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Students’ Acceptance of Web-Based Course Offerings:  
An Empirical Assessment

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Introduction
During the fall 1997 semester, two sections of a graduate level electronic commerce course were offered simultaneously using two delivery modes at a campus of a major state university. One section was offered using the traditional in-class delivery mode and the other was offered as a fully on-line section delivered via the Internet. The on-line section of the course was offered using an interactive courseware made available via the World Wide Web. The courseware contained lecture notes, PowerPoint transparencies, lecture outlines, on-line papers and cases, links to various electronic commerce related sites, a self-grading randomly generated on-line quizzes, newsgroups and conferencing tools for class discussions.

It was required that all students submit their assignments electronically and/or post them on the Web. With the exception of the final exam, no paper was used in the class. The Internet was used for communication among students and between faculty and students. With the exception of the newsgroup, which was used in the on-line section, both sections of the course had access to the interactive courseware.

An identical on-line survey was conducted at the beginning (prior) and at the end (posterior) of the semester in both sections of the course. The purpose of the survey was to assess the students’ overall satisfaction with various technologies used in the course and to assess the students’ perception of the impact these technologies may have on student motivation and learning. We were also interested in finding if students’ opinion about the use of these technologies changed in any way after they completed the course.

Overall, students’ acceptance of the Internet and the Web for course delivery was positive. Statistical analysis of the survey data reveals that the proportion of “Strongly Agree” or “Agree” responses on most assertions are significantly greater than 75% in both prior and posterior surveys. The proportion of agreements on all of the assertions, except the following two, was not significantly different between prior and posterior surveys. The proportion of agreement on assertion five which had to do with better class performance due to the posting of the assignments on the Web, at the end of class was significantly higher than the proportion of agreement at the beginning of the class. At the prior survey, the proportion of agreement on assertion four, which had to do with the use of e-mail to enhance and facilitate communications among students and faculty, was not significantly different between the traditional in-class and the on-line sections. But in the posterior survey, for the traditional group, it was significantly higher than the on-line group. Other findings are reviewed in the data analysis section of the paper.

Background
Teaching and learning based on technologies such as videotapes, television, and compressed video have now been around for a number of years. Students’ acceptance of these technologies, as well as their impact on student learning, has been somewhat mixed. A major problem with some of these technologies has been the lack of interactivity. More recently, promising technologies have been used to enhance teaching and learning. Desktop Video Conferencing (DVC) was reported (Wheeler, et al., 1995; Alavi, et al., 1995) to have been effective in some aspects of collaborative telelearning. Group Decision Support Systems (GDSS) have also been indicated to improve learning (Alavi, 1994). "Virtual classrooms" and "hypermedia virtual classrooms" (Rana, et al., 1996) have also been indicated to be effective in supporting asynchronous learning (Hiltz, 1994, 1995).

We are now at the frontier of the use of two technologies, the Internet and the World Wide Web, for teaching and learning. Some believe that these technologies are going to have a major impact on improving teaching and learning in areas such as student performance, access, communication, richness, collaboration, active and life long learning, effectiveness, and efficiency. As Neil Rudenstine, president of Harvard University recently stated, "The Internet has distinctive powers to complement, reinforce, and enhance some of our most effective traditional approaches to university teaching and learning" (Rudenstine, 1997).

Overall student performance could potentially be improved by replacing or complementing regular in-class instruction with the use of the Web for course delivery, on-line discussion group and conferencing tools, and e-mail; “...technology can enable
the effective application of constructive, cognitive, collaborative, and sociocultural models of learning.‘ (Leidner and Jarvenpaa, 1995). A recent study (Mccollum, 1997) indicates that this improvement can be achieved. Interactive and self-grading assignments can provide instant feedback to students and faculty. The Web could potentially allow better access to course resources, particularly in the case of distance learning. The use of e-mail and conferencing tools could facilitate communication among students and between students and faculty. The multi-media nature of the Web allows integration of text, audio, and video to enhance presentation richness and effectiveness. Several studies (Alavi, et al., 1995; Brown and Palincsar, 1989; Vygotsky, 1978) indicate that learning is a group process, and that group learning is more effective than individual learning. As such, the use of group support systems in courses allows on-line collaboration among students and faculty, which in turn has potential to enhance the teaching and learning processes. Interactive access to courseware facilitates active learning. The importance of active learning compared to more traditional passive learning has been emphasized in a number of studies (Alavi, 1994; Bok, 1986; Boyer, 1987). The Internet and the Web facilitate life long learning, which is a major purpose of education. Finally, the Internet and the Web can be used to efficiently disseminate information and knowledge.

As technology-based course delivery increases and faculty and student interest in these areas grows, careful analysis of the acceptance and impact of various technologies in connection with different learning models needs to be conducted. This is essential as Leidner and Jarvenpaa well articulate that otherwise "...such classrooms may do little but speed up ineffective processes and methods of teaching.‘ By the same token, teaching and learning processes need to be adjusted to the use of these new technologies in order to achieve the objective of improving teaching and learning.

The purpose of this paper is to report on insights gained in using the Internet and the Web for course delivery, to analyze and assess students' acceptance of the technologies used for course delivery, and to assess the students' perception of the capacity of these technologies to enhance teaching and learning.

Methodology

The instrument used was an on-line survey. It was conducted at the beginning (prior) and at the end (posterior) of the semester in both sections of the course. The survey consisted of three parts. The first part was related to the respondents' background information and demographics. The second part included questions related to the respondents' acceptance, attitude, and assessment of the use of the Internet and the Web to improve teaching and learning in general, and in the electronic commerce course in particular. The third part contained questions related to the comparison of the Internet and the Web with other technologies such as CD-ROM, in terms of ease of use, access time, convenience, and access to up-to-date information. The questionnaire consisted of nineteen close-ended questions. A five level Likert scale was used to determine the level of agreements with the stated assertions.

The subjects in the study were the forty-eight students who took the course. There were twenty-one students in the traditional in-class and twenty-seven students in the on-line section of the course. A total of forty-two (twenty from the in-class and twenty-two from the on-line section) responses were received from the survey conducted at the beginning of the semester, yielding a response rate of 87.5%. A total of thirty-eight (seventeen from the in-class and twenty-one from the on-line section) responses were received from the survey conducted at the end of the semester, yielding a response rate of 79.2%.

There were fourteen female (37%) and twenty-four male (63%) students who responded to the surveys. Sixty-eight percent of the respondents were 35 years of age or younger, and fifty percent of them were full-time students.

Data Analysis and Findings

Data analysis was done to determine the level of respondents' agreement and perception with the following specific assertions:
A1) In general, information technology can improve the teaching/learning processes;
A2) The growth of the Internet/Web is a positive development towards improving the teaching/learning processes;
A3) The use of the Internet/Web in this course improved the students' learning processes;
A4) The use of e-mail in this course greatly enhanced and facilitated communications among students and faculty;
A5) The students performed better in their assignments in this class because they were communicating with their peers (by posting their assignments on the Web) and not the faculty alone;
A6) The Internet/Web will require me to change my educational/learning process; and
A7) Incorporating the Internet/Web into the teaching/learning process is not more trouble than it is worth.

The overall survey responses were analyzed for the above assertions. Table 1 shows the findings. The proportion of respondents who strongly agreed or agreed with all the assertions, were significantly higher than those who strongly disagreed or disagreed for the prior and posterior surveys were. In fact, the proportion of agreement of respondents for most of the assertions, except assertions A5, A6, and A7 of the prior and assertion A5 of the posterior surveys, were significantly higher than 75%.

The data was analyzed to determine if significant differences existed for the level of agreement of students about the assertions based on delivery mode. Table 2 shows the findings. Between the traditional in-class and the on-line section, there was no significant difference on the proportion of agreement for all assertions except assertions A3 and A4 on the posterior responses. On the posterior responses, the proportion of traditional in-class group who agreed that the use of the Internet/Web
in the course improved the students learning process was significantly higher (P-value 0.026) than the on-line group. On the posterior responses, the proportion of the traditional in-class group who agreed the use of e-mail in the course greatly enhanced and facilitated communications among students and faculty was significantly higher (P-value 0.010) than the on-line group.

The data was analyzed to determine if significant differences existed for the level of agreement of students about the assertions based on gender. There were no significant differences on the proportion of agreements for all assertions, except assertion A4 (Table 3). On the posterior responses, the proportion of the male students who agreed that the use of e-mail greatly enhanced and facilitated communications among students and faculty in the course, was significantly higher (P-value 0.045) than the proportion of female students.

The data was analyzed comparing full-time and part-time students to determine if significant differences existed for the level of agreement of students with the stated assertions. Comparing prior and posterior responses, significant differences were found for assertions A3, A4, and A5 (Table 4). On the posterior responses, the proportion of the full-time students who agreed that the use of the Internet/Web in the course improved their learning process was significantly higher (P-value 0.024) than the proportion of the part-time students. The proportion of the full-time students who agreed that the use of e-mail greatly enhanced and facilitated communications among students and faculty in the course, was significantly higher (P-value 0.009) than the proportion of the part-time students. The proportion of the full-time students who agreed that the students performed better in their assignments in the class because they were communicating with their peers by posting their assignments on the Web, was significantly higher (P-value 0.026) than the proportion of the part-time students.

For the prior and posterior surveys, the proportions of agreements with all assertions were not significantly different among the age groups.

**Summary and Conclusions**

Statistical analysis of the survey data reveals that the proportion of “Strongly Agree” or “Agree” responses on most assertions are significantly greater than 75% in both prior and posterior surveys. This could be interpreted as a high degree of acceptance of Web-based course offering by students. Note that the sample may be somewhat biased. The students signed up for an electronic commerce class, an elective course for all of them. The proportion of agreements on all of the assertions, except assertion five, was not significantly different between prior and posterior surveys. This may indicate that the subjects already had a positive opinion about the use of the Web for course delivery. The fact that there was no significant difference between the prior and posterior surveys for almost all the questions may further indicate acceptance of the Web for course delivery. The proportion of agreement on assertion five which had to do with better class performance due to the posting of the assignments on the Web, at the end of the class was significantly higher than the proportion of agreement at the beginning of the class. This finding may support the notion that indeed students may do a better job in doing the class assignments if they are required to post their responses on the Web rather than simply sending it to the instructor. At the prior survey, the proportion of agreement on assertion six, which had to do with the use of e-mail to enhance and facilitate communications among students and faculty, was not significantly different between the traditional in-class and the on-line sections. But in the posterior survey, for the traditional group it was significantly higher than the on-line group. This finding may emphasize the value of using e-mail to improve communications between students and faculty. Future studies could include a group of students who primarily have negative opinion about the use of the Internet and the Web for course delivery. This group could be taught using on-line delivery mode and determine the impact of Web-based course delivery on their learning processes. Hopefully, more studies in this area will help to shed some light on the subject of the acceptance and impact of the Internet and the Web on course delivery.

Tables and references available from first author (hadidi.rassule@uis.edu).