AN ANALYSIS OF THREE INSTRUCTIONAL DELIVERY MODELS IN BUSINESS EDUCATION

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Abstract

Problem: *Enrollment trends at community colleges nationwide reflect a steady decline since 2010 (Hickman, 2016). Multiple factors affect these numbers, including competition from for-profit institutions offering 100% online degrees that utilize sophisticated learning management systems. In an effort to retain students and remain competitive, many community colleges have launched online course offerings, and in some instances, utilized additional technologies such as GoToMeeting or other synchronous communication systems.* ***Purpose:*** *The purpose of this study was to analyze three delivery methods (face-to-face, 100% online, and interactive television [ITV]) in the same course taught by the same instructor during the same semester to determine if one method of delivery exhibited statistically significant results in student performance.* ***Methodology:*** *Five sections of Introduction to Business were taught using three different platforms. There was one 100% online section, two 100% face-to-face sections, and two ITV sections taught with students in a classroom and broadcast to remote locations. Each section lasted 14-weeks and was taught by the same instructor to further control for delivery methods.* ***Results****: Students enrolled in the ITV course and the 100% online course had significantly higher final examination results than students in the face-to-face course. There was no statistically significant difference in final examination results between ITV students and 100% online students. Students enrolled in the 100% online courses and ITV courses reflected statistically significant satisfaction compared to the face-to-face students. Student experience and satisfaction were not statistically different for those enrolled in 100% online sections compared to those enrolled in the ITV course.*

Introduction

Postsecondary educational institutions have experienced declining enrollments in recent years. The result has been dwindling endowments, higher admission rates, more competitive financial packages for students, and reduced capital improvements resulting from lost funding sources and reduced revenue. Consequently, many public and private institutions have begun competing more aggressively not only with each other, but with traditional for-profit colleges as well. Competition has resulted in mimicking certain teaching models in for-profit institutions, such as 100% online courses as well as blended (hybrid) models.

New models have emerged including Massive Open Online Courses (MOOCs) that are sometimes self-directed and courses that integrate face-to-face interaction through webcams, televisions, or other visual devices. These efforts have met with mixed results when related to student opinions and performance. Research

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on student performance and attitude varies and is sometimes contradictory, regardless of whether the course is taught in a technical trade school or an Ivy League graduate program. Typical research compares student performance in two different modalities—100% online and 100% face-to-face.

Purpose of the Study

This study extends the literature and compares student performance in 100% online, 100% face-to-face, and interactive television (ITV) with face-to-face students in a traditional classroom and another group that participates simultaneously from a remote location. Further, student experience/satisfaction was analyzed so that administrators and curriculum designers might consider various course delivery modalities. Overall student satisfaction is a significant contributor to student retention and performance.

Hypotheses and alternate hypotheses tested included:

H0: The average final examination score of students enrolled in a face-to-face course will not vary compared to students enrolled in a 100% online class.

Ha: The average final examination score of students enrolled in a face-to-face course will vary compared to students enrolled in the 100% online.

$H0_1$: The average final examination score of students enrolled at an ITV/remote location will not vary compared to students enrolled in face-to-face sections delivering interactive television courses.

Ha_1: The average final examination score of students enrolled at an ITV/remote location will vary compared to students enrolled in face-to-face sections delivering interactive television courses.

$H0_2$: The average final examination score of students enrolled in a 100% online course will not vary compared to students enrolled in an ITV/remote interactive television course.

Ha_2: The average final examination score of students enrolled in a 100% online course will vary compared to students enrolled in an ITV/remote interactive television course.

$H0_3$: The student experience (satisfaction) score/rating for enrollees in a face-to-face course will not vary compared to students enrolled in a 100% online course.

Ha_3: The student experience (satisfaction) score/rating for enrollees in a face-to-face course will vary compared to students enrolled in a 100% online course.

$H0_4$: The student experience (satisfaction) score/rating for enrollees in a face-to-face course will not vary compared to students enrolled in a remote location course.

Ha_4: The student experience (satisfaction) score/rating for enrollees in a face-to-face course will vary compared to students enrolled in a remote location course.

$H0_5$: The student experience (satisfaction) score/rating for enrollees in a 100% online course will not vary compared to students enrolled in a remote location course.

Ha_5: The student experience (satisfaction) score/rating for enrollees in a 100% online course will vary compared to students enrolled in a remote location course.

Related Literature

Prior to 2010 community colleges accounted for approximately 44% of all students enrolled in higher education and delivered the majority of their courses using traditional face-to-face methods (Hickman, 2016). However, as enrollments steadily declined, these colleges moved many courses to an online format entirely or a hybrid model in an attempt to retain students. Additionally, colleges and universities sometimes reduced costs by offering online courses since there was no need for a physical facility to host students (Seaman, 2007). With this barrier removed, online classes could allow larger enrollments.

Massive Open Online Courses (MOOCs) evolved from these innovations. MOOCs are online courses that allow unlimited numbers of participants utilizing both traditional course materials like lecture notes, PowerPoint presentations, testing through video links, online discussion/support forums, and highly interactive communities (McGreal, Kinuthia, & Marshall, 2013). MOOCs led to other offerings such as Kahn Academy, edX, and Coursera, which are often self-paced learning modules and can be taken without charge or for a nominal fee for students seeking credit.

Students' perception of online classes can be an integral component on whether they are successful or unsuccessful, which results in either positive or negative changes in enrollment figures (Chawla & Joshi, 2012). Cole and Timmerman (2015) identified six primary factors affecting students' perceptions of MOOCs and online learning including reliability, accessibility, content, learning, communication, and outcomes. Similarly, analysis was conducted involving the impact of synchronous videos in online classrooms including MOOCs. By allowing participants to pause videos during synchronous classes and replay them as often as needed, researchers discovered that these groups described their learning experience as significantly better and had a more positive attitude about the course than non-synchronous groups who were unable to pause a video (Li, Verma, Skevi, Zufferey, & Dillenbourg, 2014).

Ladyshewsky's (2013) study further supports the suggestion that instructor communication and accessibility impact students' perception of online courses. Ladyshewsky analyzed six fully online graduate courses in managerial leadership taught by two different instructors. Factors analyzed included the frequency of instructor postings, social network maps, and student feedback related to the quality of instruction and the course overall. The researcher determined that student perception and overall learning experience were significantly impacted by instructor presence in various forms.

Student comments at community colleges who took 100% online courses added support to the impact instructor interaction has on students' perception toward online courses. Students who participated in 100% online classes indicated that many of them believed that there was less instructor presence during the course and that they often had to teach themselves, which resulted in most students electing to take only "easy" courses online and more difficult courses in a face-to-face setting (Jaggers, 2013).

These perceptions are not exclusive to community college students. Fish and Snodgrass (2015) researched undergraduates, graduates, males, females, and those with little online experience or extensive online class experience and found support and student preference for face-to-face learning environments. They discovered that most students did not take an online preparatory course prior to taking an online course; but the more online courses students took, the better their perception of online learning became.

Colleges have responded by creating hybrid courses that integrate online and face-to-face courses in an attempt to meet the multi-faceted demands of students. Potter (2015) found evidence that pointed to a statistically significant positive student performance for those enrolled in hybrid courses when compared to both 100% online and traditional face-to-face delivery methods. Birkeland, Wienandt, and Carr (2015) compared two groups of students enrolled in microeconomic courses and discovered that there was no difference in performance between students taking the course 100% online or 100% face to face. Conversely, face-to-face learners made significantly higher final grades compared to learners enrolled in a 100% online negotiations course (Callister & Love, 2016).

Methodology

The current study was conducted during Fall 2017 at a Western Pennsylvania community college. Five sections of Introduction to Business were taught using three different platforms. One section was taught 100% online, two sections were taught 100% face to face, and two sections were taught via interactive television (ITV). The ITV sections were taught to a group of students in a classroom and were broadcast to remote locations. All five courses lasted 14-weeks and were taught by the same instructor to further control for delivery methods.

Enrollment included 12 students in the 100% online course, 28 total students in the 100% face-to-face courses, and 32 students in the ITV courses (16 in the classroom and 11 participated via a webcam equipped with Waycom, an interactive second computer monitor that allowed the instructor to provide more interactive teaching methods to the remote students). Aside from the delivery methods, the course composition was identical in the number of exams, homework assignments, quizzes, and course materials provided by the instructor through Blackboard's learning management system.

The researchers compared final examination scores among the three groups and student performance in the ITV class separately by face to face versus students at an offsite location. Additionally, student course evaluations were analyzed for the three modalities that centered on 19 specific statements asked for all respondents in each setting. Evaluation statements required a Likert scale response ranging from 0 (*least satisfied*) to 5 (*highly satisfied*). An overall average of all statements for each delivery method was calculated. Table 1 shows an abbreviated list of the statements.

Table 1
Abbreviated Statements from the Student Evaluation of Faculty

Teaching style was engaging	Exhibited enthusiasm
Discussed classroom policy	Utilized active learning strategies
Used appropriate assessment strategies	Stimulated students to think critically
Reviewed the course outline	Speech mannerisms were not distracting
Discussed integrity policy	Incorporated a variety of teaching strategies
Posted office hours	Used a variety of exams
Provided project due dates	Provided a real-time progress monitor
Encouraged student ideas	Provided timely feedback on assignments
Started/ended class on time	Reviewed answers to exams/assignments
Teacher/class was well organized	

Results

Given the small number of participants, a normal distribution was not anticipated. Hence, the Mann-Whitney U test was used to measure for statistical significance at the .05 level.

Descriptive Statistics

A total of 61 students completed the final examination. Three scores were deleted from the ITV course due to the students' failure to complete the course. The three students intended to drop the course but did not provide the appropriate paperwork in time to be withdrawn. Table 2 displays the results of the final examination.

Table 2
Final Examination Scores

	Face-to-Face	100% Online	ITV
n	27.00	10.00	24.00
Average Score	68.30	90.20	82.92
Standard Deviation	11.73	7.87	16.05

Empirical Analyses

Data analyses reflected the following outcomes for the various hypotheses. H0 and $H0_1$ can be rejected, but $H0_2$ cannot be rejected at the .05 level of significance. Interestingly, the results indicated that students participating in the 100% online course and the ITV course actually performed better on the final examination than students who participated in face-to-face classes, which is contradictory to the findings of Callister and Love (2016) and Birkeland, Wienandt, and Carr (2016). However, this study further supports the research conducted by Potter (2015).

Additional analyses measured student attitudes/perceptions toward the course. Descriptive statistics for this data set appear in Table 3. It is important to consider the low *n* value in some cases, notably the number of students responding from the 100% online course.

Table 3
Student Satisfaction with Course Delivery Method

	Face-to-Face	100% Online	ITV
n	15.000	5.000	7.00
Average	4.684	4.874	4.816
Standard Deviation	0.216	0.217	0.118

An interesting outcome of the student satisfaction rating was that both the 100% online course and the ITV/remote course had a higher average score than the face-to-face course. Hypotheses $H0_3$ through $H0_5$ (see previous listing) and alternate hypotheses Ha_3 through Ha_5 were analyzed using the Mann-Whitney U test. Results from the analysis confirm rejection of $H0_3$ and $H0_4$ while simultaneously failing to reject HO_5 for significance at .05 confidence level (Table 4). This indicates that students enrolled in the 100% online course and the ITV/remote course were actually more satisfied with their experiences with the 19 identified *satisfaction* items than were the students enrolled in the face-to-face course.

Table 4
Mann-Whitney U Results

Comparisons	z-score	P-value	Significance .05
Face-to-face compared to 100% online	−3.08	0.002	Yes
Face-to-face compared to ITV (remote)	−1.97	0.049	Yes
100% online compared to ITV (remote)	1.75	0.080	No

These results are consistent with Cole and Timmerman's (2015) empirical analysis and the six primary factors impacting student perceptions toward MOOCs and online learning, which include reliability, accessibility, content, learning, communication, and outcomes. The questions identified in the current research mirror the qualities students have deemed *important* for online courses. Additionally, the results are consistent with Ladyshewsky's (2013) study supporting the suggestion that instructor communication and accessibility affect a student's perception of an online course.

Future Research

Acknowledging that the participants in this study were limited in number, additional research might be conducted where greater numbers of students could be studied in different delivery modalities. Further research might also include analysis of instructor interaction within the ITV/remote course that would allow the instructor to move lectures from one location to another from time to time. This could further enhance the students' experience and give each group a sense of some face-to-face learning coupled with the integration of interactive television technologies.

Additional studies may also include analysis of enrollment in ITV/remote location courses and/or 100% online courses after a student has participated in an ITV course. In short, while students may state that they were highly satisfied with the different learning environment, only increases in enrollment or evidence that the same students participated in a second or third ITV/remote location course could confirm that hypothesis.

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