

DOES COURSE DELIVERY METHOD IMPACT PERFORMANCE IN SUBSEQUENT COURSES? EVIDENCE FROM A FINANCIAL MANAGEMENT COURSE

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ABSTRACT

This study seeks to examine whether the mode of presentation for a foundational course affects student academic performance in a higher level course. In other words, do students retain more knowledge when a course is presented in the traditional lecture format or via online delivery? The course investigated was financial management, which serves as a prerequisite for several other courses in a business curriculum. Students from a medium sized state university (student population 6,500) with an AACSB accredited College of Business self-selected the online or lecture format. The presentation of the prerequisite did not have an impact on a student's grade in a capstone business course. However, it was found that students in the web version of financial management performed better (i.e., earned higher grades) in upper level finance courses than those students enrolled in the lecture version of the prerequisite.

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KEYWORDS: Online Learning, Face-to-Face Instruction, Knowledge Retention

INTRODUCTION

The demand for online coursework evidences the acceptance of distance learning in higher education. While some students earn an entire degree online without ever setting foot in a classroom, others supplement a traditional campus-based education with online classes. According to one study, “approximately 5.5 million students took at least one online course in 2012. Of this number, 2.6 million were enrolled in fully online programs, while the remainder took some courses online and some in classrooms” (Straumsheim, 2014). Much discussion has followed regarding the quality of instruction offered online and the performance of enrolled students. Proponents of face-to-face course delivery argue that there is no substitute for the traditional lecture, with its give and take between professor and student. Web supporters cite time and resource efficiency, making online presentation the superior method of instruction. However, do students retain more knowledge when a course is presented in the traditional lecture format or via online delivery? Do students that have the material presented to them by a professor in real time have a better foundation for later applying that knowledge in another class, or does the convenience and student self-reliance associated with web courses lead to a richer learning experience? Thus, it is the purpose of this research to examine whether subsequent academic success is dependent upon prior method of delivery. The remainder of this article presents a literature review on the subject, followed by the data and methodology employed, which includes an explanation of the courses investigated. The prerequisite in this study is financial management, while the subsequent courses include strategic management and upper level finance. Multiple regression analysis tests the paper's hypothesis. Empirical results and conclusions are at the end of the paper.

LITERATURE REVIEW

Since the introduction of online education in 1985 (Crotty, 2012), its popularity has grown exponentially. What was once little more than glorified correspondent courses, web learning now includes full lectures available 24/7; integrated learning management systems geared to a specific textbook; whiteboard tutorials; message boards allowing interaction between students and instructors; virtual office hours for faculty; and online proctored examinations. Online education, whether in whole or part, is an attractive alternative to students, faculty and university administrators. Online education offers students and instructors flexibility and convenience. Content can be learned (and taught) anywhere, at any time, without sacrificing family and work responsibilities. A nationwide decrease in funding to higher education has made colleges and universities flock to deliver courses online: the overhead is low and the return on investment is high.

Much debate has followed regarding whether student success is dependent upon mode of delivery. A large portion of the resulting research found no significant performance difference between online students and those enrolled in the face-to-face version of the same class. Reuter (2009) found that students in a lab class earned similar course grades, regardless of delivery. Schou (2007) saw no difference between the mean final exam score of a face-to-face class and that of the online section of introductory statistics. According to McLaren (2004), performance was “independent of the mode of instruction.” Even online students with access to video lectures did not perform any differently than those in the physical presence of a real time lecture, as demonstrated by Neuhauser (2002). Gange and Shepard (2001) investigated an accounting course and showed no difference performance wise between those students enrolled in the web version and those in the classroom. Russell (1999) saw “no statistically significant differences in student learning between learning formats.” However, some studies have shown a difference, giving classroom instruction the edge.

Terry and Lewer (2003) found that online economics students scored lower on a final exam than those who were campus based, with no discernable difference between campus and hybrid students. Coats, Humphreys, Kane, and Vachris (2004) showed that classroom students scored higher on the Test of Understanding College Economics (TUCE) than those studying online. Their experiment controlled for various student and instructor related differences. Figlio, Rush and Yin (2013) found there to be no difference in the instructional effectiveness of different modes of delivery, and only certain groups benefit from live instruction: males, Hispanics, and those that are weak academically. A few researchers have examined the type of knowledge delivered. When given a choice, most students prefer face-to-face instruction for math-based courses (Johnson, Dasgupta, Zhang, and Evans, 2009). Lam (2009) and Olson and Wisher (2002) found that the better format for delivering “procedural and declarative” content was web based. Research examining the retention of knowledge after completion of an online course has been sparse and its results mixed. Schardt, Garrison and Kochi (2002) examined this concept via a post exam administered to medical librarians in a continuing education course.

The students in the internet section retained twice as much material as those in the classroom. Unfortunately, a small sample size limits the applicability of these results. Schardt and Garrison (2007) later expand the sample and initially arrive at the same conclusion. However, after analyzing the data, there was no detectable difference between the two groups. In a study by Vichitvejpaisal, Panjamawat and Varasunun (2011), nursing students volunteered to take part in an experiment evaluating online versus live lecture problem based learning; and the online group displayed better knowledge retention than their in-class counterparts. Fordis, King, Ballantyne, Jones, Schneider, Spann, Greenberg and Greisinger (2005) contend that online learning “can produce objectively measured changes in behavior as well as sustained gains in knowledge that are comparable or superior to those realized from effective live activities.” They arrived at this conclusion after studying the performance of 97 physicians randomly assigned to an internet based continuing medical education seminar or one taught in a classroom. A grant issued by the National Association of State Boating Law Administrators to Deatz, Gossman and Trippe (2010) was to compare

knowledge retained by classroom versus online boating safety course participants four months after the course ended. While this seemed very promising, the parameters of the study changed, and the final report only investigated knowledge retained from classroom instruction in order to act as a baseline for further work. Cosgrove and Olitsky (2015) compare classroom, online and hybrid course delivery. Collection of data comparing knowledge retention occurred at three intervals during the semester. They find that “one mode is not better for acquiring knowledge;” however, face-to-face students retain material better. Unfortunately, these studies suffer from one or more of the following weaknesses, preventing wide scale applicability of results: small sample size, the courses are short, taught by peers, performance not assessed via graded assignments, and knowledge retention examined shortly after instruction ended.

DATA AND METHODOLOGY

There has been no research examining whether subsequent academic success is dependent upon prior method of delivery. This study will examine whether the mode of presentation for a foundational course affects student academic performance in a higher level course. The course investigated was financial management, which serves as a prerequisite for several other courses in a business curriculum. Students from a medium sized state university (student population 6,500) were surveyed.

Foundational Course: Financial Management

Financial management “focuses on decisions relating to how much and what types of assets to acquire, how to raise the capital needed to purchase assets, and how to run the firm so as to maximize its value” (Brigham and Houston, 2015). According to the Association for the Advancement of Collegiate Schools of Business (AACSB), the international accrediting body for collegiate schools of business, students must demonstrate a mastery of this subject in order to be awarded a baccalaureate degree. At the university surveyed, students are to earn a “C” or above in financial management in order to receive a diploma. Furthermore, financial management acts as a pre-requisite for strategic management, the college’s capstone business course, as well as, upper level finance classes. A grade of “C” or above in financial management is necessary in order to enroll in another class for which it serves as a prerequisite. Unfortunately, many students find financial management to be extremely difficult. Thus, to ensure success, students must have earned at least 54 hours of non-developmental coursework to register, as well as, have earned credit in the following areas: microeconomics, macroeconomics, statistics, and financial (or managerial) accounting.

Regardless of the delivery method, the content of the financial management course remained the same, which included the following concepts: time value of money, financial statement construction and analysis, stock and bond valuation, risk and return, capital budgeting (including cost of capital and cash flow estimation) and working capital management. Even though different professors taught the course during the time surveyed, they used one textbook, covered identical chapters, and shared the same student learning objectives. The online presentation of financial management is offered only during the summer term, while the lecture version is offered every semester. Thus, only summer sessions 2007-2013 were investigated. Upon registration, students had the option to choose their preference of course delivery. Unfortunately, herein is a weakness of this research: Students with strong academic skills and/or the ability to self-discipline may be more likely to choose the online format; students with poor study skills may prefer the lecture version with the presence of an instructor to “stay on track.” This could be true since, as mentioned previously, many students find financial management to be a demanding course. Furthermore, high achieving students are more likely to perform well in subsequent courses, regardless of the presentation of a prerequisite.

The online course stretched over 8 weeks. Students and professor communicated via email, discussion forums, online office hours, social media, as well as, Aplia for Finance (the supplemental package offered by the textbook’s publisher). Students could also communicate with each other, as well as their professor,

by using the class' discussion forums. Many tools were available to students in order to enrich their online experience and help ensure a favorable outcome. These tools were available at any time, could be accessed anywhere an internet connection was available, and included recorded lectures, power point slides, and narrated tutorials using a whiteboard. All work for the course was completed online. Students could work ahead; however, quizzes, homework assignments and exams had specific due dates. Exams and quizzes were open book.

Students who chose the campus lecture presentation attended four, two and one-half hour lectures per week for four weeks. The traditional format ensued: professors lectured, students listened and took notes on the material presented, but were encouraged to take part in class discussions and ask questions. Faculty was available to students during regularly scheduled office hours; other times, by appointment. However, outside of class, students were able to converse/interact with their professor and other students by email and message boards set up within Moodle, the university's course management system. All work for the course (quizzes, homework assignments, and exams) was completed using paper and pencil and had specific due dates. Exams and quizzes were closed book.

Subsequent Courses: Strategic Management and Upper Level Finance

Financial management serves as a foundation for several other classes in a college of business and is ordinarily scheduled by a student during his/her third year of study. The following describes the investigated courses for which financial management is a pre-requisite: strategic management and upper level finance courses. Working knowledge of the basics of financial management is necessary for academic success in these subsequent courses. At the university examined, strategic management is a capstone business course in which case studies are employed to hone managerial problem solving skills; and, it must be taken in the final semester of a student's degree plan. Several courses besides financial management act as prerequisites to strategic management. These include principles of business communications, management of organizations, and marketing. Successful completion (grade "C" or above) is required for graduation. Strategic management is offered every semester, but only presented in the traditional lecture format. Students that take upper level finance courses beyond the requisite are those that have a sincere interest in finance, usually finance and accounting majors. Financial management "sets the stage" for more complex study in the field and serves as a gateway course. It is important that those students have a strong footing in the foundational concepts of finance. The following is a list of undergraduate finance courses offered at the school surveyed for which financial management serves as a prerequisite: financial markets and institutions, principles of insurance, principles of real estate, investments, interim financial management, financial statement analysis, commercial banking, entrepreneurial finance, real estate appraisal, international finance, and the analytics of investing. Some are offered online, but most are not.

Hypothesis Tested

The hypothesis tested is the following: students who took a foundational course online will not perform differently in a subsequent course than students who took the same foundational course on campus. The foundational course in this study is financial management. The subsequent course the first time the hypothesis is tested is strategic management. Both classes are part of every student's core curriculum for attainment of a bachelor's degree in business from the university under study. The second time the hypothesis is tested relates to students that take subsequent finance courses: Does presentation of the fundamentals course determine success in subsequent finance courses? Each student's grade in the foundational course is also part of the model; it is hypothesized that students with high grades in the prerequisite will also achieve similar academic success in subsequent courses.

The model is as follows:

$$SMGRADE = \beta_0 + \beta_1(FMGRADE) + \beta_2(FMMODE) + \varepsilon \quad (1)$$

Where

- SMGRADE = student’s grade in strategic management.
 - FMGRADE = student’s grade in financial management.
 - FMMODE = student’s mode of delivery for financial management (0 = on campus, 1 = online).
- Using a subset of the total sample,

$$AVFIGRADE = \beta_0 + \beta_1(FMGRADE) + \beta_2(FMMODE) + \varepsilon \tag{2}$$

Where:

- AVFIGRADE = student’s average grade in upper level finance classes
- FMGRADE = student’s grade in financial management.
- FMMODE = student’s mode of delivery for financial management (0 = on campus, 1 = online).

RESULTS AND DISCUSSION

Table 1 presents the descriptive statistics of the sample segregated by the two dependent variables. The mean grade in strategic management is higher than the average grade in upper level finance (2.731 versus 2.112), with a smaller standard deviation (0.043 versus 0.072). Furthermore, the mean grade in the foundational course of financial management is half a grade higher for the total sample than for the subset of students taking upper level finance (2.072 versus 1.578). Three hundred twenty students were surveyed; 195 registered for the lecture version of financial management, while 125 choose the online presentation. Of these students, 187 went on to take upper level finance courses, with 47% choosing the web version of financial management.

Table 1: Descriptive Statistics of Sample

Dependent Variable: Grade in Strategic Management (SMGRADE)						
	Mean	Standard Deviation	Median	Mode	Maximum	Minimum
SMGRADE	2.731	0.043	3	3	4	0
FMGRADE	2.072	0.067	2	2	4	0
FMMODE	0.391	0.028	0	0	1	0
Dependent Variable: Average Grade in Upper Level Finance (AVFIGRADE)						
	Mean	Standard Deviation	Median	Mode	Maximum	Minimum
AVFIGRADE	2.112	0.072	2	2	4	0
FMGRADE	1.578	0.010	2	0	4	0
FMMODE	0.471	0.037	0	0	1	0

This table presents the descriptive statistics of the sample.

The empirical results are used to predict student performance in a class subsequent to a foundational course and can be found in Table 2. Regardless of the dependent variable, it was found that the grade earned in the prerequisite was highly significant ($p < 0.01$) across both models. Thus, the grade earned in financial management was a strong predictor of the grade earned in both strategic management and upper level finance courses. According to the regression results, FMMODE was insignificantly related to student performance in strategic management. Hence, the mode of delivery of financial management did not seem to impact a student’s grade in strategic management: students that chose the web version of financial management fared as well as those that sat in the lecture hall. However, delivery was deemed a significant predictor of student performance in upper level finance courses ($p < 0.05$); a positive relation was observed. Students in the web version of financial management performed better (i.e., earned higher grades) in subsequent finance courses than those students enrolled in the lecture version of the prerequisite. The multiple regression models are both significant: $F = 25.43$ ($p < 0.01$) for the strategic management

dependent variable and $F = 46.07$ ($p < 0.01$) for the upper level finance dependent variable, even though the R^2 values for each model are not very high (0.138 and 0.334, respectively).

Table 2: Regression Results for Performance Subsequent

	SMGRADE	AVFIGRADE
constant	2.243 (23.21)***	1.266 (10.07)***
FMGRADE	0.236 (6.798)***	0.445 (9.516)***
FMMODE	-0.002 (-0.027)	0.309 (2.425)**
R^2	0.138	0.334
F	25.43***	46.07***
N	320	187

*This table presents the regression analysis results for performance subsequent. *, **, and *** indicates significance at 10%, 5% and 1% respectively.*

CONCLUDING COMMENTS

The academic performance of students enrolled in web-based classes has been a hot button topic for many years. Most of the research in this area has found there to be no significant difference between the performance of online students and those in the face-to-face version of the same class, while a few papers give classroom education the edge. However, studies examining the retention and application of knowledge after completion of an online course have been sparse; and, its results mixed. Thus, it was the purpose of this research to examine whether subsequent academic success was dependent upon the mode of delivery for a foundational course. At the university surveyed, financial management acts as a pre-requisite for strategic management, the college's capstone business course, as well as, upper level finance classes. A grade of "C" or above in financial management is necessary in order to enroll in another class for which it serves as a prerequisite. Online financial management is available each summer, while the lecture version, every semester (spring, summer, and fall). Thus, only summer sessions 2007-2013 were included. Regardless of the delivery method, the content of the financial management course remained the same. Three hundred twenty students were included in the sample; 195 registered for the lecture version of financial management, while 125 choose the online presentation.

Of these students, 187 went on to take upper level finance courses, with 47% choosing the web version of financial management. Multiple regression analysis tested the null hypothesis: students who took a foundational course online will not perform differently in a subsequent course than students who took the same foundational course on campus. The results showed that the presentation of the prerequisite did not seem to affect a student's grade in the capstone business course. However, students in the web version of financial management performed better (i.e., earned higher grades) in upper level finance courses than those students enrolled in the lecture version of the prerequisite. Unfortunately, a weakness of this study may be present due to a self-selection bias: upon registration, students had the option to choose their preference of course delivery. Students with strong academic skills and/or the ability to self-discipline may be more likely to choose the online format; students with poor study skills would prefer the lecture version with the presence of an instructor to "stay on track." Furthermore, high achieving students are more likely to perform well in subsequent courses, regardless of the presentation. Thus, future research in this area could explore more variables that influence student performance, such as student ACT scores, overall GPA, gender, age, or time devoted to assignments.

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