Learning Outcomes in Web Based Synchronous and Asynchronous Learning Environments - A Comparative Analysis

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ABSTRACT

As the web-based synchronous and asynchronous learning environments are used by many schools to deliver courses, the need for the systematic impact evaluation of these new learning environments of learning outcomes becomes more significant. This paper presents an analysis of synchronous and asynchronous learning based instructions that were used for graduate courses for both on-campus (full time) and off-campus students (distance learning). The paper presents preliminary findings about learning outcomes of students in these information systems courses. The study although is limited to one schools but findings could contribute significantly to generalizability to other institutions.

BACKGROUND

In the educational environment of the 21st century, it is necessary to create educational programs that are student-centered rather than classroom or university centered (Jackson, 2000). While research has demonstrated that many students respond favorably to web-based innovations and such techniques can be highly effective (Shea and Boser, 2001; Zhao, 1999). Schools offer many different types of web-based synchronous learning environment. The common features of web-based synchronous (real-time) are browser-based, IP-based two way audio (usually half duplex), collaborative application sharing, whiteboard and synchronized web browsers. Currently, offering courses through asynchronous mode such as blackboard or web environment has been increasing in schools over the years. Many faculty members post their lectures on the web and students download the material to supplement their lectures and enhance their learning. Faculty members use newsgroups and discussion boards for students' interactions apart from conventional e-mail interactions.

Online technologies, specifically web-based applications, are increasingly being utilized as a delivery mechanism in higher education. It is the capability of the web to facilitate communication and collaboration between/among students and instructors that could overcome the increasing barriers to effective teaching and learning in higher education (Lockyer, Patterson & Harper, 2001). Web-based programs have been growing in popularity and there is every indication that the trend will continue for the foreseeable future (Holstein, 1997). Many schools have started offering web-based programs partially or fully online at the university and college level (Awalt, 1998; Dziuban et al. 1999). It encompasses a variety of media including videoconferencing, web-based training, satellite broadcast, streaming media, and audio conferencing in asynchronous as well as synchronous mode (Becker & Dwyer 1994; Mioduse et al. 2000). In asynchronous e-learning training takes place in different time frames and trainees access information at their convenience. Some examples of asynchronous training include self-paced computer-based training (CBT), web-based training (WBT), bulletin boards, and email. On the other hand, synchronous distance learning takes place for all students at the same time and information is accessed instantly. This form of distance learning provides more interactivity. Examples of synchronous e-learning include

video teleconferencing, whiteboard, Internet conferencing, and chat rooms. All of these technologies extend learning beyond traditional classrooms to encompass homes, museums, libraries, and workplaces anytime, anyplace, for anyone (Boroni et al. 1998; McManus, 1996).

Few studies have been conducted for assessing online learning (Dziuban et al. 1999). However, the research literature on the use of assessing web-based programs is short of analytical as well as qualitative studies (Burge, 1994; Chalk, 1999; Chalk, 2000; Gunawardena, 1995). Also, there have not been many studies conducted to examine how effective the current web-based, asynchronous and synchronous learning programs are. Our study used the data on social interaction that occurs during the course or project, and the effects of the experience on individuals in web-based learning environment. The study also examined instructional delivery modes, interaction and speed of course development/ adaptation. The study although is limited to one schools but findings could contribute significantly to establish new standards for student-centered learning oriented framework, a major conceptual advancement in student learning, that can serve a foundation for a revolutionary graduate learning experience.

METHODOLOGY ADOPTED

In this study, we investigated the learning outcomes delivered by synchronous learning and asynchronous learning methods. The methodology adopted was based on students' involvement, interactions and participations in courses, and their performance in graduate programs. Detailed structured as well as non-structured interviews were conducted involving IS students. The data was collected through various methods such as observations, structured questionnaires, interviews and pre and post test results of students. Furthermore, informants validated each interview transcript and interpretation. The evaluation is done using quantitative as well as qualitative techniques. The data was collected from multiple classes totaling more than 500 students.

DATA ANALYSIS AND FINDINGS

The data analysis and findings in detail would be presented in the conference since some work is still in progress. A comparative analysis of four different web-based instructional models would be presented. However, few broad highlights of findings on web-based instructions in general found are;

Positive Attitude

Students were observed to have a highly positive attitude toward web-enhanced instruction. The web provides a better environment than the traditional classroom does. As a result, even students who are separated by time and place will be better off than students sitting in lectures given by professors through teleconferencing. Asynchronous learning provides convenience and effective communication. The delays among students' discussions provided group members the opportunity to reflect and think/rethink about a problem and examine it thoroughly than is provided in a synchronous environment.

The chat room was the least used web component, possibly because it required the students to log on at specific times (Sanders et al. 2001). Due to convenience factor, students preferred asynchronous environment than synchronous environment.

Motivation/Self Responsibility

The study found that students fared poor in taking self responsibility and found hard to motivate them in a asynchronous environment than synchronous environment. Students lacked in time management, in control of their studies and maintain an image of self-worth and self-efficacy more in asynchronous environment than synchronous environment.

Learning Outcomes

There is no significant difference in performance of students using asynchronous or synchronous environment. There is no significant difference in performance among students who used deep learning strategy in either web format or lecture format. Students with similar learning strategy and motivation performed equally well irrespective of web or lecture format (Sankaran, & Bui, 2001). However, technology difficulty experienced in asynchronous environment for participation did affect students' learning outcomes. The poor internet access also was experienced an obstruction for the real-time communication.

Effectiveness

Findings from this study suggest that students showed preference to use the web for the posting of course syllabi, grades, quizzes, questions, and materials that encourage student-to-student and student-to-faculty interaction. There was mixed opinion among students about posting questions through web bulletin boards and chatting through the web. Those students who did post regularly to the bulletin board were better able to answer questions on tests, showed a higher level of critical thinking in class assignments, and were more likely to download the critical-thinking questions than those who did not participate (Sorg et al. 1999).

Achievement

Research study indicates that the achievement and satisfaction of students in asynchronous learning and synchronous learning environment is not significantly different than the achievement and satisfaction of students in traditional classrooms. One major difference across these two learning environment was that students' experiences in shaping their learning behaviors were found to be different (Poustie, 2001). For example, students in asynchronous learning environment found more isolation and less involved in team projects. Also, asynchronous learning based students missed advising from instructors' environment that affected their learning experience.

Critical Thinking

The web component primarily allowed asynchronous learning outside the classroom and increased student-to-student interaction. Students could use the web site, access chapter outlines, grades, critical-thinking and problem-solving questions, self-grading quizzes, and the course syllabus. It was found that the web component of asynchronous environment had a highly positive effect on student learning, problem-solving skills, and critical-thinking skills (Sanders et al. 2001).

Participation and Collaboration

The online discussions and participation among the instructors and students and between students was found to be poor in both but comparatively poorer in asynchronous learning environment. Although, few instructors promoted discussions and participation by provoking students on number of occasions but students were more interested to hear from the instructors and did not actively participate in effective discussions. The course lacked to increase learner-learner interactions that include group assignments, group projects, and online group debates. Communication that took place in online environments was often found to be lacking in richness as compared to traditional face-to-face classrooms.

CONCLUSION

The study indicates that students are ready for the web technology for learning environment. However, students prefer asynchronous over synchronous learning environment, since they do not have to be online at a specific time. Students showed more concern about their convenience. Their learning is more effective in asynchronous environment because they feel they have more time to think and rethink carefully about assignments. In synchronous learning environment students have to response to given questions. Further, study indicates that students have positive attitude toward synchronous learning environment although students are still not friendly to using teleconferencing, whiteboard and chat-room.

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