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Successfully Supersizing Marketing Instruction: A Comparison Study of Instructional Delivery Modes For Principles of Marketing to Mega-Class Sizes

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Abstract - This research provides empirical evidence that lecture capture represents a viable option for delivering quality instruction to extremely large classes. Quality can be maintained with this option, and may be an option to consider when facing burgeoning enrollments and reduced budgets. We demonstrate that instructional delivery mode has no significant effect on students' perceptions of quantity and quality of interaction with the instructor and other critical student outcomes. Additionally, college self-efficacy is identified as a means to increase students' level of interaction with both the instructor and their peers. Finally, the moderating role of desire for flexibility sheds light on an important aspect of flexible delivery that has been overlooked by previous research.

Keywords - flexible delivery, lecture capture, marketing instruction, media comparison, mega-classes, web-based learning

Relevance to Marketing Educators, Researchers and/or Practitioners - As enrollment increases in business courses educators need to know that there is a sound way to deliver quality instruction such that practitioners recruiting graduates can be ensured that they are hiring well-educated business students. This study provides a research-based assertion that such education can occur in large courses.

Introduction

Total enrollment in degree-granting institutions has increased 34% from the period of 1994 to 2008, and is projected to increase an additional 17% by 2019 to 22.4 million students (Hussar and Bailey 2011). As a result of growing student populations and shrinking financial resources, college deans and department chairs are challenged to consider course delivery via increasingly-large mass sections and to rely on innovative ways to meet enrollment demands and maintain course quality. As such, the pressure of supplying quality instruction in a resource-restricted environment has led administrators to shift from a viewpoint of flexible learning to one centered on flexible delivery. Flexible delivery is a term used to describe non-traditional methods of delivering course content to students in order to facilitate effective student-centered learning.

The current study examines the flexible delivery of course content utilizing three modes: face-to-face live lecture, lecture capture (fully online), and a hybrid combination of both for undergraduate business administration core courses at a large southeastern university. Specifically, the present research investigates the effect of delivery mode and college self-efficacy on quantity and quality of interaction with the instructor and with other students. Additionally, we examine the moderating role of desire for flexibility on the relationship between delivery mode and critical student outcomes. These critical student outcomes include satisfaction, perceived value, future enrollment (purchase) intentions and word of mouth.

We follow the O'Reilly et al. (2007) categorization of mega-classes as those with 300 or more students in order to differentiate this research from "other large class studies in the literature in which classes as small as 80 are defined as large" (p.70). The mega-classes examined during the present study utilize lecture capture (video streaming) over the Internet to provide flexible delivery of course content. This approach is prominent in the college's introductory undergraduate core course offerings. Enrollments in these courses each term can range anywhere from 300 to 1,500 students in a given section.

Over the years, concerns have been raised about the quality of education in mega-classes; the importance of delving further into the effects of multimedia-based instruction on mega-classes has been recognized by previous research (Karakaya, Ainscough, and Chopoorian 2001). However, little scholarly work has focused on evaluating hybrid delivery modes of instruction – courses with both a face-to-face and online component (O'Reilly et al. 2007). The present research addresses the lack of research in this area.

The empirical findings of this study demonstrate that there are feasible solutions to the challenges that college classrooms face today. Furthermore, this research increases our understanding of the effect of computer-aided instruction on student learning because these lecture capture courses are organized so that students control the pace of information delivery directly and individually (Karakaya, Ainscough, and Chopoorian 2001).

Background and Literature Review

Lecture Capture

In our context, lecture capture refers to recording and storing videos of live course lectures on the college's computer server. The videos are then made available to students during the semester in which the video capture of the course is offered. In actuality, students may view the instructor's lecture less than two minutes after the live lectures begin. Students may view these videos at their convenience, as often as they wish, and without the need to download the videos onto their own computers.

High student enrollment, continued growth and lack of viable classroom space have all acted as catalysts for the college of business to move to lecture capture for its introductory undergraduate core courses. Several additional reasons also motivated the implementation of courses using lecture capture. First, the university was seeking to provide course access and quality instruction to meet student demands, including those who may be employed or who are enrolled at one of 11 regional campuses. Second, the college was striving to provide students with enhanced learning opportunities using state of the art instructional technologies, while minimizing the number of course sections that faculty teach. Finally, by offering lecture capture courses, the college was seeking to meet accreditation requirements for having terminally-degreed faculty members teach core classes.

Initial Testing Phase

In order to transition from traditional face-to-face classes to a lecture-capture section of 1000+ students, the Principles of Marketing course was first offered using two forms of media (face-to-face and lecture capture). In the inaugural semester of using lecture capture in the Principles of Marketing class, one instructor taught 447 students in a live face-to-face section and a second section of 571 students has access to the same course via lecture capture mode of instruction. Therefore, students in both sections experienced the same lecture from the same professor; one section of students sat in a traditional face-to-face classroom and the other section viewed the lecture via lecture capture at their convenience. Once registered, students were not allowed to change the section for which they enrolled.

Evolution and Further Testing

Since that initial test semester, changes have been implemented to increase efficiency and provide more flexibility. The students now enroll in one section of the course with an enrollment cap of 1,500 students. The instructor provides a live lecture twice per week for 75 minutes in a classroom that accommodates 285 students; the lecture and overhead slides are captured on video by a production team and streamed over the Internet via the course learning management system. Although all students enrolled in the course are encouraged to attend the live lecture, attendance is not a course requirement. When the instructor is lecturing in the classroom, there is

approximately a 1-2 minute lag time from the live lecture to the video stream; if a student is watching synchronously at home or elsewhere, s/he can provide feedback or ask questions via a Facebook page being monitored in the back of the class by a teaching assistant. Accordingly, students have the opportunity to truly find the mix of live and video instruction that works best for their particular needs.

As suggested by prior literature, technology is relied upon to handle administrative tasks, such as disseminating course information, facilitating communication with the instructor and other students, as well as posting grades (Hollenbeck, Mason and Song 2011, O'Reilly et al. 2007). All the materials for the course are posted on the course learning management system (LMS), including the power point slides that will be used in the lectures. E-mail messages within the LMS are the primary form of communication with the instructor and teaching assistants. However, the discussion boards are relied upon heavily as a means in which the students are able to share ideas and thoughts about the course. Additionally, chapter quizzes are due on a weekly basis to help students keep on track with the content of the class. These quizzes are completed online within the LMS regardless of which delivery mode is chosen for the lecture. Unlike completely online courses, exam testing for all the students enrolled in these lecture capture courses is done in-person at the College of Business testing lab to preserve academic honesty and rigor. The exams consist of multiple choice, matching, and true/false questions and are protected in the lab with the use of a Respondus browser lockdown software that prevents the student from navigating out of the exam to another page or from accessing the contents of the exam from outside of the testing lab. Students receive all their quizzes and exam grades the moment they press submit and the grades are automatically posted to the online grade book within the LMS.

Flexible Delivery

Previous research on distance learning has not typically found significant differences in student performance for various instructional delivery modes. For example, McFarland and Hamilton (2005) find no difference in student satisfaction or performance between online and face-to-face instructional styles. Sitzmann, Kraiger, Stewart, and Wisher (2006) conduct a meta-analysis comparing the effectiveness of web-based and classroom instruction and find that participants were equally satisfied with the delivery formats. The authors also find support for online course instruction when unique or multiple learning approaches are employed, and especially when the courses are long, giving students enough time to adapt to the online technologies. Students also performed better when they had more control over their learning, were given opportunities to practice, and received relevant feedback. However, the authors' overall conclusions support Clark (1983, 1994), who suggests that the type of delivery technologies utilized is not as important to learning as the instructional design and student characteristics.

Clark (1983, 1994) has criticized media effectiveness research for lack of robust experimental design, and failure to isolate learning factors that are unique to a single medium. Still, some researchers argue that although it is hard to isolate

specific instructional attributes that affect learning, delivery approaches that possess multiple instructional attributes can contribute positively to learning (e.g., Kozma, 1994). Technology advocates believe that online instruction provides more flexibility and access to multiple instructional methods, and therefore may be superior to a single instructional method. Research on blended learning seems to support this view (e.g., Sitzmann, et al. 2006). The latter authors find support for the effectiveness of blended learning and obtain positive student perceptions about it.

Russell (1999) reviewed 355 studies produced from 1928 to 1998. The studies compared instruction over videotape, interactive video, or satellite with on-campus, in-person courses. Students were compared on test scores, grades, or performance measures unique to the study. Consistently, no significant difference between the comparison groups was found (Meyer 2002). However, the long life and persistence of this research model is surprising - given that numerous researchers have soundly criticized it. Phipps and Merisotis (1999) attacked this research as lacking those elements that distinguish quality research, such as control groups, randomization of treatment groups, and consistency in treatments. The research specifically faults these studies for focusing on courses rather than programs, not accounting for student differences, the interaction of multiple technologies, and the lack of theoretical frameworks. Moore and Thompson (1997) also note the prevalence of weak research designs and lack of control elements in the early comparison studies.

The present study responds to some of the weaknesses cited in previous media comparison studies and, thus, contributes to the overall body of literature. Unlike previous research where treatment and control groups received different instruction (e.g., Karakaya, Ainscough, and Chopoorian 2001; Priluck 2004), in this study, the same lecture by the same instructor is delivered to all three groups (face-to-face, lecture capture or hybrid). Thus, the present research eliminates instructional method and teacher effects. Additionally, extant literature finds that instructor-student and student-student interaction impacts course content, which in turn is the primary driver of perceived quality of the learning experience (Peltier, Schibrowsky, and Drago 2007). Since interaction with the instructor and other students is at the heart of the concerns regarding the quality of education in large classes, (O'Reilly et al. 2007), this research investigates the effect of instructional delivery mode on level of interaction with the instructor and other students in a mega-sized class environment. We propose the following:

H₁: Instruction delivery mode has no effect on level of interaction (quantity and quality) with (a) the instructor and (b) peer students taking the course.

College Self-Efficacy

Self-efficacy theory (Bandura 1977, 1997) has become one of the most widely explored research domains in the field of psychology. It provides a powerful framework for investigating many of the processes affecting behavior in a wide range of domains (DeWitz and Walsh 2002). According to Bandura (1977), perceived self-efficacy

is an individual's belief in his or her ability to successfully perform a specific task or behavior. Bandura (1997) suggests that the degree of self-efficacy belief in a particular domain will affect whether an individual willingly approaches or avoids a given behavior and his or her level of persistence and performance while engaging in that behavior. Consequently, researchers have investigated self-efficacy theory in an effort to describe factors influencing student development and academic persistence (Gore, Leuwerke and Turley 2005).

Solberg, O'Brien, Villarreal, Kennel and Davis (1993) develop a measure of college self-efficacy beliefs, which captures students' confidence in their ability to successfully engage in a range of college-related behaviors. These authors find that college self-efficacy scores are negatively correlated with measures of academic stress and positively correlated with measure of social support. More importantly, they find systematic increases in the college self-efficacy measures as a function of level of education, indicating that college self-efficacy beliefs increase with experience (Solberg et al. 1993). Therefore, college self-efficacy is investigated because of its potential to account for students' engagement in academic behaviors that positively impact the quantity and quality of interactions, such as seeking assistance from professors and interacting with other students (Gore, Leuwerke and Turley 2005). Interestingly, since an individual's degree of perceived self-efficacy is raised or lowered through performance accomplishments, vicarious experiences, social persuasion, and emotional arousal (Bandura, 1982), institutions may be able to improve perceptions of quality of the instruction by taking steps to increase college self-efficacy.

The present study contributes to the current literature by examining the influence of students' individual characteristics such as college self-efficacy instead of assuming homogeneity. Moreover, self-efficacy provides a theory-based approach to the understanding of the effects of multimedia-based instruction on mega-classes. Therefore, we examine the impact of college self-efficacy on level of interaction with the instructor and other students in a mega-class environment, hypothesizing the following:

H₂: As college self-efficacy increases, the level of interaction (quantity and quality) with (a) the instructor and (b) peer students, increases.

Student Outcomes in Mega-Classes

Clark (1994) suggests that media comparison research needs to examine student expectations and outcomes in addition to traditional performance measures. Numerous studies have investigated the impact of flexible delivery and large classes on test scores and other objective tests of theoretical knowledge (Hansen 2008; Karakaya, Ainscough, and Chopoorian 2001); yet, very little is known about the impact of these mega-classes on critical student outcomes such as perceived value, satisfaction, future purchase intentions and word of mouth. Scholars agree that an emerging theme in mega-class environment research involves looking beyond traditional indices of performance (O'Reilly et al. 2007). Therefore, we propose that:

H₃: Instruction delivery mode has no effect on students' (a) perceived value, (b) satisfaction, (c) future enrollment (purchase) intentions and (d) word-of-mouth intentions.

Moderating Role of Flexibility

Researchers have argued that students appreciate a flexible course structure (Hollenbeck, Mason and Song 2011). In fact, allowing students access to learning without the limitations of time and location has become one of the defining characteristics of online education (Peltier, Schibrowsky, and Drago 2007). Contemporary students are making increasing contributions to the cost of their education, are spending less time on campus and more time working in paid employment, and are undertaking an increasing number of activities that compete with the demands of their university studies. This shift in the student body has led to a growing number of students wanting to choose how, where and when they learn. Accordingly, greater flexibility of course delivery facilitates this independent and flexible user-centered student learning. However, the ongoing debate about the effects of flexible delivery on learning effectiveness suggests that flexibility may not be a priority or a desirable feature of a course for at least some students. Still, academic institutions cannot ignore changing student demographics that indicate a larger percentage of students now work, have family responsibilities and commute to campus; for many non-traditional students, flexible delivery of education might be the only opportunity to better themselves through advanced learning (Peltier, Schibrowsky, and Drago 2007). Consequently, we propose the following hypothesis:

H₄: The relationship between instruction delivery mode and student outcomes is moderated by desire for flexibility, such that those with high (low) desire for flexibility have higher (lower) perceived value, satisfaction, future enrollment (purchase) intentions and word-of-mouth intentions for online and hybrid delivery modes than for face-to-face instruction.

Method

Research Setting

The study was conducted with the support of a sizeable business program at a large southeastern public university. The instructor of record submitted a Scholarship of Teaching and Learning grant proposal to study the effectiveness of instruction across varying delivery modes. In order to accomplish this research goal, students enrolled in a Principles of Marketing mega-class were asked to complete a questionnaire. All surveys were completed during the final weeks of the semester when students had sufficient experience with the course to provide knowledgeable evaluations of their learning experience.

Additionally, survey data was supplemented with in-depth semi-structured

interviews conducted with a random purposeful sample of six students who had taken at least three lecture capture courses as part of their coursework, and with a criterion sample of one administrator in charge of the implementation of lecture capture courses for the college. These interviews were conducted to provide additional insights and validation to the hypothesized relationships. The sample for this qualitative explanatory study had not participated in the survey portion of the research.

Design

The design of the study was quasi-experimental as we were unable to randomly assign students to the treatment conditions of the study. Students enrolled in these mega-classes had three options to gain access to identical lecture content: a) attend the face-to-face live lectures every week, b) watch all lectures online, or c) utilize a hybrid combination of the two. Because the same instructor delivered the exact same lecture to all three treatment groups, and all other course activity was identical for all students (chapter quizzes, exam testing, etc.), this study provides a significant improvement in research design over past research.

Data Collection

The surveys were conducted during three separate Fall and Spring semesters in an 18-month period. Sample sizes were 680, 521, and 545. Therefore, a convenience sample of 1,746 participants was used in this research. For the initial study in a fall term, students were not allowed to switch their enrollment between two delivery modes offered – face-to-face or online – however, that requirement was modified in subsequent semesters to provide students with the flexibility to choose how often to attend live lectures (if at all). Consequently, the initial fall term sample of 680 provides a clear separation of the delivery modes, while the data collected from the two subsequent samples include a “hybrid” mode where students reported attending some live lectures and viewing the rest online.

The qualitative interviews were conducted as a follow up to the survey study during the summer term right after the third data collection term. Students enrolled in the Principles of Marketing summer course, which was being taught face-to-face only, were emailed and asked to participate in a study regarding the use of lecture-capture courses in the college. The specific goal of the qualitative study was to interview several students who had completed at least 2 of the lecture capture courses in the college in order to confirm and provide substantiation to the empirical findings.

Respondents were interviewed in one-hour sessions and the interview tapes were transcribed for later analysis. Each respondent was asked the following questions along with follow up questions related to specific respondent remarks:

1. How many and which lecture capture courses had the student completed?

2. What are their overall feelings about lecture capture courses?
3. Where do they tend to watch the lecture (home, library, work, etc.) and why?
4. What do they consider the greatest benefit of lecture capture courses? What attracts them the most to this type of class?
5. What do they consider the greatest weakness of lecture capture courses?
6. How do they feel more comfortable communicating with the professor? Do they communicate over e-mail, call them or go to their office hours?
7. How much of the lecture do they watch? Do they fast forward? Do they rewind and watch some parts over? Do they watch the lecture on an increased speed?
8. How long after the live lecture do they watch the lecture capture?
9. What are their thoughts about the quality and quantity of interaction with other students in the lecture capture courses?
10. What are their thoughts about the quality and quantity of interaction with the professors and graduate assistants in the lecture capture courses?

Participants received course extra credit for participation in the survey and interviews; however, students were informed prior to the interviews that their responses were anonymous and their identities would not be made known to their current professor. In addition to the students, we were also able to interview the associate dean most closely associated with the implementation of lecture capture delivery in the college.

Measures

Measurements to test hypotheses 1 and 2 were collected across all three semesters, while in order to test hypotheses 3 and 4 additional measurements were gathered in the last data collection only. Descriptive statistics for the variables are presented in Table 1.

Table 1
Means and Standard Deviation a

<i>Level of Interaction and Self Efficacy (H₁ and H₂)</i>					
College Self-Efficacy	(n=1746)	3.8 (.595)			
Level of Interaction with the instructor	(n=1746)	2.90 (1.13)			
Level of Interaction with other students	(n=1746)	2.66 (1.11)			
<i>Student Outcomes (H3 and H4)</i>		<i>Perceived Value</i>	<i>Satisfaction</i>	<i>Purchase Intentions</i>	<i>Word of Mouth</i>
Face-to-Face Mode/ Low Flexibility	(n=22)	4.00 (0.5)	4.05 (0.4)	4.07 (0.6)	4.43 (0.4)
Face-to-Face Mode/ High Flexibility	(n=24)	3.31 (1.3)	3.50 (1.3)	3.46 (1.4)	3.62 (1.5)
Hybrid Mode/ Low Flexibility	(n=64)	3.80 (0.9)	4.02 (0.9)	3.71 (1.1)	4.16 (0.9)
Hybrid Mode/ High Flexibility	(n=137)	4.18 (0.7)	4.32 (0.7)	4.16 (0.8)	4.40 (0.6)
Lecture Capture Mode/ Low Flexibility	(n=94)	3.58 (0.9)	3.88 (0.9)	3.5 (1.2)	3.82 (1.0)
Lecture Capture Mode/ High Flexibility	(n=195)	3.87 (0.8)	4.11 (0.8)	3.78 (1.0)	4.15 (0.8)
Total Participants	(n=536)	3.87 (0.9)	4.08 (0.8)	3.82 (1.0)	4.15 (0.9)

^aMeans and standard deviations in parentheses - M (SD), all variables measured on 5-point scales

Independent Variables

Instruction delivery mode was manipulated with enrollment in either a traditional face-to-face course or an online course for the first study. For subsequent semesters students self-reported whether they had attended live classes only, had watched the lectures online only or utilized a combination of the two (referred to as hybrid). Across the three semesters group size was 434 for face-to-face, 373 for hybrid and 939 for lecture capture. College self-efficacy was measured with a 14-item scale adopted from Solberg et al (1993); since the 14 items were highly correlated and showed good internal consistency ($\alpha = .88, .87$ and $.87$ for each term respectively), we collapsed these items to form a unitary measure of college self-efficacy. Next, to capture the proposed moderating effects of flexibility, participants were asked to consider the “greatest benefit from enrolling in a lecture-capture course.” Response alternatives for this question included a variety of possible motivations for enrolling in a flexible delivery course such as skipping class, providing flexibility and having control over their own learning. Students were also provided with an option to select “other reasons” or to select “no benefit” from flexible delivery. Those students who selected

“flexibility” were coded “1” and the remaining students were coded “0” to represent high and low desire for flexibility, respectively.

Dependent Variables

Level of interaction was captured with the mean composite score of an item measuring the quantity of interaction with the instructor and one measuring the quality of the interaction with the instructor on a 5-point scale (1=poor – 5=excellent), which were highly positively correlated ($r=.726$, $p=.000$). Similarly, level of interaction with other students was captured with the mean combined score of two items measuring the quantity and quality of the interaction with other students on a 5-point scale (1=poor – 5=excellent), which were highly positively correlated ($r=.768$, $p=.000$). Existing measures were adapted to capture critical student outcomes for perceived value, satisfaction, future purchase intentions and word-of-mouth and were measured on a 5-point scale (1=Strongly Disagree – 5=Strongly Agree). The computed Cronbach’s alpha coefficients ($\alpha = .889$, $.827$, $.755$ and $.861$ respectively) indicate good internal consistency.

Analysis and Results

Two multiple regressions were used to assess the impact of instruction delivery mode and college self-efficacy on level of interaction with the instructor and other students, after controlling for the effects of major, gender and age. Because there was a possibility of additional variance being introduced into the design by the collection of data across different semesters, we ran the analysis with semester term dummy variables as additional independent variables in the regression equations. The effect of semester term failed to reach statistical significance for the dependent variables of interest ($p>.01$). Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Results from the two regressions are presented in Table 2.

Hypothesis 1 predicted that instruction delivery mode has no effect on level of interaction with (a) the instructor and (b) other students. First, on the regression with level of interaction with the instructor as the dependent variable, the coefficients for the two dummy variables accounting for the three instruction delivery modes fail to reach significance despite the large sample size ($p>.01$). However, on the regression with level of interaction with other students, although the coefficient for Hybrid Mode fails to reach significance ($p>.01$), the coefficient for lecture capture Mode is significant ($\beta = -.119$, $p = .000$). Because the dummy variables for the instructional delivery mode were coded with face-to-face instruction as the reference category, the significant coefficient for lecture capture can be interpreted as indicating that students in the lecture capture section perceive lower levels of interaction with other students than those in the face-to-face section. In contrast, there are no significant differences between those students in the hybrid section and those in the face-to-face section. Thus, these results provide evidence that flexible delivery of lectures has no impact on the quantity and quality of interaction with the course instructor,

supporting H_{1a} ; nevertheless, the findings do not support H_{1b} and suggest that traditional classrooms settings still promote higher level of student interaction with other students. Furthermore, the regressions also reveal that college self-efficacy has a significant positive effect on level of interaction with the instructor ($\beta=.185$, $p=.000$) and other students ($\beta=.181$, $p=.000$). This result provides evidence that higher perceptions of college self-efficacy are associated with higher level of interaction with both instructor and other students supporting Hypothesis 2.

Table 2
Multiple Regression Results

<i>Independent Variables</i>	<i>DV: Quantity and Quality of Interaction With Instructor</i>		<i>DV: Quantity and Quality of Interaction With Other Students</i>	
	Beta	Sig.	Beta	Sig.
College Self-Efficacy	0.185	0.000	0.181	0.000
Hybrid Delivery Mode	0.001	0.975	-0.005	0.891
Lecture Capture Delivery Mode	-0.036	0.292	-0.119	0.000
Fall Semester 2006	-0.017	0.594	-0.024	0.447
Fall Semester 2010	-0.030	0.290	-0.067	0.018
Marketing Major	0.065	0.036	0.128	0.000
Other Business Major	0.036	0.258	0.083	0.008
Communications Major	-0.035	0.194	0.027	0.305
Hospitality Major	0.025	0.336	0.060	0.018
Gender	0.012	0.634	-0.043	0.081
Age	0.065	0.011	-0.049	0.052

Reference category for dummy coding: Term= Spring 2011, Delivery Mode=Face-to-face, Major= Other

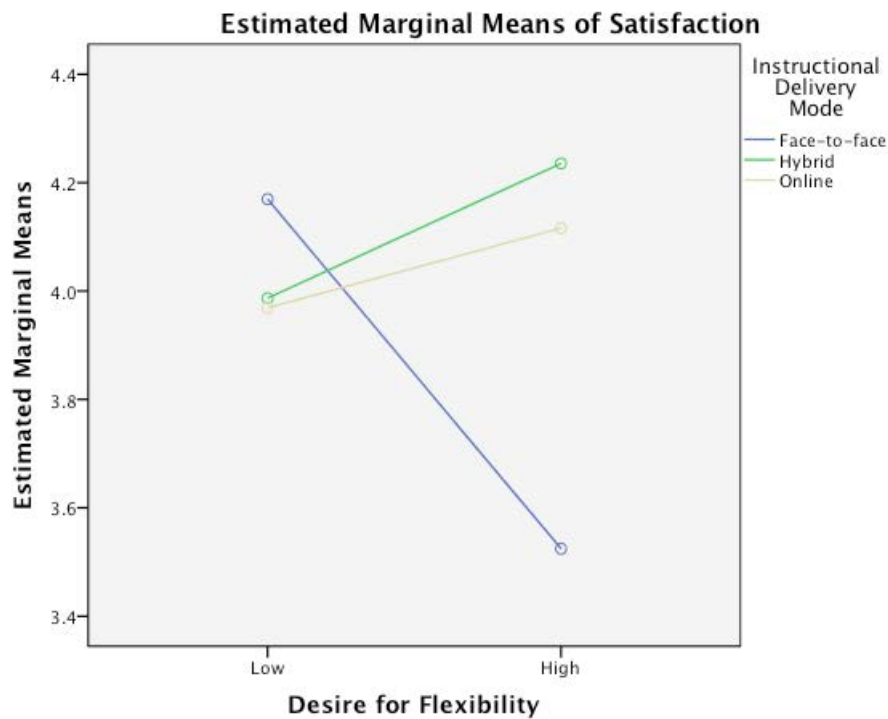
Next, in order to test the last two hypotheses a two-way between-groups MANCOVA with student major, age group, gender and expected grade as a covariates was performed to investigate the effects of instructional delivery mode and desire for flexibility on students' perceived value, satisfaction, future purchase intentions and word of mouth. The covariates were significantly related to the linear combination of dependent variables. The MANCOVA results reveal a significant main effect of instruction delivery mode ($\eta^2 = .960$, $F = 2.66$, $df = 8$, $p = .007$). Desire for flexibility does not have a significant main effect on the dependent variables for student outcomes ($\eta^2 = .993$, $F = .967$, $df = 4$, $p = .425$); however, there is a statistically significant interaction between delivery mode and desire for flexibility ($\eta^2 = .949$, $F = 3.466$, $df = 8$, $p = .001$).

The univariate analysis conducted as a follow up procedure reveals interesting results. Even though a significant main effect of instruction delivery mode on the combination of student outcomes is found, when the results of the dependent variable are considered separately, the only difference that reaches statistical significance is word of mouth ($F = 3.115$, $df = 2$, $p = .045$). Moreover, pairwise comparisons on the effect of lecture format on word of mouth reveals no statistical difference

between face-to-face ($M=4.095$, $sd=.115$) and either hybrid ($M=4.225$, $sd=.059$) or online delivery modes ($M=4.031$, $sd=.049$). Rather, the only significant difference is found between hybrid and online delivery ($p=.013$). These results provide evidence that flexible delivery of mega-classes does not influence critical student outcomes like perceived value, satisfaction, future purchase intentions and word of mouth, supporting Hypothesis 3.

Most remarkably, the interaction of desire for flexibility with instructional mode of delivery is significant for all four dependent variables ($p < .01$). Those with a high desire for flexibility have higher perceived value, satisfaction, future purchase intentions and word-of-mouth intentions for hybrid and online modes of lecture delivery. In contrast, those that do not consider flexibility a priority have higher perceived value, satisfaction, future purchase intentions and word of mouth intentions for lectures delivered in a face-to-face setting. These results provide evidence of the proposed moderating role of desire for flexibility on the relationship between instructional delivery mode and student outcomes, supporting Hypothesis 4. The relationships are illustrated in Figure 1 with satisfaction as a dependent variable; graphs for the remaining student outcomes reflected matching patterns.

Figure 1
Interaction of Delivery Mode and Flexibility



Covariates appearing in the model are evaluated at the following values: Major = 2.65, Age = 1.23, Expected Grade = 2.95, Gender = 1.47

Discussion

The survey findings are further supported by the interviews with the students, which help shed light on what is driving the results. While students do not seem to have any problems limiting the interaction with the instructor to watching lectures, e-mail and discussion posts, all of the students interviewed expressed that some in-person interaction was desirable to develop connections with other students; for instance, a 20-year old female indicated “*you can’t really make friends and have study groups because you are not physically in class*”, while a 20-year old male mentioned that “*it’s hard to meet people... if you don’t go to class like you don’t really know anybody in the class that can help you out*”. Two factors may account for these perceptions. On the one hand, the nature of the relationship with the instructor may differ from that of the relationship with other students, requiring more face-to-face time to forge those connections. On the other hand, the web platform that is currently utilized does not resemble the web 2.0 applications that students are used to develop social relationships. Perhaps incorporation of more social web tools would facilitate increased student-student connectivity.

In addition, the student interviews shed light on how college self-efficacy comes to play as they indicate the need for self-discipline and a “*system*” to organize their course activities; one female junior student comments:

You are basically managing the class... you are the one that has to set up your calendar, ok, enter the test times... they are open from here to here... I got to do my classes here and there... is a lot that goes into just organizing the class for the students... it takes so much time that you have to sort through everything... you have to weed it out.

Thus, it appears that those that are more confident on their ability to develop such system feel more empowered to engage in behaviors that positively impact the quantity and quality of interactions with both the instructor and other students.

The qualitative data also supports the hypotheses that instruction delivery mode has no impact on important student outcomes. Although common perceptions of flexible delivery might initially suggest that it should produce inferior results compared to the traditional face-to-face delivery of instruction, all the students interviewed showed positive attitudes toward the lecture capture format. Moreover, the administrator interviewed indicated that student perception surveys show that “*students love it*”.

Again, the interviews with the students reveal important insight on how flexibility makes an impact on student’s lives, as one working student commented:

I’m a real estate agent and right now I have no listing and everything is clear for my calendar, but then oh my gosh, I’m selling this house and my buyer can only see houses at that time of my class, that is my livelihood that is paying for these classes... then I have to go class, or I have to choose between going to class or work... sometimes you are a student and you want to prioritize and work comes second, but it is a disadvantage.... You know, that would stink for a face-to-face... maybe your schedule changes or whatever... life happens.

In contrast, one of the full-time students indicates her preference for attending in-person classes and referring to lecture captures says:

That would just make me lazy and not want to go to class... and if I did have questions, I'm like oh well, I can just e-mail my teacher...why not? You know, instead of going to class... so I don't know.

These comments highlight an important difference between traditional and non-traditional students. While flexible delivery can potentially be distracting to a traditional student without work or family responsibilities, it can enable non-traditional students to enroll in courses that would otherwise conflict with their schedule. Traditional face-to-face instruction can become a burden for these latter students who are forced to make trade-offs between their education and their livelihood. In fact, 25% of the students surveyed reported working full-time and another 50% reported working at least part-time. Moreover, nearly 51% strongly agree that they are responsible for most of their educational expenses. Therefore, the desire for flexible delivery should not be dismissed as simply a convenience for the students, but rather should be understood as a necessity for a good portion of students in the shifting student population.

Conclusion

As the results demonstrate, delivering instruction to mega-classes via lecture capture is a viable avenue to tackle the challenges of quickly rising enrollments and shrinking administrative budgets without compromising instructional quality. Course evaluations for the Principles of Marketing course examined in this research show a significant positive trend from 4.05 (sd=.04) in the initial test term to 4.35 (sd=.05) in the third term (1=poor to 5=Excellent).

Our findings show that instructional delivery mode has no significant effect on students' perceptions of quantity and quality of interaction with the instructor and that these results are robust across three separate semesters. In addition, we show that flexible delivery has no significant impact on measures of perceived value, satisfaction, purchase intent and word of mouth. Yet, our findings do suggest that some face-to-face classroom interaction impacts the amount and quality of interaction with other students. As universities increasingly adopt online delivery methods of content, administrators and faculty must remain cognizant of incorporating features that enable and support increased student-student interaction.

Moreover, college self-efficacy is identified as a means to improve students' perceptions of level of interaction with both the instructor and their peers. Thus, academic institutions should consider taking steps that increase students' self-efficacy beliefs. Lastly, the moderating role of desire for flexibility sheds light on an important aspect of flexible delivery that has been overlooked by previous research and which might be responsible for the conflicting findings in the literature. Namely, the relationship between delivery media and student outcomes depends on students' desire for flexibility, such that those with high desire for flexibility assign higher evaluations to hybrid and online courses than those who don't consider it a priority;

in contrast, these latter students value face-to-face instruction more than its flexible counterpart.

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