



A Systematic Study of Web-based and Traditional Instruction in an MLIS Program: Success Factors and Implications for Curriculum Design

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Traditional and Web-based learning environments in an MLIS program setting are compared. Using pre- and post-questionnaires administered to students and in-depth student and instructor interviews, the authors investigate differences in perceptions and outcomes in each environment. The authors found no significant differences in student performance between the two forms. Students did perceive differences in the educational experiences between both approaches, emphasizing the greater need for specific student and instructor qualities for success in the Web-based environment. Differences were also found between instructors and students in the importance placed on factors that determine course success. Both instructors and students must recognize the constraints and opportunities presented by the Web environment, which, when used in conjunction with other technologies, permit multiple forms of contact for effective learning. Implications for learning and curriculum design are discussed.

Introduction

Technological choices to support teaching and learning at a distance have expanded greatly in recent decades. As a result, educational institutions have used these technologies to make educational opportunities more widely available to prospective students. This is especially true for degree and continuing education programs in library and information science (LIS). The uneven distribution of LIS programs throughout the United States has made access to these programs problematic for people in underserved areas. In order to complete pro-

grams, these prospective students must either uproot themselves and move to centers offering the desired degree, or they must undertake distance education offerings in locations closer to their homes. A number of approaches may be used, including onsite visits by faculty members or technology-assisted delivery and interaction through broadcast voice or video connections. These approaches alleviate to some degree the distance problem but still require a form of centralized access since students must converge on a physical location to take part in courses. In recent years, the wider availability of the Internet and associated soft-

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ware tools to support communication and information transfer have made truly distance-independent learning a possibility. Through the use of course accessible materials available from Web pages and communication tools such as electronic mail, bulletin boards, chat rooms, and streaming audio/video, a dynamic environment is established in which teaching and learning may take place. But how effective are these technologies in facilitating learning? Are students who pursue learning through these means disadvantaged—or do they perceive themselves as disadvantaged—when compared to students in traditional face-to-face environments? Do these technologies offer learning opportunities not afforded by the traditional classroom?

The present study systematically compares the student learning outcomes and perceived effectiveness of several for-credit courses offered via the World Wide Web with traditional on-campus sections of the same courses in the Master of Library and Information Science (MLIS) program at the University of Wisconsin-Milwaukee (UWM). The purpose of the study is to gain a greater understanding of the appropriateness and effectiveness of Web-based courses for graduate education and which technologies and approaches work best from both the students' and the instructors' perspectives.

Previous Research

There is a growing body of research comparing traditional and Web-based education. Schrumm, in describing the state of research surrounding Web-based educa-

tion, speaks to the need for comprehensive, in-depth evaluations such as the present study: "The impact of online courses has only begun to be investigated. To date, the traditional distance education literature has focused on the design and implementation of correspondence, compressed video, or satellite broadcast delivery courses. That literature provides some parallels, but does not directly inform the design and development of online courses."¹

However, Hassenplug and Harnish maintain, "one of the factors consistently identified in the literature on distance learning as being critical to the effectiveness of learning...is the amount, type, and quality of interaction between and among participants and particularly students and the instructor."² Holt, et al., describe an array of benefits surrounding interactive Web environments, including:

- More people can participate regardless of place or time;
- People who may not be comfortable participating in face-to-face groups have a voice;
- Participants have time to reflect, rather than react in "knee-jerk" ways;
- More data and ideas are collected;
- Participants have unlimited space and time to express their views;
- Everyone can see everyone else's contributions and build upon them.³

Given the newness of Web-based instruction, it is not surprising that many are learning to teach online as they progress. This is unfortunate, yet sets of desirable characteristics, traits, and strategies are now emerg-

ing to assist instructors in online environments. Recent works recognize the need for a new pedagogical model.⁴ Henri and Kaye see the greatest obstacle facing instructors in all types of distance education as "re-creating the teaching-learning process:"

The challenge that distance education attempts to take up does not lie in the teaching-learning relationship but in the way in which this relationship is achieved in the light of the distance factor. The real challenge lies in the fact that in distance education one has to re-create at a distance the teaching-learning relationship; one has to put in place from a distance an educational environment in the student's normal living milieu; that from a distance one has to plan, develop, and disperse what is to be taught without the possibility of modifying it in accordance with the student needs.⁵

Of the new roles, Rath asserts that "instructors who thrive in the new environment combine the skills of a traditional classroom teacher with those of a technical support representative—they engage students and spark their curiosity and are also responsive, well-organized, courteous, patient, and flexible."⁶

Overall, the roles of the instructor in distance education combine those of a mentor with a facilitator of knowledge. The ability to effectively *plan for* and *facilitate* a virtual classroom is clearly important. The planning and development of online courses are often cited as requiring significantly more time that adds to faculty workloads. Some institutions provide release time for online course development, while others may consider online courses as part of the normal teaching load. Regardless, online teaching requires different pedagogical models and instructor qualities.⁷ Furthermore, Eastmond affirms: "Supporting online teaching demands that faculty actively guide the online discourse in a caring, stimulating manner . . ."⁸

Additional requisite qualities include a

comfort level with the delay in engagement and with the loss of control.⁹ Sherry and Wilson see a relationship between the loss of an instructor's control with a corresponding awakening within students; students come to the "realization that the instructor is not the sole authority or repository of answers, and that the answers to real problems aren't as simple as they might seem!"¹⁰ Students, therefore, must also relearn the learning process. Lowry, Thornam, and White suggest a number of qualities, including motivation, self-directedness, and computer literacy as requisite for distance students in higher education.¹¹

Similar results reported by Small in her mixed method study revolve around the teaching and learning experience, as well as the uses of technologies.¹² The current study, in addition to Small's, contributes to significant implications for the development of Web-based courses in the graduate environment as well as Web-based curricular redesign in general. For individuals seeking greater exposure to the literature surrounding Web-based education, the authors recommend Khan and Cole, both of whom include many highly valuable articles on various facets of Web-based pedagogy in general.¹³

Methodology

Six courses in the MLIS program at UWM offered during 1999–2000 were selected for inclusion in the study. Each course was offered as a traditional onsite section and a Web-based section. The courses in the study were taught by the same instructor to control for differences between instructors in their presentation and course content. In one case the instructors were different, but the course content was similar. One of the six courses in the study served as a pilot course in the summer of 1999 to help refine the survey instruments.

Students in each section of the course were surveyed at the beginning of the

semester. The pre-survey instrument included questions to elicit information on student demographics, student attitudes toward educational technology, student perceptions about the learning experience, and what they felt students and instructors needed to bring to the course to succeed. Students were surveyed again at the end of the semester on their educational experiences in the course and were re-asked several questions that had appeared in the pre-survey. Both pre- and post-questionnaires consisted of open- and closed-ended questions.

WebCT, a popular Web-based course-management package, was used to deliver the Web-based courses. The WebCT environment permits both synchronous (chat rooms) and asynchronous communication (personal e-mail, bulletin boards) among course participants in addition to providing access to course materials in a variety of formats. The software also collects usage statistics for each course, thereby allowing instructors to monitor student activity in accessing the course Web site and postings made to communal communication services.

Quantitative data were collected and analyzed from survey responses on student perceptions and attitudes regarding their learning experiences. Mean grade outcomes were compared between the two sections for each course, and more generally across the traditional and Web-based courses. Data were analyzed using Microsoft Excel[®] and SPSS[®].

Qualitative data were collected from several sources. In addition to student responses to open-ended questions from both survey instruments, twelve students (six relative newcomers to Web-based courses and six who had completed at least several courses in the Web-based format) were randomly selected to participate in in-depth follow-up telephone interviews regarding their experiences with Web-based courses. Instructors for each of these courses were also surveyed about their attitudes on teaching in a Web-based environment. Those instructors new to Web-based courses were

given an in-depth pre- and post-interview. In each case, the interviewer was accompanied by a research assistant who took notes and audiotaped the sessions. Contents of the interviews were later transcribed for analysis.

The data analysis for the transcribed interviews and open-ended survey responses was conducted using techniques from qualitative methodologies described by Miles and Huberman, Lincoln and Guba, Denzin and Lincoln, and Patton.¹⁴ The qualitative data from the instructor interviews were assigned codes, which according to Miles and Huberman are "tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study."¹⁵ Coding allows researchers to see themes and comparisons, recognize conceptual significance, and draw conclusions from the various data.

The study, as noted, used multiple forms of data, including demographic data, quantitatively grounded data, and rich, qualitative data from interviews and observations, all of which were analyzed first singularly, then collaboratively, to form the study results and implications for curricular design. Key research questions guiding the study included:

- Are there any perceptual and performance differences in the learning experience between students in each environment?
- Which technologies and approaches work best from both the students' and the instructors' perspectives?
- How can students best be prepared to participate in Web-based classes?
- How can faculty best prepare for, develop, and implement such courses?

Results

Including the pilot course, a total of 129 pairs of completed pre- and post-surveys by students in traditional sections and 53 in the

Web-based sections were received. A lower response rate and generally smaller enrollments accounted for the smaller number of responses in the Web-based sections. A number of students were registered in more than one of the courses participating in the study. For the majority of the quantitative analyses, only the first set of surveys submitted by these students was used to avoid redundancy in student responses, which could bias the findings.

Demographic data collected from the surveys revealed that respondents in both environments came with a mix of educational backgrounds, representing the humanities, social sciences, sciences, and professional fields. There were several differences in the demographics between the two groups. The Web-based environment contained a higher percentage of students with prior education in a professional field. The Web-based group was also more mature (38% over 40 years of age, compared to 29% for the traditional environment), with a larger percentage of female respondents (81%, compared to 58% for the traditional environment).

Performance Outcomes

T-tests were conducted comparing average final course grades between traditional and Web-based sections of the same courses. Letter grades assigned to each student were first converted to grade points using a traditional 4-point scale. There were no significant differences in mean grade points for four of the six courses ($p > 0.05$). There were significant differences in two of the courses: in one case, favoring the Web-based course ($p < 0.005$), in the other, the traditional classroom environment ($p < 0.028$).

Respondents were asked about their familiarity with computing technology and Internet resources (productivity software, World Wide Web, e-mail, mailing lists) in both the pre- and post-survey. Self-assessed familiarity was reported on a 5-point scale (1 = Not at all familiar to 5 = Extremely famil-

iar). The investigators wished to determine if there was any significant change in computer literacy level for students in either environment. No significant differences ($p > 0.05$) were observed in pre- and post-familiarity or in changes in familiarity for both environments, based on t-test results. It should be noted that many respondents in both environments had already reported a high level of computer familiarity in the pre-questionnaire, which did not change in the post-questionnaire.

Student Attitudes Towards Instructors

Students were asked in the post-questionnaire to rate the importance (1 = not important, 5 = very important) of different personal characteristics that students should bring with them to their respective instructional environments. Results of t-tests are reported in Table 1.

Square root transformations were applied to data sets with appreciable differences in variances. These did not change the significance of the outcomes from the untransformed data analysis. T-tests reveal there was no significant difference in the importance of student flexibility, communication skills, and organization skills between the two environments. Students in the Web-based sections, however, felt the attributes of self-discipline, self-motivation, technical expertise, and patience were more important in their environment than students in the traditional classroom environment.

Students were also asked to rate the importance of characteristics an instructor for the course should bring to these environments (Table 2). There were no significant differences between the environments regarding the importance of instructor subject knowledge, flexibility, patience, communication skill, and ability to facilitate discussions. Students in the traditional environment felt a dynamic presence was more important in their environment, while

Table 1. Student Attitudes on Student Qualities

Quality	Score				2-tailed t-test Signif.
	Web-based \bar{x}	Var.	Traditional \bar{x}	Var.	
Self-discipline	4.89	0.10	4.34	0.42	0.00*
Self-motivation	4.93	0.07	4.33	0.46	0.00*
Flexibility	4.00	0.92	3.62	0.98	0.08
Technical experience	3.89	0.44	3.05	1.23	0.00*
Patience	4.22	0.56	3.70	0.84	0.00*
Communication skills	4.41	0.64	4.44	0.34	0.84
Organization skills	4.41	0.71	4.17	0.54	0.20

* significance at a level of .05

Table 2. Student Attitudes on Instructor Qualities

Quality	Score				2-tailed t-test Signif.
	Web-based \bar{x}	Var.	Traditional \bar{x}	Var.	
Dynamic presence	4.15	1.02	4.60	0.29	0.04*
Knowledge of subject area	4.88	0.11	4.85	0.15	0.63
Knowledge of IT	4.58	0.41	3.82	1.14	0.00*
Flexibility	4.46	0.66	4.10	0.68	0.05
Patience	4.35	0.64	4.12	0.61	0.39
Organization skills	4.85	0.14	4.53	0.36	0.00*
Communication skills	4.69	0.46	4.80	0.16	0.47
Ability to facilitate discussions	4.58	0.81	4.74	0.19	0.25

* significance at a level of .05

students in the Web-based environment felt instructor knowledge of information technology and organization skills were more important.

Overall, students were positive about their experiences in both groups, with only a small percentage of respondents (2% for the traditional environment versus 12.5% for the Web-based environment) indicating that

they felt the instructional medium caused them to learn relatively less than the other environment. There were no notable differences between age groups in either environment regarding this perception based on cross-tabulations between class format and age groups. Chi-square significance is not reported in this case because of the very small number of observations where stu-

dents favored the other approach.

In-depth qualitative interviews with students and instructors were conducted in order to complement the quantitative findings and open-ended questions from the pre- and post-questionnaires. As Buchanan has discussed, qualitative research in Web-based education is novel, and yet holds great potential for understanding and, thus, increasing the efficacy of Web-based education.¹⁶

The qualitative findings focus on student and instructor perceptions of interactivity and control of dialogue, qualitative differences among student relationships, levels of preparedness and effort devoted to Web-based education, attitudes and perceptions of types of delivery, and differences among distance education and traditional education students in terms of maturity, insight, abilities to communicate effectively, and real-world experiences. Both traditional and Web-based students indicated that the professor responded quickly to e-mails, and in that regard, the format of the class did not affect interaction with the instructor. Two of the suggestions that were repeated often were to have the instructor participate more and guide the bulletin board discussions. Some students were concerned that a few instructors needed more training in WebCT and encouraged the support of a full-time distance education coordinator position to ensure continuity and uniform service for both students and instructors.

Based on the in-depth student interviews, it became clear that students have high expectations of instructors in the distance environment. Students felt that organization was one of the most important instructor qualities. Acting as a "guiding force for students" was also regarded as vital. This may be manifested in several ways, for example, the ability to facilitate discussions. Students expect instructors to provide ideas, since respondents indicated "the discussion just will not happen by itself." Furthermore, in guiding discussions, instructors should also "curb the talkative students." Feedback is

another instructor quality that is essential to students. When students described their least-favorable distance education experience, "no feedback" was the most prevalent. At the same time, feedback was also the focus of the discussion when students described their most favorable distance education experience, again highlighting the importance of instructor feedback and discussion in a Web-based course.

Student Attitudes Toward the Class Formats and Technologies

Participants' initial attitudes toward Web-based education varied. Many students in both the traditional and Web-based sections of each course were excited about having the opportunity to participate in education via the Web. Students stressed the convenience of the Web-based classes, which allowed them to "attend" when they wanted.

The greatest concern of traditional as well as distant education students at the beginning of the semester was the level of interaction and discussion with other students and the professor that the technology would allow. This primarily related to the concern that Web-based students would not be able to see each other or the instructor, or to become better acquainted with their colleagues. Suggestions were made by Web-based students to have everyone scan pictures of themselves in order to have a visual image of classmates. Some students had concerns that they did not possess the technical skills in order to take a Web-based class. Others did not have computers at home, making access to course content more difficult. In addition to their own technology skills, a number of students worried about technical glitches that would hinder learning in a Web-based course.

A persistent theme in both the pre- and post-questionnaires for the Web-based students as well as during the in-depth interviews was the concern with the technology operating properly. When the server

was down, their connection to the course materials, the instructor, and their classmates was removed. Other glitches, such as occasional difficulty in accessing electronic reserve materials available on campus, and sporadic breakdowns during real-time chat sessions were frustrating. Students who participated in the in-depth interviews also saw motivation, computer skills, and course selection ability as their primary concerns with the courses and technologies used.

In the post-questionnaire, many of the concerns expressed by Web-based students regarding interactivity disappeared. Traditional students believed that since much is learned in class through interaction with other students and the professor, they would not receive the same attention in a Web-based class. The majority of Web-based students felt that more interaction took place in a Web-based course, citing that the discussions that took place on the bulletin boards were more in-depth and well thought out. Students also felt more open to comment on issues in a Web-based environment than in a traditional class.

The opportunity to share ideas and have everyone be heard was invaluable. The Web-based students also commented that being able to read and re-read what the professor and classmates wrote allowed them to reflect more on what was said before sending a post to the message board. As the class progressed, Web-based students stated that they felt more comfortable with the technology and were more positive about using it in the future. But students also insisted on variety. During the in-depth student interviews, it became clear that students tired easily of one format of lecture in distance education. They preferred variety where instructors employed various multimedia technologies in the course.

When the technology and bandwidth permitted, Web-based students uniformly enjoyed real-time communication sessions, whether as simple textual chat sessions or streamed video and audio from the instructor. One student expressed his approval of

Real[®] video broadcasting: "It was really nice to be in real time and to see and hear the professor." Another talked about the usefulness of audio supplements to presentation materials. The immediacy and spontaneity of the interactions made for an environment approaching that of a traditional classroom and permitted a camaraderie that could not be duplicated using asynchronous tools such as bulletin boards and e-mail.

Concerns expressed early on by Web-based students regarding the anonymity of classmates and the inability to get to know their classmates as a result of the technology also disappeared. Students had the opportunity in most classes to post brief biographies at the beginning of each course in the form of home pages or bulletin-board messages. Several commented that they actually knew more about Web-based classmates than classmates they had in the traditional classroom settings. To strengthen this sense of community within the class, students suggested several tactics to be used in conjunction with the chat room and bulletin boards including:

- Make private e-mail addresses available to allow communication outside of the Web site environment;
- Have introductions at the beginning of the semester with brief bios;
- Participate in group projects/buddy system to encourage one-on-one interactions independent of the instructor; and
- Develop student Web pages where further information about class members could be shared, including nontextual media formats such as photos.

The content of a course also influenced student attitudes in the Web-based environment. This was particularly evident from the interviews. Some students thought that certain courses were better suited for distance education while others thought the course content made no difference. Technical courses, courses that are detailed-oriented, and courses with presentations

requiring emotional content were deemed less appropriate by some participants; but this was based on perception rather than experience. Other students concluded that it was the instructor, rather than the course topic, that was key in determining the success of a course. One student summarized her distance learning experience as "I think the best courses were one technical class and one theoretical class. They're pretty disparate kinds of classes and both worked effectively."

Participants in each section were asked if they would take a Web-based course in the future. Those who responded "yes" overwhelmingly said they would do so because of the convenience. Without this option for students, many would have to drive long distances to attend classes or would not be able to attend at all. Students liked the independence of working on their own and at a time that fit their schedules. The major reason for not wanting to take a Web-based course in the future was the lack of personal interaction. Surprisingly, a few students said that they were not comfortable enough with the computer and felt their lack of knowledge in technology would affect their learning. Finally, the majority of students who responded "no" said that the extra fee for a Web-based class would deter them from taking such a course.

Instructor Attitudes and Perceptions

Most of the faculty members interviewed (four of six) transformed their thinking about Web-based education upon completion of their courses. Each expressed concerns upon the inception of their courses about technological limitations and the time required to develop the course for the Web environment. The time spent to develop Web-based course materials was significant, and some felt that release time should be built in to faculty teaching loads to compensate for the additional time commitment. Some felt prepara-

tion time and instructional time was triple that of traditional onsite teaching. One commented that "class never ended . . . I get up and get on the computer at 6:00 in the morning, and everybody was up all night, sending messages. I thought, OK, before I went to bed, I checked my mail and responded. I wake up and there are 20-plus new messages. You know when you leave class after you give a lecture [in the traditional environment], it's over. I felt if I didn't check the Web class at least three times a day, I would be bogged down. That took me off guard." However, as described, post-interview data revealed that the additional time enabled stronger relationships among the students and contributed to more motivated students.

Of particular import, faculty expressed pedagogical concerns. A common sentiment was "I did not think my course would translate well in a Web-based environment" and "I have to try to use one-dimensional means to express multidimensional concepts." Others expressed hesitation, stating they had never done this before so they were not sure what to expect.

Despite the fact that these faculty members were extremely technologically savvy, concerns about the media of delivery were commonplace. Some recommended that prior to teaching online, faculty should receive training both on the technology or platforms used as well as on the pedagogical aspects of Web-based education. To date, little research discusses faculty development in a systematic manner; most instructors learn in a hit-or-miss way, from anecdotal assistance from peers who have already taught online or from the small, but growing, research on instructor qualities and strategies for successful distance education in general.¹⁷

Post-interviews, however, revealed a sense of surprise and enjoyment surrounding the adaptation of courses to a Web environment. Most were very pleased with the nature of the interactions, both student to student and instructor to student. The environment permitted the ability to

articulate clearly and with predetermined focus and to share information with no fear of embarrassment.

In particular, one professor discussed her reactions when a student in her Web-based class "blurted" something out on the discussion board about a character in a young adult's literature class reading. Her onsite class, also reading the same material, said nothing about this character. When the instructor shared the comment from the Web class, some of the onsite students concurred. When pressed with why no one onsite raised the issue of this character, the instructor felt it was due to the nature of the Web environment and its promotion of open discussion to assert oneself more freely or to take more risks. "I think there are less inhibitions on the Web and people feel they can say what they want to say; whereas in class, I think people are more self-conscious. They think they might look stupid or it's a dumb question." This instructor continued, noting that she was able to be more deliberate in her directions and her comments, as the text-based asynchronous forums enabled and even encouraged that approach.

Faculty members concurred on a number of points regarding characteristics requisite for an instructor in Web-based coursework. Time management was highlighted, with suggestions surrounding the appropriate numbers and lengths of asynchronous postings.

A "no-post day" was also encouraged, to provide for a reading day or catch-up day. One faculty commented, "I think every person who is doing this for the first time needs to learn things like don't spend 24 hours, 7 days a week replying to all these messages. It is very easy for a person to feel trapped. You just feel obliged—obligated to respond when you see a hundred messages sitting in your account."

Instructors' responsibilities must consist of management skills for themselves as well as the students—"students need to learn a new set of etiquette rules like not to be too talkative and not to send too many

messages. Some students feel that they need to do that because they miss that kind of learning environment, when they can come to campus and talk with peers. So, on the Web, some of them want to do that too. But they need to learn to control that." Similarly, one instructor emphatically stated to her Web students: "OK, this is the deal. Think about what you are going to say before you start typing." The instructor then continued that, "in the Web class, people are more cognizant of their thoughts, and they're more deliberate about typing their thoughts because they've thought them through before." Nevertheless, this continuous participation in a Web-based class was summarized by one faculty as "a more . . . intellectually immersive experience" that "becomes a bigger part of your life."

The faculty interviewed also concurred that student learning was as good as, and in many cases better than, the onsite counterpart in traditional settings. While sound assessment measures for Web-based coursework are under debate, these instructors used very similar grading or assessment measures for their classes.

Typically, the six instructors placed greater emphasis on participation in the online course than in the onsite. Student participation in online coursework resulted in such comments as: "A lot more of their learning took place on their own . . . they learn from their own mistakes. The Web-based section served as a more recursive learning experience, where the technologies that were discussed in the course were also the ones used to convey the course content," and "Student performance in the Web-based class was a little better than the on-campus class. They were motivated to participate, and many more students were willing to share their thoughts on the Web with their fellow students, and with me, apparently. And, they also shared their own life experiences when they talked about the class issues."

One instructor saw enhanced student performance in a unique way. He would select a few outstanding samples of assign-

ments and post them to the entire group; after a few times, he saw students trying extremely hard to be the ones posted: "The assignment would be posted, and the students were very excited about seeing their work selected as the signposts for the group. So next time, the students all tried harder; they wanted to be posted. The students whose assignments were posted felt encouraged, recognized, and then other students wanted that recognition. It opened up a new type of learning experience!"

Discussion

The present study reaffirms the finding of many other studies comparing student performance in distance education environments that there is no statistically significant difference in student performance when compared to a traditional classroom environment.¹⁸ General sentiment among the instructors was that students in the Web-based sections were a very self-motivated group that could overcome shortcomings the technology and distance may have presented. The extra effort entailed in undertaking a Web-based course would deter potential students who would not be willing to do so.

Although categorized as "Web-based" courses, technologies that exist independent of the Web were also integral to each class for facilitating communication and access to course content. It just so happened that these technologies were a part of the WebCT environment. The Web site was instrumental in creating a gathering place for students and instructors and facilitated easy access to textual and visual material.

Bulletin boards were used to facilitate extended asynchronous dialogues among the participants. The perception of the bulletin board as a "lifeline" to the course exemplified the importance students placed on the communication tools. A sense of isolation resulted without a regular stream of contact from classmates or the instructor. Although students liked the idea of an asynchronous

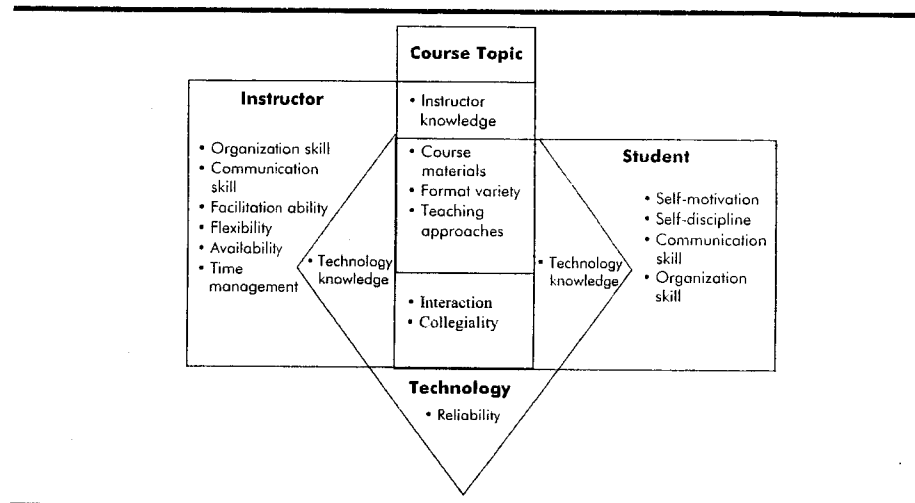
bulletin board, which permitted the luxury of thinking about their responses before submission, a strong desire for synchronous communication, even if only textual, was quite evident. Generally, synchronous sessions took place less frequently than bulletin board dialogues, but were viewed as vital to the course. The spontaneity permitted by course chat rooms, or real-time audio/video sessions with the instructor when feasible, greatly increased a sense of community and connectedness.

The centralized nature of the Web-based environment also may have played a role in how students perceive, and ultimately interact, in the Web-based environment. Even though the electronic environment reduced the impact of distance, the physical geographic distribution of students played a role in their lack of interaction with one another outside of the class Web site. The Web site and, by association, the instructor were perceived as the nexus through which all communication should be directed. Interaction was largely centralized and nonexistent without instructor orchestration, unlike a traditional classroom, where students would interact with one another without instructor initiation.

The in-depth interviews held with instructors and students revealed a key difference in perceptions regarding the success of a Web-based course. Instructors felt the success of an online course was largely content-driven. Students, however, felt the success of a course was largely instructor-driven, with content being less important. Instructor flexibility holds significant importance, due to both technological limitations and Web-class dynamics. One instructor shared, "As things change and even though you may have carefully planned how a course worked, depending on technology failure or the dynamics of the classroom, you may have to change."

The instructor's responsibility is indeed greater to online students; students become extremely reliant on the instructor as their academic lifeline, as they often have little

Figure 1.
Relationships Among Key Success Factors in Web-based Courses



contact with other members of the institutional team. This component adds a level of additional work to faculty in online classes who may also be responsible for sending course materials and technical support documents themselves.

A critic of distance education, David Noble, echoes this sentiment in his assessment: "The use of the technology entails an inevitable extension of working time and an intensification of work as faculty struggle at all hours of the day and night to stay on top of the technology and respond, via chat rooms, virtual office hours, and e-mail, to both students and administrators to whom they have now become instantly and continuously accessible."¹⁹

Of note are the attitudes by both students and instructors regarding the more "discrete" nature of engagement in the traditional environment versus the more "continuous" level of contact and preparedness needed in the Web-based environment. The technology also allows for much more careful administrative monitoring of faculty availability, activities, and responsiveness."

Time-management skills become more important with the Web-based environment. Instructor training regarding the technology and pedagogy in the Web-based environment are needed.

The study findings are summarized in a descriptive model appearing in Figure 1. The four key factors that determine success in the Web-based environment are the instructor, students, technology, and course topic. Each factor has associated attributes that may exist independent of other factors or as a result of the interaction among two or more factors. The relative size of each factor in the figure represents its importance in determining success.

The instructor is the key to success in this environment, bringing attributes that promote successful learning. Students also play a significant role in shaping their own learning experience as well as that of others. Without their active participation, there is no sense of community or presence.

Technology serves as the vital link between instructors and students and in the delivery of the course content. At the inter-

section of the four factors is the course experience itself. Interactions may also take place between students and instructors and among students outside of the course content itself, thus strengthening collegial ties.

The findings of the study have several implications for the design of Web-based courses and the way students and instructors interact in the Web-based environment.

- a) Instructors planning to undertake a Web-based course must recognize the perceptual differences held by students toward the course. Without the availability of social cues evident in a traditional classroom environment, students rely on the instructor to initiate and channel communication. Students must also recognize that the instructors themselves are not available at all times, even though course materials may be.
- b) In mounting a Web-based course, instructors should ensure that communication takes multiple forms, providing both asynchronous and particularly synchronous contact. Multimedia forms of communication should be encouraged, where possible. Training for students in how to use these technologies may also be needed. The instructors should encourage contact among the students outside of the Web to decentralize communication flow (e.g., group project work). This may reduce the isolation felt by students.
- c) Faculty development and release time should be factored in to allow the instructor to acquire the necessary skills and strategies for efficacious Web-based education. Effective planning and forethought are key to a successful learning environment.

Conclusions

Avenues for facilitating distance learning have greatly increased in recent years, due largely to the wider availability of the Internet

and associated information access and communication tools. With many options available for conveying course content and facilitating communication, educational institutions are now exploring how best to facilitate teaching and learning in electronic environments. The investigators of the present study have undertaken a mixed-method investigation comparing student learning, performance, and attitudes as well as instructor perceptions of Web-based and traditional classes to better understand factors that promote successful implementation of Web-based courses. These findings have implications for curriculum design in electronic environments.

Both instructors and students in the Web-based environment struggle to deal with the constraints defined by the technology, constraints that do not exist in a traditional classroom environment. Using class performance as an outcome measure, the authors found that, overall, there were no significant differences in student performance between the two formats. However, differences did arise in student perceptions of the importance of instructor and student qualities needed to succeed in the Web-based environment.

When integrated with the findings of a qualitative analysis of pre- and post-questionnaire responses and in-depth interviews with students and instructors, it becomes clear that the instructor is the key to success in the Web-based environment, even more so than the course topic itself and the technologies used. Adequate instructor preparation and an understanding of the special student needs, learning styles, and expectations in the Web-based environment are essential for success. Conversely, students must also understand the nature of the Web-based environment. They must be motivated, patient, and gregarious for maximum benefit.

Communication between the instructor and students and among the students themselves is essential, and it is most beneficial when supported in a variety of formats. By capitalizing on the strengths offered by the

electronic communication media, quality learning experiences are possible in the Web-based environment.

Many research questions await further study in the Web-based environment. For example, how do student attitudes, perceptions, and interactions change as they progress through a Web-based program, gaining more experience with the technologies and the environment? The investigators are completing a finer-grained, in-depth analysis of the data, examining the influence of factors such as student demographics and the nature of the courses themselves.

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(Re)Positioning Librarians: How Young People View the Information Sector

Roma Harris and Margaret Ann Wilkinson

This paper was presented at the ALISE 2001 Annual Conference.

More than 2,000 students entering their first year of university studies completed questionnaires about the work roles, future employment prospects, educational requirements, status, and starting salaries of twelve occupations. Their responses were compared with U.S. and Canadian government labor-force projections. The results revealed a complex interplay of gender relations in the students' perceptions of the occupational world and their roles within it. The results also revealed an interesting positioning of the job title "librarian" relative to other fields. Unlike their assessment of the other occupations included in the study, the students considerably underestimated the level of education required to be a librarian (most did not believe that librarians require a university education). They also underestimated librarians' average starting salary and rated the occupation's social status and future prospects to be lower than the other job titles.

Taken together, the results indicate that young people beginning their university studies hold views about career prospects in the information sector that are consistent with some labor-force analysts' views of occupational winners and losers. The students see status, opportunity, and success to be attainable in fields such as computer engineering and systems analysis. Unfortunately, they view the occupational present and future for librarians in a somewhat dimmer light, a worrisome result in view of labor-force data that suggest reasonably strong salary and employment opportunities for this occupation in both the United States and Canada. The implications of these findings for library and information science (LIS) education are discussed in the context of gender and identity politics.

Introduction

To say that librarianship is in a state of flux could hardly be more of an understatement. Rarely is an issue of a library and information science journal released in which concerns aren't expressed about the pace and meaning of change and the future of libraries and the profession. For instance, commenting on a study about public libraries, Estabrook observed that

library leaders are optimistic but anxious. They see opportunities for public libraries to marry traditional services with digital formats but

worry how libraries can find a competitive niche in the rapidly changing information environment. They recognize the potential for libraries to provide new services and educate people to use new technologies, yet fear there is no broad leadership in the profession to meet the challenges of competition and change. Not surprisingly, there is no consensus.¹

If there is no consensus among library leaders, it is not surprising that the public, too, is unclear about the future of libraries. According to Estabrook, "the public's view of libraries is complicated to assess and

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