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## Student Responses to Online Course Materials

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### Abstract

*The purpose of this study was to gather and analyze feedback from graduate students regarding their use of the Internet to complete certain research course assignments. A database of information was assembled from feedback forms, e-mail messages, electronic mailing list postings, and personal conversations collected during the fall 1998, winter 1998, and fall 1999 quarters. A careful examination of the data indicates that the majority of students had a positive experience using the Internet, both as a means of accessing course materials and as an important resource for assistance in completing their research proposals.*

*(Keywords: graduate students, Internet, online courses.)*

As the Internet begins to be used more throughout education, students will gain more familiarity with using the Web, and perhaps more will experience the benefits of having course materials easily accessible. Thus, students may not have to come to campus as much to access library resources. As a result of university- and state-sponsored initiatives intended to develop distance education curriculum, grant money was made available in 1998 to facilitate the creation of courses for distance delivery. One such course was EDUC 541: Introduction to Graduate Study and Research. Web-based course materials for EDUC 541 were initially developed over the summer of 1998 and then field-tested using students enrolled in the on-campus sections of the course

during the fall and winter quarters of 1998–1999. Originally, the implementation plan called for half of the 10 EDUC 541 classes to be made available online during the fall 1999 quarter and then for all of the classes to be made available online in subsequent quarters. Because of changes in my (Matthew) teaching load, however, the course was not offered entirely online during the winter 1999 quarter as intended.

Development of the Web-based course materials for EDUC 541 followed instructional design stages advocated by Willis (1992): design, development, evaluation, and revision. As the materials evolved, care was taken to ensure that students would not become lost in the hypertext on the screen (Jib & Reeves, 1992; Park, 1991; Saga, 1992). This was an important consideration because it was anticipated that students would have a variety of technical skill levels and prior experience with the Internet. A team approach to development (Hoffman & Ritchie, 1998) was used to assure that the materials would address these differences and contain a viable support system.

Initially, I focused on course content, while my co-author worked on the design and technical aspects of its online implementation. As the collaboration continued, however, our roles became less distinct. Since the purpose of our study was to gather and analyze feedback from graduate students regarding their use of the Internet, it was important that, during the project's design and development stages, we remained cognizant of the following considerations:

- \* Once students successfully access the materials, they must develop mental models of the content to understand how the material is presented in the hypertext environment (Jib & Reeves, 1992; Park & Gittelman, 1995). Students who do not develop an adequate mental model of the Web site can become confused and disoriented as they search the hypertext documents.

- \* Well-designed online course materials can promote improved student learning by appealing to students' learning styles, providing flexible learning, and encouraging learning in a variety of ways

(Owston, 1997). Web sites can provide stimulating interactive course materials, such as links to course-related sites and sample tests to take. Projects and activities that students can complete at their own pace and at their convenience give students flexibility in their learning. Further, Owston contends that Web-based learning enables students to learn using critical thinking, problem solving, written communication, and collaborative activities.

\* Barriers to accessing online course materials include malfunctioning hardware, configuring software to access the Internet, slow or down servers, busy signals, and lack of access to computers (Owston; Ross, 1996). Hence, technical support from the instructor and the university is an essential component of an online course. Barriers encountered when accessing and using the online materials cause students to become frustrated and may interfere with their learning course content.

\* As professors continue to place course materials on the Internet, it is important that research be conducted to determine students' reactions to the required use of the Internet. Data need to be collected to determine the availability of student Internet access, the ease of use of the online materials, usefulness of the materials, difficulties encountered, and student willingness to take the course completely online.

## **Methodology**

Course requirements related to this study included accessing the course Web site to examine course materials, linking to related sites, downloading files, participating in an electronic mailing list, using e-mail, and completing feedback evaluation forms. In addition to using this information, field notes were recorded by my co-author after class sessions and conversations with the students.

## ***Participants***

Fifty graduate students enrolled in EDUC 541 during the fall 1998, winter 1998, and fall 1999 quarters were asked to participate in this study. Each was working on a master's degree in education, except for one student who, during the fall 1999 quarter, was taking the course in preparation for writing her doctoral dissertation. The students ranged in age from their early 20s to their early 50s. During the fall 1998 quarter, 16 graduate students enrolled in EDUC 541; 1 student dropped the class after the first night. Of the remaining 15 students, 9 were females, and 6 were males. The winter 1998 class began with 16 graduate students. Three dropped the course before completion. Nine of the remaining 13 students were females; 4 were males. Twenty-five students enrolled in the fall 1999 class. Four dropped the course before completion. Of the remaining 21 students (14 females and 7 males), four failed to return the required feedback forms.

### *Instruments*

The instruments we created to collect data included feedback forms (Feedback Form I and Feedback Form II), electronic mailing list postings, and e-mail messages. The feedback forms were housed on the University of Texas—Houston Medical School server and accessed by a link from the EDUC 541 home page. Responses were sent directly to my co-author. As the course professor, I did not view the responses until after I had grades submitted each quarter. Feedback Form I consisted of seven questions. The first five were multiple-choice questions regarding the type of Internet browser and computer hardware the students were using and on how well they were accessing the class Web site. The intent of these questions was to ensure that all students would be able to access the class materials and to collect information to help further refine the online presentation. Question six asked whether the students had taken any other courses requiring them to use the Internet. This information was used to evaluate how comfortable students were with accessing online course materials. Question seven asked the students to assess the Web site in terms of its user friendliness.

Feedback Form II contained the identical questions found on Form I plus an additional 12 questions. The additional questions were both multiple choice and open-ended. They were concerned with difficulties students may have encountered with the Web site, the usefulness of its content, and its ease of use. Form II also asked if students would consider taking another course requiring Web access, and if yes, would they take this course completely online. Students were then asked to elaborate on their responses. The version of Feedback Form II used during the fall 1999 quarter contained the original 19 questions plus one question concerning use of the class electronic mailing list and another seeking to determine how many classes they completed online rather than attending the corresponding class session.

Although e-mail assignments varied slightly each quarter as course requirements were adjusted, students were generally required to:

- \* e-mail the instructor after completing each feedback form,
- \* send comments after visiting links to American Psychological Association (APA) sites, and
- \* submit a progress report on their research proposal during the fifth week of class.

During the winter 1998 and fall 1999 quarters, students sent an e-mail message introducing themselves. Because I was unable to attend the winter 1998 quarter's first night of class, e-mail introductions took the place of the customary in-person greetings. The e-mail information was useful in getting to know the students, so it was included in the e-mail assignments for the fall 1999 quarter.

Because of problems establishing an electronic mailing list, one was not available during the fall 1998 quarter. A text-based electronic mailing list was established during the final three weeks of the winter 1998 quarter and postings were not required, so it was used by the students on

a very limited basis. During the fourth week of the fall 1999 quarter, an electronic mailing list accessible by Web browser was established.

### ***Procedure***

In the summer of 1998, an instructor Web page and a Web site for EDUC 541 were constructed. The materials were divided into several broad categories: course objectives, course requirements, grading scale, calendar, instructor information, and feedback forms. The first five categories contained information from the syllabus distributed in class. The requirements category included links to the university library and the ERIC database. The calendar category provided links to handouts used in class, class assignments, other related sites, and supplemental materials to facilitate the development of the research proposal. Additional materials were added each quarter.

On the first night of class, students were informed that they would be required to use the Internet to complete class assignments. Information was provided about obtaining a university e-mail account and the locations of computer labs with Internet access available on the campus. The course Web site was introduced using a laptop computer with Internet access and a projection system. Throughout the quarter, the laptop and projection system were used during class meetings to display the Web site and other course-related sites and to demonstrate features of word processing software that would be useful to students as they completed their research proposals.

### ***Data Analysis***

Questions one through seven on Feedback Forms I and II required multiple choice and “yes/no” responses. On Feedback Form II, questions 8 through 20 consisted of multiple choice and “yes/no” responses with spaces for comments. Percentages were used to analyze the responses to the multiple choice and “yes/no” responses. We independently used qualitative data analysis to study the written comments.

Comments on the feedback forms, e-mail messages, mailing list postings, field notes, and personal conversations provided multiple sources of data. These multiple data sources provided structural corroboration that enabled us to examine recurring themes and draw conclusions (Eisner, 1998). Additionally, *consensual validation* (Eisner), or agreement as a test of validity, was obtained as a result of our independent examination and interpretation. The data sources were studied specifically to determine patterns in student perceptions about the Web-based course materials. Constant comparative data analysis was used to compare the coded data within and across categories. As categories were compared and contrasted to determine similarities and distinctions, relationships were discovered (Leedy, 1997).

## **Results**

Responses from the feedback forms, e-mail messages, mailing list postings, field notes, and personal conversations all provided useful information about student responses to, reactions to, and problems with the required use of the Internet to complete course assignments.

### ***Results from Feedback Forms I and II***

Questions one and two dealt with the screen resolution and number of colors on the monitors the students were using to access the site. This information was used to ensure that students would be able to view the site. Twenty-seven percent of students reported that they did not know the resolution during the fall 1998 quarter, 46% reported this during the winter 1998 quarter, and 65% reported this during the fall 1999 quarter. Using this feedback, we subsequently determined that half of the students had low-end monitors with 640 x 480 resolutions.

Because of differences in Web browser operability and display features, questions three and four were aimed at determining what Web browsers were being used. Responses from students enrolled during the fall 1998

quarter indicated that 60% were using Internet Explorer (1995–2000) and 40% were using Navigator (now part of Communicator, 1994–2001). During the winter 1998 quarter, 31% reported using Internet Explorer and 69% were using either Navigator or Communicator. Responses from students enrolled in the fall 1999 quarter indicated that 12% (2 students) did not know which browser they were using, 47% used Internet Explorer and 41% used Navigator or Communicator. At no time did students report problems accessing the Web site attributable to the particular Web browser they were using.

Question five attempted to determine how students were accessing the Web site. During the fall 1998 quarter, most of the students (74%) accessed the Internet from their homes; during the winter 1998 quarter, most (69%) accessed it from the campus computer labs; and during the fall 1999 quarter, access was divided between the campus computer labs (35%) and home (53%). The majority of students were public school teachers. Few had Internet access at their schools, and only one had Internet access in her classroom. The one teacher with Internet access in her classroom also reported that it was frequently not working for weeks at a time.

Question six asked students if they had taken any other courses requiring them to use the Internet as a way of determining their comfort level with accessing online course materials. Responses during the fall 1998 quarter indicated that 40% of the students had accessed course materials from the Internet previously. This percentage increased to 54% during the winter 1998 quarter, but dropped to only 24% during the fall 1999 quarter.

Question seven asked students about the general ease of using the course Web site. Because revisions to the Web site were made periodically, it was important to both determine and maintain the Web site's user friendliness. Information regarding the Web site's user friendliness would also assist in determining whether or not students had developed adequate mental models to be able to locate information on the site

without becoming confused or disoriented. During the fall 1998 quarter, 100% of students reported that it was easy to use; 94% of students reported that it was easy to use in both the winter 1998 and fall 1999 quarters. This slight drop in reported user-friendliness may be due in part to a doubling of the amount of information presented online subsequent to the fall 1998 quarter (when all 10 EDUC 541 classes were available in an online format).

### ***Results from Feedback Form II***

Questions 8 through 20 appeared only on Feedback Form II. These questions were designed to solicit general information on using the Web site. During the fall 1999 quarter, three students required assistance accessing information on the Web site. Their difficulties may be attributable to the lack of familiarity with using the Internet to access course materials and, for some, computer use in general. It is worth noting that the fall 1999 quarter was the first in which all course materials were provided online.

Questions 9 and 10 concerned difficulties accessing the online course materials. Question 9 asked if students had encountered difficulties; question 10 asked them to elaborate. Students reported relatively few problems during the fall 1998 quarter. Of those who did report problems, 27% provided no additional information as to what the problems might have been. One student had difficulty configuring his home computer to enable him to use his university e-mail account. He called me one evening to chronicle his failed attempts to transmit the first e-mail assignment. Technical assistance was provided over the phone by my son; shortly thereafter, the student's first e-mail message was received.

During the winter 1998 quarter, difficulties in accessing the online materials were reported by 85% of the students. Four students provided additional information about difficulties. Three students indicated that the difficulties were because of their own lack of experience using a computer and accessing the Internet. One student commented "I was so

unfamiliar with the online process so I had some problems at first.” In addition to lack of experience using computers, one of these students used computers in five different locations to complete the assignments.

Feedback received from the fall 1999 quarter indicated that 65% had difficulties accessing materials. Nine students elaborated on the difficulties that they encountered. Unlike the students in the previous quarter, none of these students attributed their problems to a lack of experience. Eight students indicated that the problems were related to links that would not work and difficulty accessing the education server to get to the Web site. As the Web site continued to expand, problems with broken links increased. However, these were fixed as soon as students reported them.

Questions 11 and 13 solicited suggestions for making the Web site more user friendly. Comments from students in all three quarters could be grouped into three main categories:.. comments regarding additions or changes to the Web site, comments dealing with links, and comments stating that they had no changes to recommend. Recommended additions and changes included:

1. adding study guides,
2. enlarging the font size,
3. providing a troubleshooting handout for when problems were encountered, and
4. including more learning activities.

Three comments were made by students suggested that a particular link should be added when, in fact, the link was already present. For example, one student requested, “Access to the library,” a link that was available under course resources. Another student commented, “there should be a place on the Web site that states course requirements.” This link was available in the menu bar at the bottom of each page. Another student stated, “Once you have chosen a link ... make it easy to get back

to the home page.” Again, the menu bar at the bottom of each page had a link to the course home page. Nine students indicated that the site was very user friendly, and that they could not think of any changes that needed to be made. These comments included: “The web site is fairly easy to use now. I cannot think of anything else to do”; “If I could use it anyone could”; and “I think the Web site is more user friendly than the other few I have experience with.”

Question 12 asked about the usefulness of the electronic mailing list. A majority of the students found the mailing list postings extremely helpful (24%) or helpful (33%). Some students who did not find the mailing list helpful may not have had easy access to a computer or may not have checked their e-mail on a regular basis. Also, the information posted on the mailing list may not have been relevant to their research proposal and, hence, not useful to them.

Question 14 addressed the concern that students continue to regard the Web site as user friendly even as professors place additional materials online. Overall, students indicated that having course materials available on the Web site made the course easier. There was, of course, no way to determine whether students who elected not to use the Web site did so because of difficulties accessing the course materials.

Question 16 asked students to identify the most useful part of the Web site. These responses were placed in the following categories: research proposal, calendar and class assignments, e-mail, and other. A major portion of the class was devoted to the development and writing of a research proposal. Therefore, the site included several pages regarding the format of the proposal as well as guides on how to write various sections of the proposal. The majority of responses to question 16 related to usefulness of the Web site when writing the research proposal. They included such comments as: “The most useful part of the web site was the part on research papers”; “The information given as examples in writing research papers”; and “Having a nice course reference to

complete my research proposal without looking through a stack of paper instructions.”

The course calendar included information on the chapters to be discussed at each class meeting, brief notes on the chapters, activities to enhance understanding of the material, useful Internet links, and assignments. To some students, this was the most useful part of the Web site. Their responses contained comments such as: “Clicking on assignments to get more detail and also having the assignments handy in case of misplacing the syllabus;” “Easy to keep up with the assignments and go back over the links before and after class;” and “The most useful part of the web site was the course calendar with all the details.”

Because many of the students were on campus only on class night, question 16 provided an opportunity to comment on the usefulness of being able to reach me by e-mail. This was reflected in comments such as: “Also it was good to know that I could always e-mail my Professor and get a timely response.” Other comments included, “That the class notes were easily copied” and “Knowing other students had the same difficulties that I did.”

Question 17 asked students to think about the least useful part of the Web site. Most said they could not think of any part of the Web site that was not useful. Three students commented on the inconvenience of having to arrive early for class in order to complete Internet assignments using campus computers. One commented about the unreliability of Internet access at the local public school, which meant that the class materials were often not readily available.

Question 18 addressed the issue of whether students would be inclined to take another course requiring access to the Web based on their experience accessing online material for EDUC 541. A majority of the students in all three quarters expressed a willingness to undertake such a course. Only during the fall 1999 quarter did students have the option of taking five courses completely online rather than attending class. Three

students completed one class online. One student completed five classes online. This student was a teacher who lived near the university. She commented that being able to take the classes online enabled her to be at home with her small children in the evening. She completed class assignments and activities late at night when her children were in bed. This student was highly motivated and did a very thorough job of completing her assignments.

It was anticipated that after a full day of teaching, students would prefer to take the course online rather than drive as long as one-and-a-half hours each way to attend class. During class discussions and informal conversations, however, students indicated that the course was too difficult to take online. They indicated that they understood the material better when they participated directly in group activities during class. Because the course required library research, students said they came to campus to conduct their library research on the same nights they were attending class.

### ***Results from E-mail Messages and Mailing List Postings***

E-mail messages and mailing list postings were examined to:

- \* determine whether the students were using their own e-mail accounts,
- \* determine content for themes, and
- \* corroborate responses to the open-ended feedback form questions.

Despite an almost identical number of enrolled students, each quarter showed an increase in the number of e-mail messages received from the students. During the fall 1998 quarter, a total of 73 messages were received. This number increased to 109 during the winter 1998 quarter and then doubled to 220 during the fall 1999 quarter. This increase may be attributed to the fact that, as more materials were placed online and students accessed these materials, they became more familiar with using

the Internet for completing coursework. This increased familiarity may have encouraged students to learn to use e-mail for a variety of purposes. An initial e-mail from one student stated “This is actually the first time I ever used my E-Mail since I have enrolled here ... (Don’t laugh) I do hope to become more computer literate while in this class.” Another student said, “ I am actually glad for all of this; before I took this class I bought this computer and the only thing I had done was buy some shoes over the Internet.”

The growing number of e-mail messages generated by students is only one indication of their increasing familiarity with using e-mail; message content is another. During the fall 1998 quarter, only one student e-mailed a draft of his proposal abstract as part of an e-mail message. Not confident that the attachment would be received, he also attached a copy to my office door. During the winter 1998 quarter, several students attached rough drafts of portions of their proposal to their e-mail messages. During the fall 1999 quarter, students attached drafts of portions of their proposals as well as drafts of their entire proposals. A comparison of e-mail messages over the three quarters indicated a growing expertise and increased level of comfort among students regarding e-mail use.

Problems with hardware and software were addressed in some of the e-mail messages. Students were resourceful in finding solutions to their problems. One student wrote: “Do you have a printer for an imac? I don’t have all the connectors for my printer yet and my powerbook has die[d] on me.” He brought the file to campus on a disk and printed it out in my office. Another solved a printer problem by e-mailing the assignment to me with this message “Since my printer never works, I thought I’d just email my summary of Simpson and Nist.” One novice computer user sent this message: “I have completed the feedback form with a little help from the lab monitor ... OK maybe a lot of help ... See you Thursday night.”

Students frequently used an e-mail account belonging to another person, such as mother, father, neighbor, professor, friend, and fiancée. They cited not having their own account, failing at using their own university e-mail account or having problems with the school district network as reasons for using another person's account. Students were reminded to put 541 (the course number) in the subject line and to sign their own name when using someone else's account. For example, one student wrote, "Hello, I am emailing from my fiancée's computer since all my attempts at emailing are collapsing around me and I can't use either of my accounts now." Another student e-mailed from his neighbor's account: "The computer problems at our school continue. The technician came out today and said that there is no hope for our system. It may be weeks before we have anything in our lab. A neighbor allowed me to use their computer to visit the SPSS site."

One e-mail assignment required students to examine two sites containing information on the APA guidelines, because they would use these guidelines in writing their research proposal. One student wrote

I just figured the APA site out. It seems like it would be pretty helpful. I especially like the section under APA on references. I have a hard time with references and I hate having to go back and flip through the book trying to figure out which to use. This way, I can just go here and the different types are clear. I am going back now to search on that APA journals section. I just wanted to let you know that I found it.

This interesting response to the format of one of the sites was received: "I prefer the online form to the APA manual because it is set up in a question form (just like I ask myself)."

Another e-mail assignment involved writing a progress report on their research proposals, which, as expected, elicited a range of responses. One student wrote: “My research proposal is coming along. I still have bugs to work out and need to finish the introduction.” Another student whose proposal was not going well remained optimistic: “My Proposal is coming very slowly. I pray that a burst of energy and knowledge will soon surface. Thanks for being a good listener. I’ll see you on Thursday.” Student attempts at using e-mail and the Web site were supported by e-mail reassurances such as, “Trust me you are not the only first time email user in the class.” Reassuring e-mail messages, access to the Internet, providing students with access to the printer in my office, and demonstrating the Web site in class all served to help lessen student frustrations over using the Internet to complete their assignments.

Shortly after student e-mail addresses were entered into the electronic mailing list, one student mistakenly posted one of her assignments to the entire mailing list. She then posted a second message to apologize for the error. I responded by posting a message thanking the student “for being the first brave soul to try out the listserv” and then took this opportunity to remind everyone to focus on getting their thoughts across rather than worry about spelling and grammatical errors. The message also noted that a mini-lesson on using an electronic mailing list would be included in the next class session.

Students were asked to post questions about class assignments and their research proposals to the mailing list. I noted that students often had the same questions and that classmates may respond faster than the professor. Questions that were e-mailed to me were responded to on the mailing list for everyone’s benefit. One student e-mailed this question about a class assignment: “Please advise if the critiques are to be single-spaced or double-spaced.” As a means of reminding students to use the mailing list to post questions to the entire class, I posted the question and the reply on the mailing list with this note, “This is an example of a question others of you may have, but have not gotten around to asking yet.”

Reminders about class assignments, new additions to the Web pages, and information on the midterm exam were all posted on the mailing list. After reading several rough drafts of the research proposals, a checklist of common errors to be avoided in the final drafts was added to the Web site. The location of this checklist was posted on the listserv. Another posting reminded the students of the coming midterm and where to find a study guide.

## Conclusions

As anticipated, the students had a variety of technical skill levels and prior experiences with the Internet. At the beginning of one quarter, two students were turning in assignments typed on their elementary school's typewriter. By the end of the quarter, one of these students had purchased a computer, signed up with an Internet provider, and enrolled in a computer course for the following quarter. The other student was able to complete assignments using on-campus computers and those belonging to friends. Among the more experienced computer users were two students who had their own Web sites. One of these students provided useful scripting assistance as the course Web site was modified based on students' comments and recommendations. Students who lacked computer skills developed them over the course of the quarter, and students with computer skills willingly shared their expertise with others in the class and the professor.

Students encountered the same barriers as mentioned in other research studies (Owston, 1997; Ross, 1996), such as configuring software, servers being down, and lack of access to computers. As one student wrote, "I really enjoyed your class and found the web site very useful (when I had a computer that worked — ha, ha!)" Some students met in the campus computer labs and worked together to submit e-mail assignments and conduct Internet research. Support from other students in the class, campus computer technicians, computer lab monitors, neighbors, friends, and the professor enabled students to overcome these

barriers and successfully complete the course using Web-based materials, e-mail, and the electronic mailing list.

Although students indicated that the site was easy to navigate they did have suggestions for improvement, which were implemented throughout the study. Extensive use of the Web site during class facilitated most students' understanding of how to find and access the available materials. Students found that having the course materials online facilitated understanding the course content and assisted them as they completed their research proposals. However, students thought the course was too difficult to take completely online and indicated that they needed face-to-face contact with the instructor to successfully complete it. One measure of the success of placing the course materials online is that students in the class talked with other graduate students not enrolled in the class about how useful the materials, links, and activities were to their successfully completing the research proposal. As these other graduate students enrolled in the research course and discovered that a different professor was now teaching the course who did not use Web-based materials, they made personal appeals to have the course Web site activated once again.

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