# THE IMPACT ON LEARNING OF AN ASYNCHRONOUS ACTIVE LEARNING COURSE FORMAT

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**ABSTRACT**

Among the many differences between asynchronous interactions and traditional classroom communication, the most critical differences involve those that may affect a student's ability to learn. The efficacy of courses in facilitating instruction and learning is a key concern of all educators involved in or contemplating conducting such courses. This paper explores the impact on learning in asynchronous internet courses compared to learning in a traditional classroom setting. Specifically, the study examines student perceptions of the effectiveness of an active-learning, asynchronous internet course relative to that of a traditional classroom-based course. Students were asked to compare effectiveness on a variety of dimensions. The study yields results consistent with previous research related to learning outcomes along several measures, particularly with regard to students' positive attitudes about their learning in an online computer course. However, the findings here offer new evidence that learning can also be enhanced with an active learning format in an online course.

**KEY WORDS**

Internet, Accounting, Learning Effectiveness, Active learning

## I. INTRODUCTION

More sophisticated and affordable technology has motivated many universities and colleges to offer a variety of alternatives to traditional classroom instruction. These alternatives include distance education courses via television at remote classroom sites and both synchronous and asynchronous internet courses. The least traditional of these alternatives utilizes asynchronous communication by which communication is mediated by technology and is not dependent on teachers and students being present in the same location at the same time. By using asynchronous communication, students can work at their own pace and at locations they are able to control [1], [2]. Many of the traditional classroom activities can be

recreated technologically through computer conferencing, electronic mail, bulletin boards, and the internet. In fact, the use of the internet to deliver distance education has grown faster than any other instructional technology [3].

Still another dimension of mediation through technology is the scale of activity versus passivity. This is the extent to which the student is expected to actively participate in the learning process and is a design choice of both classroom and internet courses. We can think of a pure lecture/test environment as being on the extremely passive end of the continuum and, say, an independent study course requiring wholly self-directed research culminating in a term project as being on the opposite end of the continuum. Of course, some combination of passivity/activity is most common. Ideally, the design choice is motivated by the nature of the course and its learning objectives.

There are many differences between asynchronous interactions and traditional classroom communication, but the most critical differences involve those that can affect a student's capacity to learn [4]. In a regular college course there is unity of space, time, and sequential actions. A distance education class lacks all of these [2]. Many educators worry that without classroom discussion and student interaction, instructors cannot provide real guidance and feedback [5], [2]. Questions related to the effectiveness of technology-based courses in facilitating instructional tasks pose significant concerns for all educators involved in or contemplating conducting such courses [6].

## II. MOTIVATION

Answers to these questions should depend on the extent to which technology is used to mediate classroom instruction. In an internet-based, paperless course, the student must be an active learner. In contrast with the passive learner who sits in a classroom and receives information from a lecturer or discussion group (that is, in oral communication), the active learner must aggressively seek and assimilate packets of knowledge to achieve the core competencies identified in the course. The purpose of this study is to explore the impact on learning of asynchronous internet courses as compared to traditional classroom learning. Specifically, the study examines student perceptions of the effectiveness of an active-learning, asynchronous internet course relative to that of a traditional classroom-based course. Students are asked to compare effectiveness on a variety of dimensions.

Some disciplines, history for instance, lend themselves well (at least at some levels) to a passive learning environment. Others, like accounting, offer a ripe opportunity for active learning, particularly learning through the internet. Accounting exists to provide information that can be used to make business decisions. In a real sense, accounting is synonymous with information access and dissemination. A major force in global information access and dissemination is the internet, making the internet an ideal medium around which to construct an accounting course. What's more, unlike the "facts" in history, accounting operates in an ever-changing environment. In fact, the information that accounting utilizes is itself changing at a dizzying rate. In the next 10 years, the sum total of information will double every two weeks. As a result, accountants—and accounting students—must lessen their tendency to rely on learning existing information and move more toward learning how and where to locate and assimilate new information. As described below, the courses on which this study is based are master's-level accounting courses embodying the active learning concept, designed to encourage and teach students to actively seek out information needed to meet course objectives.

## III. DISTANCE EDUCATION RESEARCH

Recent research involving distance education has shifted from a focus on technology itself to its effects on learners. More specifically, this recent research can be classified generally into four categories: interaction, active learning, student perceptions, and learning outcomes.

## A. Interaction

One line of research has centered on the value of interaction to learning. Many educators feel that interaction is a necessary component of learning. According to Jaffe, "Learning is an essentially social process that requires interaction for the purpose of expression, validation, and the development of the self as a knowledgeable learner" [5]. Following this reasoning, a valid question is whether or not interaction can be effectively achieved in a distance education course. One line of research into distance education courses suggests that faculty responsiveness is one of the most important elements of a successful achievement of meaningful interaction in a distance education course [5], [7], [8], [1]. Accordingly, students must be connected to some medium that allows for feedback and encouragement so that interest, attentiveness, and commitment are maintained [5].

Research suggests that courses should be designed so that, regardless of the medium used, regular interaction occurs between teacher and students, students and students, and students and their learning environment [5], [1]. This often involves intensive time and preparation by the instructor to provide a learning environment that allows for sufficient opportunity for appropriate interactions [9]. Soo shows that, although distance educators rated real-time interaction lowest, learner-centered learning rated highest [10]. This indicates that the teacher has an important role in online computer assisted learning. Technology utilizing bulletin boards, e-mail, asynchronous conferencing, and listservs enables interaction to occur. Some feel this technology must be used to its capacity to compensate for the lack of human interaction and class discussion [5], [9].

## B. Active Learning

Another line of research has focused on the "active learning" aspect of many distance learning courses. A major purpose of teaching in post-secondary education is to assist students in moving from a position of dependency on the instructor to one of self-reliance in learning [8], [1]. Rowntree believes that students must do more than simply receive information: "They also must engage and participate in activities and tasks that enhance understanding" [8]. One important way to assist students in this transition is by asking them to demonstrate an understanding of the concepts involved through writing [5]. The asynchronous course usually requires more conceptual writing and literacy skills than the traditional classroom course [7], [2]. A study by Larison reports that 95% of students surveyed felt that the asynchronous course required a higher amount of work than the traditional lecture course, and 83% of the students felt the asynchronous course required an equal or higher amount of writing [7].

In a traditional classroom, low levels of class participation are sometimes unavoidable and accepted. This can occur because a few students carry the participation burden of the entire class. Often, the same group of students fields the questions while the remaining students depend on those students to respond. On the other hand, in the asynchronous course, a single student does not relieve other students from the responsibility to participate [5]. Students who are not sufficiently self-disciplined and motivated, or who are not prepared for the heavy workload, may have more difficulty with this type of course [2].

## C. Student Perceptions

One line of research suggests that student reactions to online learning are influenced by a variety of audience characteristics such as attitudes toward technology maturity, and other demographic characteristics. For instance, it has been suggested that students with a more thorough understanding of online computer communication have more positive attitudes toward the distance-learning course [11]. Wegner finds that students who perceive that the online course is information-rich and adequate to the instructional task at hand make greater use of the learning environment [6]. In Wegner's study, 80% of the survey items relating to instructional delivery and learning opportunities receive higher ratings by

students taking an online course than students taking the same class in a traditional classroom setting. Lack of contact with the instructor is the chief concern mentioned by 50% of the online course students.

Edelson finds that the most difficult hurdles to overcome in an online course involve the anxiety caused by "the disunities of time, space and action, and the numerical superiority of student comments to those of the instructor" [2]. Students who are cognitively mature and relatively confident in their ability to express themselves have the least anxiety concerning the online course [7]. The study-participant graduate students perceive that online interaction and student performance in a computer-conferencing course are superior to the traditional classroom in a study by Larison [7]. Student success in an internet-based course requires careful attention to the student audience as well as careful selection of instructional design [4].

## D. Learning Outcomes

A fourth line of research focuses more specifically on the relative achievement of learning outcomes. Media comparison studies indicate there is no significant difference in the educational effectiveness of media type [8], [11], [6]. Cheng and others compare performance of graduate-level students enrolled in traditional and computer conferencing classrooms. Results indicate no significant difference in overall course performance or attitudes [12]. In a study by Wegner and others, there appears no significant difference in test scores between the students enrolled in the traditional classroom and those enrolled in the online computer course despite the fact that the online computer course students did not attend a single on-campus lecture [6].

While research studies comparing achievement tend to show no significant difference, several studies indicate students have more positive attitudes about the course and their learning in an online computer course [10], [3], [13], [6]. In Stringer's study [3] two-thirds of the students surveyed about their distance-learning course liked the convenience and wealth of information available through the internet. Sandercock and others report that although no difference in academic assessment performance was noted in the online course, students indicated the use of computers had improved their technology skills and increased their quality of learning [13]. Students particularly like the flexibility an online course offers as well as the ability to control the pacing of instruction [2], [3], [1]. The next section describes the procedures used in analyzing ALN effectiveness.

# IV. METHODS AND PROCEDURES

To collect primary data for the report, a 12-item survey instrument was prepared to determine students' perceptions of the effectiveness of an active-learning, asynchronous internet course with that of a traditional classroom-based course. The population selected for study was comprised of graduate students in four sections of asynchronous internet courses being taught at The University of Memphis. The specific courses used in the investigation were two sections each of two masters-level accounting courses in the Summer and Spring semesters of 2000 and Spring semester of 2001. Although they were two different courses, each course follows a virtually identical asynchronous format. For purposes of the comparison sought in the study, these courses were thought to represent an appropriate contrast to a traditional lecture-based course for several reasons. One is their asynchronous format: Students have considerable flexibility as to when and where they complete the course requirements. Two, the courses have no lectures and no textbook. Three, the courses exemplify the active learning concept, being designed around a series of electronic cases for which students are expected to actively seek out information needed to solve the cases with focused—but limited—guidance as to where the necessary information is to be found. In fact, the process of learning how and where to locate information is an important objective of the courses. The presumption of operational similarity between the two courses was confirmed by a comparison of responses. A chi-square analysis indicates no differences between the two courses in any

of the responses at the .05 level of significance.

A five-point scale was provided for each question in the survey instrument, with 5 representing a high level of agreement and 1 representing a high level of disagreement. The midpoint of the scale, 3, was considered to represent no preference and was deemed the comparative benchmark for the study. Demographic information (age, educational level, gender, academic major, and student status) was also requested. Two class members and the instructor reviewed the first draft of the questionnaire. Suggestions for improvement were incorporated into the final instrument, which was given to 70 students, from which 66 useable responses were returned.

Mean responses (based on the five-point scale) for each of the statements regarding student perceptions were calculated. A t-Test for independent samples was administered to the mean responses of each to determine whether the responses were statistically different from 3, the neutral midpoint of possible responses. Frequencies and percentages for each demographic factor were also calculated.

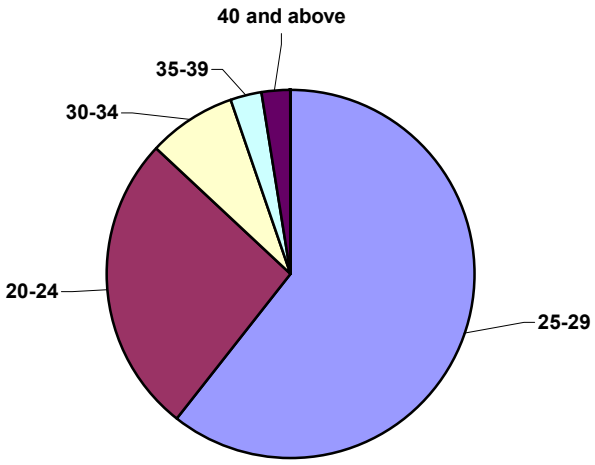
# V. SURVEY FINDINGS

## A. Respondents' Demographics

Respondents were asked to indicate their age, classification, gender, academic major, and student status. Of the 66 students indicating their gender, 33(50%) were female; 33 (50%) were male.

As shown in Figure 1, the highest percentage (52%) of the 66 students indicated their age was in the range of 25 to 29 years. Only 11 percent were over the age of 35.

**Figure 1**
**Age of Respondents**




As shown in Figure 2, most respondents were accounting majors and were United States citizens.

**Figure 2**
**Academic Classification and Status of Respondents**

| | Frequency | Percent |
|---|---|---|
| **Academic Classification** | | |
| Accounting | 44 | 66.7% |
| Management Information System | 19 | 28.8% |
| Finance | 1 | 1.5% |
| Marketing Management | 2 | 3.0% |
| **Student Status** | | |
| U.S. Student | 51 | 77.3% |
| International Student | 15 | 22.7% |

## B. Responses

Respondents were asked to rate each of the elements on a five-point scale with five representing *fully agree* and one representing *fully disagree*. For analysis, the responses were separated into two categories. The responses that relate to learning outcomes are reported in Figure 3. Since all t-values are greater than 1.997 (the comparison value for a population of 66 and an alpha of .05), each response is significant. The element of learning outcome with the highest mean response concerned an overall feeling of the use of the internet as an effective learning tool. The next highest mean response concerned whether the student would take another online computer-assisted course. However, the element of learning outcome with the lowest mean response concerned the ability to better learn the material as compared to learning in the traditional classroom setting.

**Figure 3**
**Learning Outcomes**

| Question | Mean* | T – Value** |
|---|---|---|
| Gain new skills | 3.88 | 7.63 |
| Develop writing skills | 3.68 | 5.63 |
| Meet course objectives | 3.57 | 5.09 |
| Learn the material | 3.34 | 2.96 |
| Motivated to complete the assignments | 3.65 | 4.75 |
| Used the internet regularly | 4.18 | 9.72 |
| Would take another online computer-assisted course | 4.32 | 11.59 |
| Feel use of the internet is effective learning tool | 4.40 | 16.59 |

*5 = fully agree; 1 = fully disagree
** = the response is significant at p=.05

Four of the survey questions relate to communication effectiveness. Communication in the courses was conducted between the instructor and individual students only, achieved through almost daily two-way email correspondence and one-way message posting from the instructor on the course "bulletin board." Responses to these questions are shown in Figure 4. As was the case for learning outcomes, the responses

to each communication effectiveness question are significant. The element of communication effectiveness with the highest mean response concerns e-mail as an effective means of communicating to the instructor about class issues. On the other hand, the element of communication effectiveness with the lowest mean response concerns the ability to discern the course objectives when communication effectiveness is compared to discerning course objectives in the traditional classroom setting.

**Figure 4**
**Communication Effectiveness**

| Question | Mean* | T -Value** |
|---|---|---|
| Discern course objectives | 3.60 | 5.39 |
| E-mail is effective communication means | 4.49 | 15.99 |
| Prefer e-mail to telephone for communicating with Instructor | 3.89 | 6.68 |
| Bulletin Board is a good way to communicate | 4.38 | 12.97 |

*5 = fully agree; 1 = fully disagree

** = the response is significant at p=.05

# VI. SUMMARY AND INTERPRETATION OF RESULTS

The study yields results consistent with previous research related to learning outcomes cited above, in particular, that of Sandercock and others [13]. Specifically, students indicated the use of the online course had helped them gain new skills as compared to the traditional classroom setting (mean of 3.87). Similarly, most students responded positively concerning whether they would take another online computer-assisted course. This is consistent with several studies (see the work of Soo, as well as the group studies involving Stringer, Sandercock, Wegner and others) which indicate that students have more positive attitudes about their learning in an online course [1], [3], [13], [6]. Since the population of the study consists of graduate students familiar with computer technology, these results also are consistent with previous research in which students with a greater understanding of online communication and more cognitively mature graduate students were more comfortable with and performed better in distance learning courses [11], [7]. Results, though, are somewhat inconsistent with previous research that indicated no significant difference in learning performance [8], [11], [6]. Students responded positively to the question concerning the use of the internet as an effective learning tool.

Students had a relatively less favorable response when comparing their ability to learn the material in the online computer course to their ability to learn the material in the traditional classroom setting. Responses related to students' motivation to complete the assignments in the online computer course also are not as convincingly positive. In the online computer course, these two learning outcomes involve active learning as compared to a more common use of passive learning in the traditional classroom. Since active learning involves more time, energy, and self-reliance, the response could be the result of the difficulty adapting to this kind of learning involved rather than the medium used.

Concerning communication effectiveness, results indicated that students felt that e-mail is an effective means of communicating with the instructor. Students also had a positive response to the Bulletin Board for communicating. However, students were less favorable toward their ability to discern course objectives as compared to the traditional classroom setting. This might be due to the fact that course objectives are relatively easy to relate in either learning format.

In conclusion, the findings of this study are in general agreement with earlier research indicating that students have a more positive attitude about the course and their learning in an online computer course. This study offers new evidence, as well, that learning can be enhanced with an active learning format in an online course. It is possible that the favorable attitudes of students surveyed toward their online learning experience were in part due to this being their first exposure to a course of this type. Whether incremental benefit persists beyond a single course is not answered by this study. Additional research is necessary to determine whether most or all of the benefit is gained with one course or whether second and subsequent courses, similarly structured, would be viewed as favorably, or even more favorably, than the first such course.

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