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A Comparison of Traditional and Online Classrooms: Student Perceptions and Learning Outcomes

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Abstract

This study compared student learning outcomes and student perceptions of and satisfaction levels between two sections of the same class—an online section and a face to face section. Using a quasi-experimental design, students were randomly assigned to two course sections. Results suggest that while learning outcomes were similar, the face to face encounter motivated students to complete course requirements to a greater degree and also provided students with another layer of information concerning the instructor that was absent in the online course.

Introduction

Recent research in online education has focused upon whether web based courses provide students with the same degree of personalized learning and content mastery that students experience in face-to-face (f2f) classes. Few studies, however, utilized experimental design across several variables including student learning as well as student satisfaction with the learning experience.

The innovative use of technology in education has greatly improved the quality of web-delivered courses (Schott, *et. al.*, 2003). To determine whether web based courses indeed provide students with a comparable if not superior learning experience, researchers over the past 6 years have conducted a plethora of studies comparing aspects of the traditionally delivered instruction with online instruction. Findings over t are mixed, but the general consensus is that students learn just as well using web based instruction, but are less satisfied with the learning experience (Rivera, McAlister, & Rice, 2003). Miller, Rainer, & Corley (2003) noted that the more negative aspects of web based instruction include procrastination, poor attendance, and a sense of isolation. Other studies noted that online courses are more effective with particular personality types

(Daughenbaugh, *et. al.*, 2002; Mehlenbacher, *et. al.*, 2000) and the Office of Institutional Planning and Research at Sinclair Community College found that community college distance learning students achieved lower grades than those who attended f2f classes (2000). Their study suggested that the distance learning students are typically of a different ilk or from a different population than the traditional student and have other obligations to juggle along with attending school.

Student attitudes towards learning online as well as student mastery of content have been linked to the quality of the online course (Sweeney, O'Donoghue, & Whitehead, 2004). Others have noted that converting a traditionally delivered course to the web based medium is not a straightforward process and some aspects of the face to face classroom cannot or will not be duplicated (Mehlenbacher, *et. al.*, 2000; Jones, 1999). Student attitudes may also be affected by other variables including gender, previous computer experience, and learning styles (Gurbuz, Yildirim, & Ozden, 2000; Sweeney, O'Donoghue, & Whitehead, 2004) although Lu, Yu, & Liu found that learning style preferences did not affect content mastery in online courses (2003). Finally, student perceptions of the student/instructor interaction may predict the level of student success in an online learning environment (Doherty, 2000).

Few studies have utilized random assignment to determine whether the “average” student might fare just as well in an online course as in an f2f course. Many studies used existing sections of web based and online courses resulting in possible sampling bias and a threat to the internal validity of the study due to self-selection. Rather than comparing two potentially unequal groups, this study utilized random assignment in order to compare equivalent groups thereby controlling for predispositions towards one type of learning style over another.

Currently there are more than 900 students enrolled in the Bachelor of Education in Early Childhood Education (ECE) program which prepares students to teach children ages 3-8 with a variety of learning styles including those at-risk, typically developing, mild to moderately disabled, and gifted. The course in this study, *Early Childhood Education: Philosophy and Practice*, is a beginning level survey course required for early childhood majors who just entered their pre-professional program (typically first-year students). The f2f sections of the course are scheduled to meet twice weekly in seminar fashion. Content covered in the course ranges from ECE history, theorists, curriculum, inclusive learning environments, designing and planning themes, webbing to strategies (what is this?), evaluation and parent involvement. Central to the course is the development of reflective thinking and application to reflective practice. The online version of this course was developed and is taught by the same instructor who taught the control group class. The online course has been in existence for ? years. The instructor has taken care to follow the 7 Principles of Good Practice in Online Education (Graham, *et. al.*, 2001) in the development and implementation of the course. Student feedback for the web based course has been above average.

To make both sections of the course “equivalent”, the instructor used duplicate syllabi and duplicate assignment requirements. The instructor has been teaching at the university level for over 30 years and has taught a variety of online courses, including *Philosophy and Practice*, for over 5 years. Students in the web based section were required to attend at least two 50 minute “Live Chat” sessions with the instructor per week which served to replace the discussion time in

the f2f section. Students in both sections were given equal credit for attendance (in class or online chats). All students in both sections were assigned to small groups for some in-class or online assignments.

Method

Often students who enroll in web based courses have a predisposition towards this means by which to learn (Halsne and Gatta, 2002). This issue threatens the validity of findings based upon comparisons between web based and f2f courses. The groups, by nature of learning preference are not equivalent and therefore findings cannot be generalized beyond the restrictions of the studies. To address this weakness, this study used a quasi-experimental design that infused non-random selection with random assignment to the control (f2f) and experimental (web based) groups. Prior to registration, students were asked whether they would be amenable to allowing the department to assign them to either the f2f or the web based section of the course. While students volunteered to participate in the study, random assignment to the groups strengthened the internal validity of the study and enhanced group equivalency. There were, however, three students in the f2f course that added the course after the controlled enrollment period ended (during the add/drop period). These three students, while included in the class, were excluded from the study.

To validate group learning style equivalency, students in both groups completed the VARK (visual, aural, read/write, kinesthetic)—a diagnostic instrument designed to identify learning preferences (Fleming & Bonwell, 2002). Using the VARK, students can be classified with mild, strong or very strong preferences in any of the four learning styles. In addition, students can show multimodal tendencies (more than one style appears to be preferred). For the purposes of this study, students were classified in one of 5 categories—visual, aural, read/write, kinesthetic, or multimodal learners.

To control other confounding variables that might result from the delivery methods of two sections of the course, the same instructor taught both sections during the same semester. The instructor took care to compare the design and delivery of both sections of the course to ensure that topics covered, work required, testing, and the classroom experience were as closely matched as possible. The syllabi of both courses were also compared by a colleague to provide content validity.

The examination of student learning outcomes compared group means of student test scores and total points earned for the semester (final grade) using an independent t-test. Scores (as opposed to letter grades) were used with the assumption that they better reflected an interval unit of measurement. To measure student perceptions of student-teacher interactions as well as satisfaction with the course as whole, identical end-of-semester evaluations were completed and an independent sample t-test to compare mean evaluation scores for the groups was calculated. The evaluation used in this study was one required by the ECE Department and not constructed by the researchers.

Findings

Sample info: Of the total (over 100) students who enrolled in all four sections of the *ECE: Philosophy and Practices* course, 39 agreed to participate in the study. The f2f course (control)

had 21 students—3 males and 18 females—and the web based course had 18 students—1 male and 17 females. To equalize groups, two males and one female were randomly removed from data collected from the control group (the three who added the course later were also excluded from data collection). All of the students in the f2f course were considered traditional students in that they enrolled in college right out of high school. There were two non-traditional students (returning for licensure) enrolled in the web based course. To determine whether the non-traditional students could confound results, a test of group equivalency was performed.

Group equivalency: The VARK survey of learning preferences was completed by 18 students in the f2f group and 15 students in the web based group (instructor did not require completion of this survey). The two non-traditional students did complete the survey. The distribution of learning preferences for each group was equally distributed across the learning styles. A chi square goodness of fit test was administered using the control group as expected frequencies and the experimental group as the observed frequencies. Results showed no statistically significant difference between group learning preferences (chi square equaled 3.36; 4 degrees of freedom; p less than 0.05). Therefore it was assumed that the groups were equivalent and that the differences in groups due to sampling error did not significantly affect outcomes. To limit the effect of student comfort using the computer, a tutorial provided by the university's Division of Distance Learning was provided to all experimental group students. This tutorial has proven to effectively orient students to the online delivery system as evidenced by student evaluations of this tutorial.

Student Evaluations: Students in both classes completed identical course evaluations before their final exam. The evaluation included items that explored student perceptions of both the instructor and the course. Instructor items focused upon teacher effectiveness. Course items included those dealing with the general organization, the value of the course as it related to their major area of study, the textbooks, exams, and general assignment workload. All evaluations were anonymous.

Overall, students in the f2f class rated both the instructor and the course significantly higher than those students in the web based course (p less than 0.001). Mean scores for the f2f and web based classes were 1.22 and 1.82 respectively on a 5 point scale where a "1" indicated the highest ranking (outstanding) and a "5" the lowest (poor). In both cases the instructor received very good scores; yet the students in the f2f course felt the quality of the instructor and the course to be better. T tests were then conducted on individual questions to locate where the classes differed significantly. The alpha level was lowered to 0.002 to control for Type I comparison error rate (alpha, 0.05, divided by 22 items) and the analysis revealed statistically significant differences on each of the 22 questions suggesting that students collect extra information concerning an instructor based upon direct observation. For example, in the web based course, students have limited access to instructor interaction with other students. A student in the web based class will ask for assistance with course content using private email. However, it is common for students to ask questions of this type before, during, and after an f2f class where other students may observe the exchange. It is logical, therefore, that an instructor might receive a lower rating on an item like offering assistance to students with problems connected to the course in a web based course where this interaction is less evident unless the student experiences this interaction personally.

Overall, students in the web based course gave the instructor a high rating and the f2f students gave a stellar rating. In neither case did the students indicate a negative experience but rather differencing levels of a positive experience. Students were asked to project their own course grade based upon assignments and exams and to also assign the instructor a grade for the course (A through F). Comparisons indicated that the students in the f2f course expected an average grade of A minus while those in the web based course expected a grade of B minus. As far as grading the instructor, f2f students assigned an average grade of A and the web based students assigned a grade of B plus. Topics covered by the items are listed below. The first topic had a p value of 0.001; all subsequent items had p values of less than 0.001:

Offered assistance to students with problems connected with the course.

What grade would you assign the instructor (a, b, c, d, or f)?

Demonstrated promptness in returning graded assignments and exams.

Meaningful class preparation.

Demonstrated sincere interest in the subject.

Expected grade in this course (a, b, c, d, or f).

Encouraged independent thought by students.

Personal interest and sensitivity to student problems.

Demonstrated ability to explain course material.

Personal interest and sensitivity to student problems.

Demonstrated fairness and reasonableness in evaluating students.

Instructor availability for consultation

Demonstrated respect for students

To determine whether students in one section of the course actually did perform better than those in the other, exam grades and total points for the semester were compared. Three indicators of student success were examined—midterm examination, final examination, and overall points earned for the semester (included all assignments and test scores and was used to calculate final grades). Of the three comparisons, only the mean score for overall points differed at a significant level (p equaled 0.02). Students in the f2f course averaged a grade of A minus and those in the web based course averaged a grade of B. Students seemed to predict their final grade with accuracy indicating that the grading process for both sections was clear-cut. The main difference between test scores and overall points earned for the semester were other assignments required throughout the semester. A closer look at student records revealed that students in the web based course did not earn lower grades on these assignments but merely failed to submit some of them suggesting that learning outcomes were similar as evidenced by test scores but the personal contact of a f2f course positively influenced and motivated students to turn in assignments.

Conclusions/Recommendations

General findings of this study showed that two equivalent groups, randomly assigned to either an f2f or web based course, do not have equal experiences in the area of student perceptions of instructor and course quality. Learning outcomes can be considered to be equal based upon test scores. Because the instructor was the same for both courses, it can be concluded that the method of course delivery may have some effect on the variables examined. Student evaluations of the course and the instructor differed by course delivery. Students in the web based course tended to rate both the course and the instructor lower than students in the f2f course—although ratings for

both groups were considered to be above average. Finally, student achievement differed only in the area of course assignments due to unsubmitted assignments rather than quality of work. Test scores showed no statistically significant difference indicating that student mastery levels were essentially the same; yet students in the web based course were more likely to omit submitting one or more assignments thus lowering their final grade. Students in the web base course may be less motivated to complete assignments.

Limitations of this study include a small sample size and a restricted population thereby affecting external validity. Future research might apply this model to other content areas and explore the specific differences in course delivery methods that account for student perceptions.

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