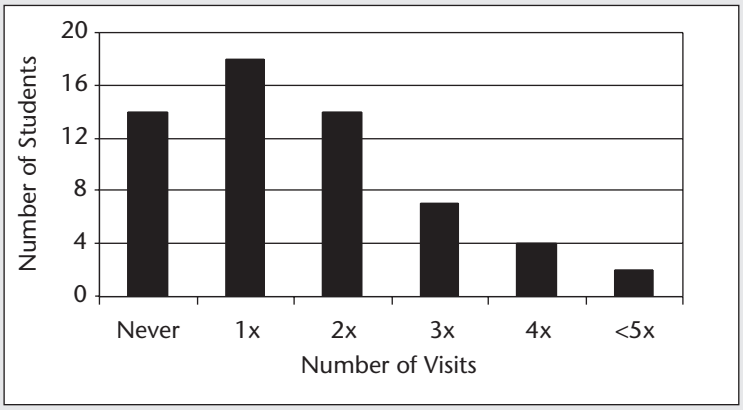
Use of Resources

To help assess the program, the coordinators asked students enrolled in the class to complete an evaluation survey at the end of the term that focused specifically on this project. The peer mentors also completed an evaluation survey. In addition, they wrote reports summarizing their activities and providing suggestions for improvements.

The project coordinators expected that the most popular components would be the peer mentors and the Web site developed to support the class project, and that use of these resources would be focused on the term project. Use of the peer mentors was the highest of any resource, with 76 percent of enrolled students reporting that they visited the peer mentors at least once. Although students reported "meeting" with the peer mentors a limited number of times (see Figure 1), the peer mentors indicated that they answered many questions through e-mail and chance encounters. The students might not have considered the e-mail and chance encounters as "meeting" with the peer mentors and so might have underreported their use of the peer mentors in the evaluation. According to the peer mentors' reports, 39 percent of contacts occurred during office hours. E-mail accounted for 29 percent, chance encounters for 26 percent, and phone

Figure 1

How Often Students Met with Peer Mentors



conversations 6 percent.

The Web site was the second most used resource, with 73 percent of the students reporting that they employed the site. As Figure 2 suggests, those that did use the Web site tended to visit it multiple times.

The difference in use patterns between these two resources is interesting, but more notable is the number of students *not* using the resources. This trend was more striking for the librarian and the Element K tutorials, which received use by only 24 percent of the students. In previous terms, the librarian had devoted an overwhelming amount of time to helping students through the research and data analysis portions of the term project. This workload dropped to the lowest level ever, probably due to the participation of the peer mentors. As expected, students preferred going to the peer mentors and the Web site first, approaching the librarian only if they failed to get the help they needed. The professor noticed a similar drop in traffic during his office hours, and those students who did come presented more substantial questions than typical.

The evaluations indicated that the students appreciated having the opportunity to get help in the evenings when they actually do their school work rather than being forced to get help only during the professor's office hours or during the librarian's scheduled hours.

While the students appreciated the availability of help in the evenings, the peer mentors were not as available as the project coordinators would have liked. Peer mentors were asked to hold their office hours in the Williams School library at one of the group worktables equipped with a computer, but these tables are very popular with students, who must work in groups for many of their classes. If there were no students present to help, the peer mentors often felt obligated to step aside and let other students use the group tables. This meant that on several occasions students seeking help could not locate the mentor.

Although the evaluations indicated that the majority of students sought help with research or software (see Figure 3), there was a significant need for help with class assignments. The student comments indicated that although the peer mentors were quite knowledgeable about statistics, they would have liked the peer mentors to have been better informed about what was happening in the classroom.

The expectations of the project coordinators also affected the usefulness of the peer mentors. The peer mentors were expected to assist mainly with the term projects. The students enrolled in the class, however, expected the peer mentors to be fully involved and knowledgeable of the day-to-day activities in the classroom and to provide help with individual statistics problems. This expectation had not been considered, and no communication link between the professor and the peer mentors about the classes' progress was put into place other than the peer mentors' having the syllabus. If a class seemed to be having trouble with a concept presented in class, the peer mentors were generally not warned, and they felt handicapped without this direct knowledge of what was happening in the classroom.

Project Assessment

Cline summed up his assessment of the program with this statement: "The results in the final projects, the keystone of the course, were clearly superior—there were no poor papers." While there was little difference in the quality of the projects at the high end of the

Figure 2

How Often Students Used the Web Site

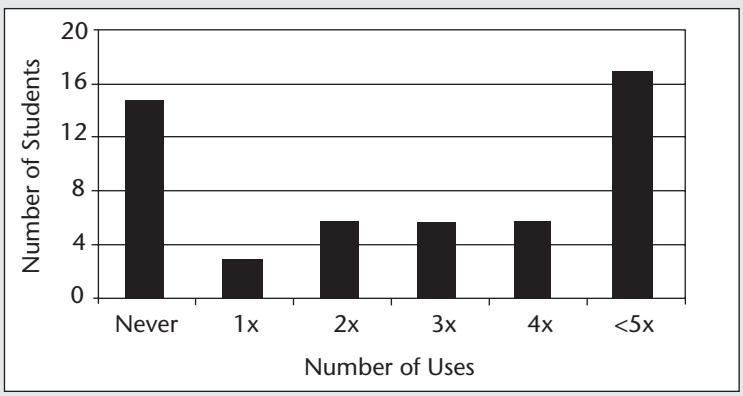


Figure 3

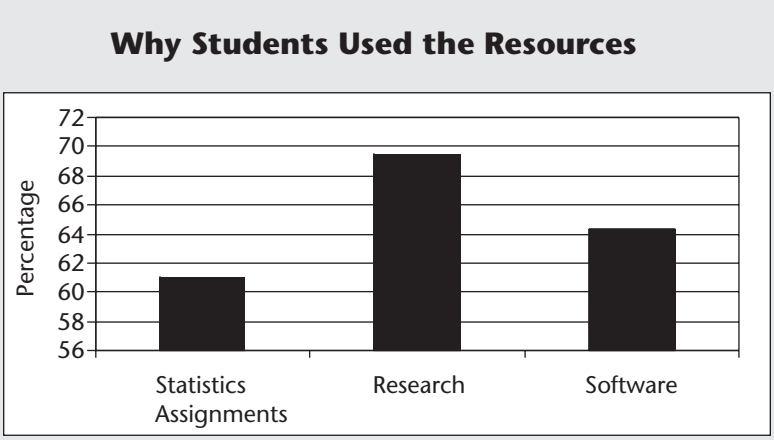
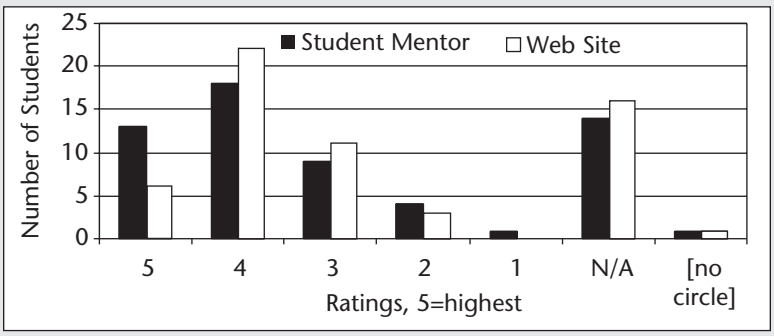


Figure 4



grading scale, there was a marked difference at the lower end. He also noted that there was significantly less anxiety on the part of students at the end of the term than is usually the case. These differences he attributed to this project and especially the support of the peer mentors.

The students' self-assessments of their skill levels at the beginning and the end of the term showed clear improvements in all skills covered by the project, with the most striking difference being in the use of MINITAB, the statistical analysis software used in the class. Most of the students had never used such a program before. Although the students were comfortable with searching the Web, doing research, and using PowerPoint at the beginning of the term, significant improvement was evident in their test results at the end of the term.

The student evaluations of the peer mentors and the Web site, which appear in Figure 4, indicate that the two resources made a valuable contribution to the course.

Comments from students showed that they wanted both the peer mentors and the Web site to be better tied to the course content. The mentors should be more aware of what was happening in class, and the Web site should give examples of projects.

Evaluations validated that the peer mentors were the preferred source when students wanted help. The peer mentors were available where and when the students did their schoolwork and were the highest-rated resource on the evaluation.

Improvements in the program suggested by the peer mentors and students in the class follow:

- Ensure better communication among the participants, especially the peer mentors and the professor.
- Post more examples on the Web site of successful term projects.
- Hold the peer mentors' office hours in a private area, such as a classroom equipped with a computer, rather than in the busy, public environment of the library.

The project coordinators also recommended that the Web site be developed within a course management system rather than as a specialized Web site. This would increase their ability to communicate with the students and to restrict the availability of some information (such as peer mentors' home phone numbers) to only those students enrolled in the course. It would also allow the various supporting Web pages to be more modular in nature, so they could be mixed and matched with those of other classes.

Local funding will replace grant funding in the next implementation of the project, planned for winter 2003 in support of two sections of the Quantitative Methods course. The project coordinators anticipate expenses will be about half of the original $4,200 grant, partly because of the lack of start-up costs. Nearly all of the project funds will be allocated to wages for the peer mentors, who are paid $10 an hour.

Conclusion

The method of incorporating the instruction of information fluency skills in the Quantitative Analysis class at Washington and Lee University offers a scalable model for supporting this instruction in other research-intensive courses. This model allows the skills to be taught within the context of a discipline in a way that matches how students like to learn. It also allows for the instruction to be provided without overwhelming support personnel. *e*

Endnotes

1. See <http://www.colleges.org/~if/> for details.
2. Adapted from L.A. Goetsch and P.T. Kaufman, "Readin', Writin', Arithmetic, and Information Competency," *Campus Wide Information Systems*, Vol. 15, No. 5, 1998, pp. 158–163.
3. See <http://elementk.wlu.edu/> for details on implementation of the Element K tool at Washington and Lee University.

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