

ASSESSING THE VALUE OF A SYNCHRONOUS SEMINAR COMPONENT IN ONLINE DATABASE CLASSES

Matthew A. North, Washington & Jefferson College, mnorth@washjeff.edu

ABSTRACT

Current research shows that online students often feel a sense of isolation that is not always recognized and addressed by instructors and is generally detrimental to student performance. This paper reports the results of a study of online college students' performance and outcomes in four sections of an online 'Introduction to Databases' course. The first two sections were taught with a mandatory weekly 1.5 hour chat room class session, while the latter two sections were taught completely asynchronously. Through regression analysis of assignment scores, exam and project performance, and threaded discussion board participation, we find that weekly real-time contact with the instructor and other students significantly improves student outcomes and increases student retention.

Keywords: Online education, databases, virtual classroom, synchronous learning networks, chat.

INTRODUCTION

The demand for distance education has historically been driven by a need for educational opportunities independent of time and place restrictions [6]. Recognizing opportunities for growth in terms of enrollment, revenue, diversity, etc., institutions of higher education have increasingly embraced and implemented distance education programs, generally utilizing the most recent available communications technologies as delivery mechanisms [2]. In the Information Age, this approach translates directly to the use of Internet technologies for delivery.

Pedagogical research has shown that one of the most common problems students face when engaging in online studies is a sense of disconnection and isolation [5, 8, 9]. With increases in personal computer ownership, in-home Internet connectivity, and enhanced Internet communications technologies since 1995, many instructors have turned to live chat room sessions in order to engage online students in instruction and academic conversion [3, 9]. This study will examine the use of chat rooms as an online instructional technology, used to facilitate synchronous seminar sessions in an online credit-bearing *Introduction to Databases* course, and the subsequent effect of their use (or lack of use) on student performance. The thesis of this paper posits that weekly real-time interaction significantly improves students' final grades and overall performance in online database classes.

RESEARCH METHODOLOGY

From July 2004 through May 2005, four online sections of *Introduction to Databases* were taught by the author. The first two classes (synchronous sections) were taught consecutively during the July through December 2004 time period. These sections required attendance at a weekly chat room-based seminar, in which the instructor would review the previous week's lesson material and answer questions regarding the coming week's material. The chat sessions

lasted an hour and a half, and were held during evening hours when working adult students were more likely to have time available to attend. Students who were unable to attend during a given week were allowed to complete an alternate written assignment in order to receive participation credit; however completion of such assignments was extremely rare (3 instances).

The latter two sections (asynchronous sections) were taught consecutively during the January through May 2005 time frame. In these sections, students completed work identical to the assigned work for the synchronous classes, but without the benefit of weekly real-time contact with the instructor.

Details of Coursework, Student Profile, and Data Collection

- Each of the four online course sections occurred during an eleven week quarter, consisting of four one week lessons, a midterm week, four additional one week lessons, and a reading week followed by a final exam week.
- The database topics in each of the eight lessons remained consistent across all four course offerings. Students created databases in Microsoft Access, and each week’s lesson material built upon the previous week’s work.
- The synchronous sections were composed of 39 total students, while the asynchronous sections contained 42 students. In the first section there were 12 students (six women, six men), 27 (11 women, 16 men) in the second, 17 (11 women, six men) in the third, and 25 (11 women, 14 men) in the fourth.
- Student performance was assessed in three ways. First, students completed database development activities during each lesson week, applying lesson concepts. Next, students were required to post responses to lesson topics on the class discussion board each week, citing sources outside the course textbook as references for their response content. And finally, students completed two exams, one Midterm and one Final.

At the beginning of each of the four terms of study, each student was given a copy of the course syllabus which outlined the grading criteria for all assessment activities. For the synchronous sections, chat room participation and message board participation accounted for 18% of the final grade in the course (9% for participation in each forum). For the asynchronous sections, message board participation alone was valued at 18% of the final grade. The two exams combined for 34% of the final grade, while the remaining 48% was evenly divided among the graded activities students completed during the eight lesson weeks (Table 1).

Table 1. Grading breakdown for Introduction to Databases

	Chat Room	Message Board	Midterm	Final	Assignments
Synchronous Sections	9%	9%	14%	20%	8 lessons @ 6% ea. = 48%
Asynchronous Sections	N/A	18%	14%	20%	8 lesson @ 6% ea. = 48%

In an effort to ensure objective, consistent, and equitable evaluation of student participation in chat rooms and discussion board activities, a grading rubric was developed and provided to each student as well (Table 2).

Table 2. Grading Rubric for Class Participation

Points	Seminar	Message Board
0%	<ul style="list-style-type: none"> ▪ Student failed to attend the session or complete the alternative assignment, or logged into the seminar but did not post anything. 	<ul style="list-style-type: none"> ▪ Student failed to post any messages
50-69%	<ul style="list-style-type: none"> ▪ Student attended the session, but failed to participate. 	<ul style="list-style-type: none"> ▪ Student's message was very short, was posted late, and did not provide enough evidence of the student's understanding of the discussion questions. Significant writing errors.
70-89%	<ul style="list-style-type: none"> ▪ Some vague or summary references to lesson material. ▪ Few interactions with students and Instructor. 	<ul style="list-style-type: none"> ▪ Student's message was posted on time. ▪ Some vague or summary references to lesson material ▪ Inconsistent and/or unclear writing
90-100%	<ul style="list-style-type: none"> ▪ Substantial, original contributions that further the work of the class ▪ Frequent, informed references to lesson material ▪ Frequent interaction with students and Instructor within sessions 	<ul style="list-style-type: none"> ▪ Student's message was posted on time. ▪ Substantial, original contributions that further the work of the class ▪ Frequent, informed references to lesson material ▪ Clear and fluent writing

Statistical Approaches to Student Performance

Both descriptive and predictive statistics were used in this study. Students were combined into either the Synchronous group (N=39) or the Asynchronous group (N=42). Means and Medians of each graded component listed in Table 1 are calculated in order to determine “typical” student performance. In addition, percentages of students scoring below the 70% (C-) threshold are calculated.

Simple and multiple regressions were calculated using the final percentage earned in the class as the dependent variable. It is logical that all graded activities would correlate very highly to the final percentage of points earned in the class; therefore multiple regressions using all variables are not calculated. Instead, multiple simple regressions are calculated in an effort to determine the correlation between certain activities and the final grade. Specifically chat room-to-final

grade and message board-to-final grade regressions are used. In addition, a multiple regression analysis is also performed, combining these two variables and comparing them to their impact on the final grade in the course.

Beyond the relationship between participation grades and final grades however, there is a more interesting outcome to be examined. With these simple and complex statistics calculated for each of the two class groups included in this study, we can compare and contrast outcomes of students who participated in real-time, regular interaction with those who did not. In addition to comparing statistics, comments from post-course student evaluations will be included in order to illustrate their feelings regarding the use, or disuse of weekly, mandatory chat sessions.

FINDINGS

In general, this study shows that students who are regularly engaged in online chat sessions for *Introduction to Databases* perform better than their peers who are not. Statistically speaking, there are significant differences between the scores received by the two groups.

Synchronous Class Results

Of the 39 students who participated in classes sections requiring chat participation, 13 (~33.3%) failed to attain the minimum score of 70% in the online *Introduction to Databases* course, which is required for students to count the course toward graduation with an IT major. Table 3 delineates the statistical results of average student performance for those who completed the course synchronously.

Table 3. Synchronous Student Performance (N=39)

	Final Score	Chat Room	Message Board	Exams	Assignments
Means	74%	78%	68%	76%	67%
Medians	92%	98%	88%	98%	85%

Regression results for this group, calculated with a 95% confidence level, show highly correlated and significant relationships between student participation and final scores (Table 4).

Table 4. Synchronous Student Participation and Outcomes (N=39)

	R-Square	Significance F	Lower 95%	Upper 95%
Chat-to-Final Score	0.877	1.91 ⁻¹⁸	0.83	1.07
MB-to-Final Score	0.776	1.31 ⁻¹³	0.61	0.88
MB & Chat-to-Final Score	0.955	3.19 ⁻²⁰	0.49	0.83
	(Multiple R)		& 0.15	& 0.44

Asynchronous Class Results

Of the 42 students who participated in classes sections requiring chat participation, 25 (59.5%) failed to attain the minimum score of 70%. Beyond the fact that this shows that more than half of all asynchronous students will be repeating the course, this translates into a 56% increase over the fail rate from the synchronous sections. Table 4 shows the statistical results of average student performance for this second, asynchronous group.

Table 5. Asynchronous Student Performance (N=42)

	Final Score	Chat Room	Message Board	Exams	Assignments
Means	57%	N/A	52%	55%	58%
Medians	60%	N/A	55%	64%	65%

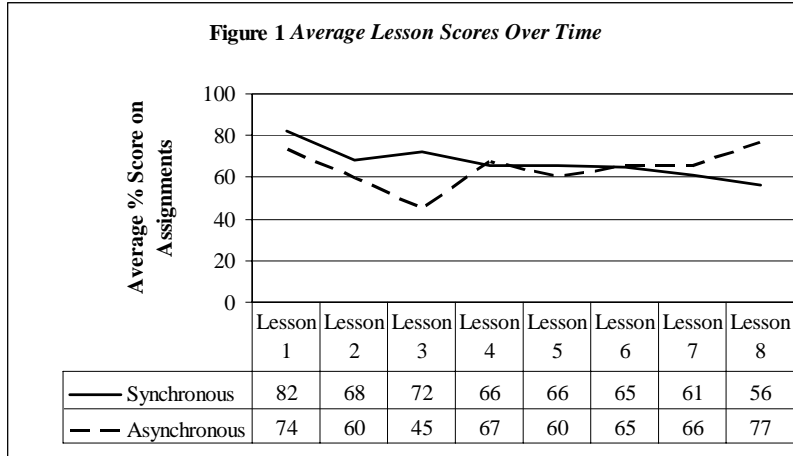
Regression results for this group, also calculated with a 95% confidence level, also show highly correlated and significant relationships between student participation and final scores (Table 6). The main difference is that for this group of students, there is only one participation mechanism with which the final scores could be compared: message board activity.

Table 6. Asynchronous Student Participation and Outcomes (N=42)

	R-Square	Significance F	Lower 95%	Upper 95%
MB-to-Final Score	0.833	3.56 ⁻¹⁷	0.68	0.90

Analysis and Discussion

In analyzing Tables 3, it should be evident by the disparity between means and medians that there was a certain contingent of synchronous students who performed very poorly across the board and pulled class averages down. This same gap between means and medians is not nearly as pronounced in the asynchronous data (Table 5). This is likely due to the bimodal distribution of online learners as described in various published studies regarding online student success [1, 4, 7]. These and similar studies have repeatedly observed that when given an entire set of course material and a point in time by which to complete the work, online students tend to divide themselves into two groups: those who are self-disciplined enough to do the work and succeed, and those who are not. By utilizing periodic interactive sessions with students, a greater number of those who may otherwise fail will remain engaged, and will pace themselves through required coursework toward successful course completion [4]. Figure 1 illustrates this phenomenon using trend lines representing the average score on each of the eight lesson assignments over the course of the term.



Students in both asynchronous and synchronous courses tend to receive lower scores on their work as the term proceeds; however, asynchronous students initially engage at a lower rate and their scores drop quickly from there. The asynchronous line in Figure 1 shows that some students begin to recognize the impending end of the term and subsequently follow that realization with an increase in course work; however, for many this effort arrives too late in the term to allow successful completion of the class.

Simple comparison of both the means and medians of these two courses is also revealing. Final scores in synchronous sections of the online database course are typically some 30% higher than final scores are in asynchronous sections. No single performance assessment measurement varies extensively from this figure. Since the only major difference between the synchronous and asynchronous sections of this online database course is the use of the chat session (all other coursework being the same), it would logically follow that the synchronous seminar contributes to better student outcomes.

The regression results (Tables 4 & 6) both clearly illustrate the strong relationship between student participation and final scores. Table 4 shows that use of a chat room in this course highly correlates to the final score received in the class. Although there is a slightly larger variance in the Message Board (MB) to Final Score comparison in this table, combining message board activity *with* weekly chat room seminars appears to create a highly engaging online learning environment which directly affects student performance. Table 6 depicts a higher correlation between message board participation and final score; however this is to be expected given that the message board in asynchronous sections is the *only* participation tool available for instructor-student interaction.

It is worth noting that other factors such as time of year, student backgrounds, or other external influences could potentially contribute to the variance in final grades between the two groups in this study, however it is likely that the impact of these factors would be minimal (within the confidence intervals), and such factors are therefore not included.

CONCLUSION

The incorporation of a synchronous seminar component into the course *Introduction to Databases* is a valuable tool which helps students succeed. Statistics show strong correlations between weekly student participation activities and final grades, with the most highly successful correlation being accomplished through the combination of real-time chat sessions and message board discussions. In addition to the statistical justifications for attempting to incorporate chat rooms in online course delivery, anecdotal evidence by way of student course evaluations supports their use as well:

- “I personally think that seminars are critical with every subject. I haven't found a course yet, even the ones that I find easy, where I didn't need some guidance at one point or other.”
- “I enjoy meeting the professor and students and getting to know everyone's different personalities.”
- “Even though it is distance education, during the seminars it gives me sense of a classroom setting. I can get my questions answered on the spot, rather than waiting for an answer and getting frustrated in the process!”

As previously mentioned, one of the most common causes on online student failure is a feeling of isolation. Based upon these representative student comments and the analysis done regarding student outcomes, it is evident that chat rooms are a useful and valuable tool in contributing to the success of online students.

REFERENCES

1. Chase, C. I. (1998). A Chat Room – Educational Psychologists but no Educational Methodologists? *Educational Psychology Review*, 10(2), 239-248.
2. Hamer, L. O. (2001). Distance Learning Technologies as Facilitators of Learning and Learning Related Student Activities. *Marketing Education Review*, 11(3), 55-67.
3. Haythornewaite, C. (2001). Exploring Multiplexity: Social Network Structures in a Computer-Supported Distance Learning Class. *The Information Society*, 17, 211-226.
4. Lim, C. P. (2001). A Holistic Approach Towards the Use of an Integrated Online Delivery and Management System. *Journal of Educational Media*, 26(1), 19-33.
5. Posey, M. W. (2002, May 13). How to Teach an Invisible Class. *Community College Week*, 14(20), 9-11.
6. Prewitt, T. (1998). The Development of Distance Learning Delivery Systems. *Higher Education in Europe*, 23(2), 192-193.
7. Schweitzer, K., Paechter, M. & Bernd, W. (2003). Blended Learning as a Strategy. *Journal of Educational Media*, 28, 213-214.
8. Wang, A. Y., Newlin, M. H., & Tucker, T. L. (2001). A Discourse Analysis of Online Classroom Chats: Predictors of Cyber-Student Performance. *Teaching of Psychology*, 28(3), 222-226.
9. Zirkle, C. (2001). Access Barriers in Distance Education. *Contemporary Education*, 72(2), 39-42.