ASSESSING STUDENT CHARACTERISTICS FOR SUCCESS IN ONLINE VERSUS FACE-TO-FACE ENVIRONMENTS

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ABSTRACT

Online education is pervasive in higher education today. More students are taking courses online than ever before. Institutions are encouraged to adopt virtual classrooms as the market demands access. This study examined the characteristics of students who choose to enroll in online or face-to-face courses and their eventual academic outcomes in their selected course. The purpose was to determine whether online and face-to-face students possess the same skillsets or if there are characteristics that a student should possess when choosing to enroll in an online class or program. Additionally, this study examined students' perception of online courses versus face-to-face courses to determine if there were any differences in students' feedback based on the type of course in which they were enrolled. The course Management Information Systems 101 (MS107) served as the focus of this study; it is a required undergraduate business course in an urban university. Typically, undergraduate sophomores or juniors take this course and are declared business majors at the university. The units for analysis consisted of students enrolled in MS107 in the fall of 2017 and spring of 2018 semesters. The online courses were conducted via WebEx, synchronously with live interaction from the professor. The face-to-face classes were conducted in the traditional environment on the university's main campus. Data were collected from the university's student system, student feedback forms, and the university's New Student Questionnaire (NSQ) and concatenated to present a full picture of each student's course outcome, demographics, and responses to the NSQ. The purpose in analyzing this information was to determine if there are behavioral, demographic, or other characteristics that might lend to better or worse performance in an online classroom. Finally, student feedback was analyzed to determine whether students have different opinions of MS107 depending on course delivery

method. Results of this study indicate that from a course delivery perspective, engagement between students and faculty is a critical asset that should be developed in the online classroom environment. In the analysis of the student self-reported characteristics, many of the characteristics for success for the entire sample hold true for the characteristics of successful students in the face-to-face sections. For the online sections, however, the key predictors of success are simply previous grade point average and expectation of high averages in college, eliminating variables like self-confidence and hard working. The results of this study support prior research that states students perform better in face-to-face classrooms than online; however, this research begins to showcase what opportunities might be available for improvement in the online classroom.

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CHAPTER 1

INTRODUCTION

In 2014, Allen and Seaman published the tenth installment of *Grade Change: Tracking Online Education in the United States.* This report provides the results of a survey on online learning completed by over 2,800 colleges and universities. Allen and Seaman showed that 69.1% of higher education leaders indicate that online learning is critical to their long-term strategy (p. 4). As online learning is quickly becoming the norm for many college students and professors, it is important that higher education leaders understand how to guide their students toward the right path of education—whether online or the traditional face-to-face route.

Students can now earn their entire degree without ever setting foot on a campus or meeting a faculty member in person. For some students, this provides a convenient, methodical way to obtain a degree. For other students, there may be a disconnect in the learning and their personal characteristics may inhibit them from succeeding in an online environment. Allen and Seaman (2014) also indicated that academic leaders felt that online students require more self-discipline than traditional students and that student retention rates are lower for online classes. It is important for administrators to understand whether this is the case and, if so, how admissions offices and online learning offices can assist with placing students in the right style of classroom that will lead to their ultimate success.

According to Seaman, Allen, and Seaman (2018) in *Grade Increase: Tracking Distance Education in the United States*, there are now fewer undergraduates studying on campus than at any point since 2012 (p. 3). The number of students enrolled in distance-

only learning courses, paired with the declining rate of student enrollment in undergraduate institutions, means that there are now fewer students coming to a physical campus. Instead, according to Seaman et al., the number of undergraduate students enrolled in a distance learning course has grown by 5.6% from Fall 2015 to Fall 2016. Another statistic from the same report outlines that the growth of distance-learning student enrollment is occurring in the public and private institutions, not the for-profit sector. These numbers serve as a cue for public and private institutions of higher education to continue to increase their distance learning offerings to continue increasing or at least maintain their enrollment numbers. It is not as simple, though, as adding online sections of courses traditionally offered as face-to-face sections. Institutions, striving to continue their educational practices, must look to provide students in online courses with the same opportunities as those in the face-to-face sections.

In a 2007 white paper, the Association to Advance Collegiate Schools of Business (AACSB) defined distance learning as "any learning system where teaching behaviors are separated from learning behaviors" (p. 4). AACSB said that students and faculty can communicate in any number of ways through technology, including text, computers, video, internet, and face-to-face communication. Since 2007, this definition of online learning has not changed much; however, the landscape of online education has most definitely shifted from a separation of student and professor into a model where students and professors can use technology interactively and in real time.

In higher education, the effectiveness of online learning and its contribution to the student's ability to digest and understand material has also been hotly debated. Previous research around online education is evaluated in the literature review on course delivery

method, showcasing that there are some disparate thoughts when it comes to how educators feel about online education and a student's course outcome as it pertains to course delivery method.

According to the annual report *Online Report Card: Tracking Online Education in the United States* (Allen & Seaman, 2015), about 5.8 million students took at least some of their classes online in 2014. This study also uncovered that online learning is taking place more commonly at public institutions than private. The researchers found that online courses are critical to the success and long-term strategy of the institution. This may be due to the different makeup of the public institution's student body or its mission. Today's public institution serves a population of students who are looking to work and go to school at the same time. According to Chris Blake (n.d.) of the *Seattle Post-Intelligencer*, Seattle's metro newspaper and the first newspaper to go fully digital in 2009, students take online classes for many reasons, including but not limited to flexibility, accessibility, and comfort.

Kelsey Sheehy (2013) reported that despite a lack of support from faculty, online education was in growth mode. Enrollments in online classes continued an upward trend, even though faculty felt that it was not as effective in delivering coursework as the traditional face-to-face classroom. In 2013, 62.4% of the colleges surveyed for the study *Changing Course: Ten Years of Tracking Online Education in the US* reported that their institutions were meeting market demands by offering fully online degree programs— almost double that of 10 years prior. That said, in the same report, chief academic officers reported that only 30.2% of their faculty accept and value online education. As the number of students enrolled in online classes increases, it is incumbent on the faculty and

the administration to determine where the value can be found in online education and what types of students might best fit into the online learning environment. The lack of faculty support could be that there is simply not enough research around the student outcomes in an online classroom or that faculty need coaching and support when transitioning to a virtual classroom.

According to the Online Learning Consortium (2016), "As the balance of power shifts from universities to consumers, new hybrid models of education are already beginning to emerge" (p. 1). Online learning is disrupting the educational marketplace, allowing students the freedom to select courses that are of value to their future, regardless of time, location, or university. The same report indicated that the number of distance learning students is up 3.9% year over year. This increase in students' interest in online learning and their desire to increase their skillsets while maintaining robust full-time jobs or family commitments leads to nearly six million students *going viral* by enrolling in online classes. Some employers and educators still indicate that online learning does not allow for the rigor or networking opportunities that are afforded in a face-to-face campus experience; however, as more universities and colleges undertake and implement online learning programs, this skepticism is in decline. Online courses and whole programs are quickly becoming more widely accepted as students continue to enroll, complete, and join the workforce. As the increase in online learning continues, schools will need to adapt their delivery methods to accommodate not only the online learning environment but the method of delivery, ensuring that the students enrolled in these virtual classrooms are able to succeed and prosper.

With the upward trend in online course enrollment, it is critical that institutions examine the persistence and success rates of current students enrolled in online courses as compared to their counterparts in face-to-face classrooms. Equally important is an understanding of the motivations and intrinsic characteristics of the online learner. Understanding this persona will likely lend to better advising, course design, and resource allocation for the institution. This will also enable institutions to understand better the changing face of the student population and thus increase services to those students in required areas.

Incoming students may not have a clear understanding of the different skillsets that may be required when taking an online class versus a traditional face-to-face format to which they are accustomed. Students may see the online class as providing the exact same interface as the traditional or that they will be successful in the classroom, regardless of the delivery method. Research has indicated that there are different demographics or characteristics that students possess that lend toward success in an online classroom. Researchers have found that women, Whites, older students, students with higher previous grade point averages (GPAs), and students with self-discipline will be successful in the online classroom (Sparkman, Maulding, & Roberts, 2012; Wilson & Allen, 2011; Wojciechowski & Palmer, 2005; Xu & Jaggars, 2013). Swan (2001) found that interaction was a key factor for success—regardless of delivery method. The following question arises: Are the characteristics that frame success in an online classroom intrinsic to the student, or is it the course development and framework that will ultimately lead the student to a path of success?

Statement of the Problem

The purpose of this study is twofold. First, the study examines students enrolled in both face-to-face and online classrooms to determine if there are any significant differences in student achievement outcomes (earned grade in the course) and student perception of the course delivery (Student Evaluation Feedback [SFF] data). Second, this study investigates the data to determine if there are significant differences in student achievement outcomes (earned grade in the course) and selection of course delivery method, based on a particular set of student characteristics as reported by the student when entering college. Examining student reported characteristics and correlating them to the outcome of the student in the course may help to answer whether online learning is a course offering that should be available to all students of higher education. Student demographics are analyzed to determine whether a particular demographic will earn higher course grades in an online versus face-to-face environment. Lastly, this study looks at student coding, including what academic year students enrolled in the course and what their intended major at the time of registration was to determine if any of these variables has a bearing on their academic success. As more schools create programs in which students can obtain a degree wholly online, it is crucial to understand the skills and characteristics that are required for student success in such a program.

To address the research questions posed in this dissertation, a mixed-method approach is utilized to determine whether students achieved higher outcomes in online sections of Management Information Systems 2101: "Information Systems in Organizations" (MS107) based on possession of a standard set of behavioral characteristics. The traditional MS107 course is taught completely face-to-face with

students meeting weekly to participate in activities, lecture, and discussion. The online MS107 sections are taught completely online with both synchronous and asynchronous components. Students log into class via WebEx from any possible location. In the online sections, students cover the same materials, discussions, and lectures as the traditional format, only in a virtual format. To assess the outcomes and the characteristics, New Student Questionnaire (NSQ) data and final class grades are examined for courses conducted in the Fall 2017 and Spring 2018 semesters. To determine student satisfaction with an online learning environment, SFF data are analyzed from the same time period.

Research Questions

The current study addresses several questions that relate to student performance and success in an online course and how their success relates to personal student characteristics. First, it assesses the academic achievement outcomes of the students in both the online and face-to-face sections in a lower-division, required course in the Fox School of Business undergraduate curriculum. This course, MS107, is required of all Fox School undergraduates and is primarily taken in their sophomore or junior year of study. As the purpose of this study is to ascertain if the delivery method affects student achievement, final grades earned are the metric used to determine success. Second, a profile of each enrolled student has been constructed using demographic and anecdotal data available from the NSQ. These data are utilized to determine whether there are significant differences in outcomes dependent on student demographic information or information self-reported on themselves when taking the NSQ. Finally, student perceptions of the course delivery and experience are discussed utilizing the data gleaned from the SFF evaluation results of the students enrolled each semester.

RQ1: Is there a significant difference in student achievement as measured by final grade in an online course versus a face-to-face course?

RQ2: Is there a significant difference in the SFF data for an online course versus a face-to-face course?

RQ3: Are there differences in the types of students that will select an online class versus a face-to-face course?

RQ4: Are there specific characteristics that will determine success in an online course that differ from the predictors of success in a face-to-face course?

Importance of the Research

The online learning environment is growing at a rapid pace with enrollment rising every year. As institutions struggle to compete with an increasingly digital classroom, as demanded by the market, it is important that the online courses created provide the same level of education and opportunity as the traditional method of course delivery. Online learners often feel alone or on their own within the environment, which may lead to lower persistence rates or course outcomes. As the literature review in the current research describes, students who are engaged in a collaborative learning environment show higher persistence rates; it is important that these findings continue in the online classroom as well. The current research will also build on Ally's (2008) theory of connectivism, where students continue to learn as the environment adapts and changes around them, attempting to determine if it is the learning environment that will enable success or if it is a student's characteristics when entering the environment that may lead them to a successful outcome.

Additionally, as online courses become commonplace for today's student, it is critical for both students and institutions to understand which student characteristics may position a student for success in a virtual environment. This understanding would enable advisors to understand which students will ultimately persist and succeed in an online classroom and thus provide students with the advising ability that is ultimately tailored to meet their needs. Understanding student behaviors could lead to better course development as educators gain a deeper understanding of what skills a student must possess to complete a course in an online environment. As more faculty members begin to teach a flipped or hybrid classroom, it is important to understand the characteristics of students that will ultimately achieve success.

Summary

Responding to the consistent increase in an institution's desire to provide and the student's desire to enroll in online classes has led education administrators to the goal of opening courses and seats in online classes and filling those seats with students who will succeed. The current study evaluates the effectiveness of an online classroom versus a traditional classroom, looking closely at students' persistence and satisfaction with their experience, utilizing data from an undergraduate business requirement (i.e., MS107). The study further looks at students' self-reported data to determine whether there are any characteristics that correlate to greater success in an online classroom. The information in this introduction provided a justification for this study as well as a brief overview of the literature and proposed research questions.

CHAPTER 2

REVIEW OF THE LITERATURE

We live in an age where students are digital natives (Prensky, 2001) or, rather, speak the language of technology with a fluency like no other generation. There are few barriers to their technical capabilities, and the undergraduates of today expect institutions, professors, and peers to communicate with the language of technology at the same pace. Allen and Seaman (2015) stated that 74% of undergraduate students have taken an online class of some sort—yet, only 50% of university officials feel that online learning is as effective as traditional face-to-face education. There seems to be a fundamental disparity in what the market is demanding—effective online coursework—versus what institutions report they are providing. Lastly, today's global employer, for whom we are preparing students to engage in employment, cite critical thinking skills as a top requirement in a student's skillset upon graduation. That said, it is crucial that today's institutions provide effective education that develops a student's ability to think, analyze, and learn in multiple formats of delivery. It is incumbent on today's institutions of higher education to provide students with the necessary tools for success and to assist students with the advising necessary to determine if they will be successful in an online environment.

The digital mindset of the student cannot be ignored. In a UNESCO brief on the digitally native student, Cornu (2011) stated that this is "the generation of web 2.0, whose students can communicate, collaborate and have access to information at any time and from anywhere they choose" (p. 3). The report details that students of today are constantly connected and have access to everything they need at their fingertips. According to a *Campus Technology* review of its 2016 conference, Kelly (2016) wrote,

"Students view technology as electricity—but university leaders may not" (p. 2). Kelly discussed how today's students perceive technology that is not interactive as being broken and that we, as educators, should focus on the changing definitions of students' needs. To be effective educators, we must show a fluidity of collaboration, technology, and critical thinking. Today's technically savvy students may not see the difference in online versus face-to-face courses, feeling if they have the technical capacity, enrolling in an online class may be the same as enrolling in a face-to-face section. While in some cases there may be little difference in how the professor conducts the course regardless of delivery method, it may be that students are better prepared for success when they take the course in person rather than virtually—or vice versa.

In today's digital landscape, educators cannot ignore the technology that students use daily but rather must strive to incorporate it into their classroom. Today's student utilizes a myriad of technology on a daily basis—Google for fact finding, YouTube videos for learning or pleasure, online chat boards for news, and social media for relationship building—all of this in addition to their personal interactions with peers. Today's students are also comfortable chatting online, engaging with peers, and posting their thoughts and beliefs to a broad audience. Understanding their mindset contributes to understanding how they will learn and communicate effectively in an educational environment. That said, does a student's technical ability indicate that he or she will be successful in an online learning environment? Does technical aptitude indicate that a student will perform the same in the classroom, regardless of the delivery method? Or are the typical characteristics that point toward student success a better predictor of how the student will perform in the online classroom?

While reviewing the characteristics for success that shape students' performance, it is also critical to acknowledge what is happening in the classroom that may also promote students' learning. Engaging students to think critically is also a challenge faced in the classroom today, regardless of delivery method. Often, whether virtually or in a traditional classroom setting, students are only looking for what they need to know to *pass the test*. With the ability to *google* everything or watch a video on virtually any topic, how can today's educator enhance students' ability to analyze a situation, think critically on a topic, and offer their own collaborative response? Again, does students' ability to use technology and their own self-motivation enable them to push forward in the classroom environment regardless of its face-to face or online nature?

From these three concepts—the digitally native student, the efficacy of online learning, and the student's intrinsic characteristics—a critical issue arises. How does today's educator incorporate the digital mindset and requirements of the student, the pedagogical expertise of the faculty, and the necessity to provide an education in both a face-to-face and online environment to provide students with the environment that will enable them to persist toward the completion of their degree?

This literature review focuses on what is considered online learning, what the current bank of research says about student success in the classroom and student characteristics that lead toward that success, and what the research says about student success in an online versus traditional face-to-face environment.

Online Learning and its Growing Pervasiveness in Education

The term *online learning* is often hard to define (Moore, Dickson-Deane, & Galyen, 2011). There are many variations, often used interchangeably, of the concepts

around online learning, blended learning, e-learning, etc. This often leads to misunderstandings about what researchers or educators are discussing when they talk about an online environment or an online class. While the terms seem similar enough, to have a clear understanding of what is included in an online environment or online course, it is important to start with a common understanding of what the term indicates for the purposes of this research.

Mayadas and Miller (2014) provided several variations on course delivery methods. The definitions pertinent to this research follow: "*online course*—all course activity is done online; there are no required face-to-face sessions within the course and no requirements for on-campus activity" (Mayadas & Miller, 2014, p. 2) and "*hybrid or blended course*—online activity is mixed with classroom meetings, replacing at least 20 percent, but not all required face-to-face meetings" (p. 2). For the purposes of this research, those two definitions are blended to form a term with a slight variation on both: a *hybrid online class* is taught completely online or virtually but includes synchronous face-to-face class meetings in which the students and faculty interact and engage through lecture and a series of collaborative, instructor-led, in-class activities.

Mark Bullen (1998) studied participation and critical thinking in online distance education from a university perspective. Bullen's study was extremely early on in the days of online education and looked into how computer conferencing would change the landscape of learning. Based on literature from previous studies and his findings, Bullen determined that computer-based learning has "the potential to create a new learning environment in which interaction, collaboration, knowledge building, and critical thinking" (p. 1) are defining features. The question arises around how to do this, though,

in a virtual environment and if those criteria are critical to the success of the student. How are they incorporated into the learning environment? Certainly, the online learning landscape allows for educators to take new approaches and perhaps look for new outcomes in the learning environment but crucial is how to meld the technology and the interpersonal into a cohesive classroom environment that will foster student success. While years have passed since that initial study, the same four tenets play a major role in today's online educational environment and remain important to student success. It is the duty of administrators in an online education environment to ensure that students are provided with the optimal learning environment in which they can understand, analyze, and utilize the material covered in class.

Driscoll, Jicha, Hunt, Tichavsky, and Thompson (2012) presented two opposing views of the efficacy and effectiveness of online learning and presented the two distinct sides of the argument of the value added to students learning in an online environment. They first discussed the research of Rovai and Barnum and stated that an online learning environment robs the student of the face-to-face classroom approach of the interaction that is vital to develop students' knowledge. While students have many electronic interactions available through discussion boards, email, web postings, and shared documents, the authors cited the works of Bok (2003) and Summers, Waigandt, and Whittaker (2005) that indicated that these electronic forms of communication are too scripted, too formal, and unsuitable substitutes for the real-time, in-class discussions and interactions that take place in a traditional face-to-face classroom.

In opposition to that view, Driscoll et al. (2012) proposed the idea that there is no significant difference between a student learning outcome in a traditional or an online

medium—the dependence of success is based on the student and faculty investment in the learning process. Whether the class is conducted online or in person, if students are invested, they will come away with the same level of knowledge. After making those claims, the authors moved into their own study to determine whether performance and satisfaction differ across online and face-to-face settings, with no regard to students' personal characteristics. Driscoll et al. found that when classes were designed pedagogically the same in both online and face-to-face environments and when the variables for instructor and subject were controlled (i.e., the same faculty member taught the same material with the same expected learning outcomes in both sections), "the online education can be equally as effective as face to face" (p. 2). The authors also determined that students in both environments desire interaction between faculty and other students as part of the learning environment, regardless of the course delivery method.

Auster (2015) studied the effects of *flipping the classroom* or, rather, that of having students watch screencasts or prerecorded lectures and then utilize the face-to-face classroom time engaging in more discussions than just the traditional lecture environment. Auster primarily focused on face-to-face learning with a supplemental online component, rather than an online environment with an online hybrid environment, but her findings are important in that 95% of students felt that the online delivery of content as part of the class was at least somewhat effective in the learning environment. Students also reported that they were much more enthusiastic about utilizing the online tools at the end of the semester than they were at the onset. Perhaps this is due to the value added being realized as the students developed a deeper understanding of the tools

and a more intense interaction with the professor during the semester. Auster asserted that there is "an increasing appeal to the use of screencasts and blended learning to the students over time" (p. 45).

Kelly (2016) also found that 75% of respondents have adopted some type of hybrid or blended learning approach to their traditional courses. Of those who had not yet done so, 11% indicated that they expect to do so in the next year. Recent research has focused on student–course interaction and how an individual's interaction with course materials can be used to predict course outcomes. Using Learning Management System data gleaned from both for-credit and massive open online courses, Almeda (2018) found nine features of interaction that contributed to the prediction on students' final course outcome. For example, Almeda showed that the number of student comments on online discussion boards was directly related to their success in the course—both on a letter grade or pass-or-fail level. Today's online educators must understand which factors of engagement are critical on the student's path to success in the classroom to encourage their students' success.

In an exploratory study, Breirton, Wilson, Kistler, Flowers, and Jones (2016) analyzed the effect of online discussion in synchronous and asynchronous environments and found that while a deeper cognitive learning resulted from asynchronous discussions, there is much more research to be done in the area of online learning and of specific techniques that are used in a virtual environment. Their goal was to research strategies used to promote and generate deep, analytical thinking, which as stated is something that is critical to the success of today's college graduate.

The literature around student satisfaction and success in an online classroom indicates that engagement with the material and the instructor is a predictor of student satisfaction and deeper cognitive understanding of the material. These findings support the idea that students are likely to perform better when they feel as though they have a personal connection to the material and can engage on the topic in a meaningful manner.

Characteristics for Student Success

Previous research has focused on two traditional predictors of student success in college—the student's high school GPA and the student's performance on standardized tests, such as the ACT or the SAT (Sparkman et al., 2012). Sparkman et al. (2012) used this as their basic understanding when studying how other, nonacademic variables factored into admitting students to college. Admissions counselors typically use this as a baseline for determining if students will succeed in the program and in their college career. Sparkman et al. found that the most likely demographic to graduate from college is "white females, not dating, who live on campus their first semester and one or more of their parents having a 4-year degree" (p. 648). The authors suggested that the students in other demographics may lack the financial or emotional support to commit to college, increasing the likelihood of dropping out or taking lighter course loads, which ultimately defers or bars their success in college. This is an extremely specific cross-section of socioeconomic, personal and demographic data that showcases the student success in college but does not showcase whether or not these data are consistent for those enrolled in face-to-face programs or online.

In a study of 51,107 degree-seeking students enrolled in the community college system in Washington State, Xu and Jaggars (2013) looked specifically into student

demographics with a focus on student persistence and outcome while enrolled in the institution's face-to-face and online classrooms. The overall findings in the study indicated that typical college students do not fare as well in an online environment as they do in the face-to-face classroom, but there are specific demographic characteristics of students that trend lower than the norm. The authors found that males, Blacks, and students with lower levels of academic preparation performed more poorly than the rest of the population. The authors also found that students enrolled in online business classes tended to perform more poorly than when enrolled in other subjects. When paired with the study by Sparkman et al. (2012), the results become more applicable to the online environment—perhaps it is not just the face-to-face sections where women perform better but in university overall—regardless of course delivery mechanism. Other studies have focused on gender, age, and ethnicity alone as factors assisting or harming success in an online classroom.

Wilson and Allen (2011) found that online students were typically female, older, and had more banked semester hours than the face-to-face students (p. 59). This may be due to better success rates among the group or a better level of preparedness. Figlio, Rush, and Yin (2010) also found that the poorer performers in online courses tended to be male, had a lower GPA than the college median, and were Hispanic. They proposed various reasons as to why these characteristics led to lower performance in online classes. However, there is still much research to be done to determine if this is a given or if there are other factors that also lead to success or if these findings are simply consistent with overall educational outcomes regardless of course delivery method.

There are other characteristics, aside from demographic and socioeconomic, that may influence students' outcome in the classroom. Sparkman et al. (2012) found that classroom flexibility had a negative correlation to students' success in that students who could easily adjust their emotions, thoughts, and behaviors may have found it easier to change or drop courses, degree programs, and even career plans. The ability to change and adapt, in this case, proved to be detrimental to students' ability to perform well and/or complete their coursework. The authors also found that students who could control their impulses, that is resist the temptation to act without thinking, were more likely to be successful in the classroom. Reviewing this combination of low flexibility and high impulse control indicates that students who are truly committed to their coursework will likely be successful in the classroom, completing the coursework and their degree.

Prior to the above-mentioned research, Astin (1993) found that the most powerful source of influence on a student's academic and personal success was that of student interaction with faculty and with peers. Astin found that students with high levels of peer interaction through a variety of on-campus activities such as intramural sports, tutoring other students, working on group projects, and socializing in student clubs was the best predictor of how successful those students would be in their college careers. Astin also found that student–faculty interaction was of critical importance to the student's academic performance and intellectual growth and future career growth. These findings indicate that a student's face-to-face interactions among members of the collegial community are better predictors of achievement than just looking at the student's previous academic performance. This is a characteristic of learning that is more than about what the student possesses but how the faculty member and the student relate. It

may be that the student can overcome certain barriers to learning in the classroom if there is a feeling of connectedness to the professor and the community in the classroom.

Onlinecollege.org (2011) listed 10 characteristics that students should possess to be successful in their college career. They warned that the student need not possess these characteristics to obtain a degree or a job. However, they are strongly correlated with success. The site also delved into each characteristic and why it is important. The characteristics listed in order follow: interest in learning, inquisitive nature, ability to adapt well to change, focus on personal and professional goals, persistence, self-direction and self-efficiency, an open mind, confidence and humility, an online presence, and respect for the educational process . Many of these characteristics do not appear to be inherently tied to a student's intelligent aptitude to earn a high score on a test or write an A+ paper but rather are focused on a student's intrinsic core value system and his or her ability to think, understand, and adapt.

This poses the question: Do any of these characteristics correlate directly to a student's ability to be successful in a classroom environment, more specifically in an online environment? Is a predisposition toward any of these characteristics over others an indication that a student may be successful in a virtual environment? These traits may provide a student with the fundamental skillset for success in any environment. What is missing is whether or not these characteristics make more sense or are required for students taking courses in the traditional face-to-face method or virtually in some capacity.

In research on student characteristics of success in an online business class, Wojciechowski and Palmer (2005) studied students enrolled in an online business course

over a period of 3 years. They sought to determine if there were certain factors that students and their advisors should consider when determining to enroll in an online course. The authors looked at 13 variables for correlation to success, most of which were based on student's participation in an event (e.g., on campus orientation), a score (e.g., ACT), or demographic data (e.g., gender or age). The authors concluded that the variable most closely linked to success was the student's GPA. This indicates that students who have strong GPAs in other classes should perform well in an online environment. This conclusion has a natural feel to it, as other researchers have noted that there is a positive and significant relation between performance in previous classes and current performance in a class. It is worth it, then, to look further and review what other characteristics linked to possible success look like in an online environment. The current research may indicate that students will do well in a course regardless of delivery method and regardless of intrinsic characteristics they possess.

Wojciechowski and Palmer (2005) also found that students who attended the in-person orientation session earned better grades in the classroom. Looking back at the research that indicates that engagement is a critical factor for success, this could be linked to a student's sense of community or rooted in the idea that students who attend orientation want to feel involved with the university. The next significant variable was that of the number of withdrawals that students had in previous classes and, finally, the student's reading scores in a college-administered reading exam. Linking these four characteristics together, one can start to surmise that students who do well in school will do well regardless of delivery method—but that there must be some sense of community included with that ability to do well. Students should feel that they are a part of

something and not simply learning on their own. Is this a characteristic for all learners? Or would this sense of community be less important to online learners as they may have different expectations around their experience while attending classes?

Eduventures (2015), a company focused on helping higher education leaders understand students and what is important to them, surveyed over 28,000 students currently enrolled in an online program. Its goal was to help its clients understand the mindset of the online learner and the factors—either positive or negative—affecting a student's success. Eduventures found two distinct categories of students. Students who performed well had a clear understanding of (a) the course objectives and (b) the technology for the course. Students cited these factors as important over any other potential factors in their success. The students who performed poorly indicated that personal distractions, lack of motivation, and the pace of the courses all hindered their success in the classroom. It is interesting to note that the higher-performing students did not weigh things like personal motivation or time management skills as key indicators of their success. They also did not value the faculty or peer interaction as a contributor to their success. Could it be that they hold these characteristics as intrinsic to going to school and thus be irrelevant or unimportant for success in an online environment?

According to Lim, Dannels, and Watkins (2008), there are four descriptive themes occur across all students taking courses online. They have concluded that expertise in technology is not an issue, online courses allow for much more convenience, and online courses tend to be very well organized. The fourth theme is the requirement that students be self-disciplined to participate and make the most of the class. Self-discipline is an undercurrent in much of the research on online course success factors.

In research on student perceptions and needs for success, Baxter (2012) found that managing expectations about work and study roles played an important role in student retention and success in class. She also found that if expectations were not managed appropriately, students would rapidly leave the online class. Baxter found that students were successful when they had a determination to succeed, a supportive home environment, and university interventions (i.e., regular check-ins with advising and faculty members through the course of the student's program). It is not enough for the university to have the support in place, but students must be aware of its availability. When moving into an online environment, it is apparent that the university support system must be readily available to students so that they do not feel that they are on their own. They must feel that even though they are not on a campus, they are part of some community—whether physical or virtual.

There are some common themes that occur around the characteristics that will generally lead to success for a student in the classroom environment. Many of the studies on success in the online environment are very specific to a type of course or population of students, whether it be science or community college. As noted, the findings vary somewhat across the studies; however, as the body of research continues to grow in this area, the characteristics or needs of the students in the online classroom is starting to become more focused. The early days of asynchronous classes and discussion board posts will no longer suffice. The value for students will occur when they feel part of a community and are able to interact with the faculty and their peers in a virtual classroom. This also ties into the self-discipline traits in that if students feel connected to the

professor and class, perhaps they will feel more inclined to keep working and progressing toward a good outcome.

<div align="center">Outcomes in Online Classrooms</div>

According to James, Swan, and Daston (2016), "Researchers are learning that the learning outcomes from online courses are not significantly different from traditional courses" (p. 2). Online students are more likely to withdraw or not complete the course or not return to school after a few semesters. The authors also found that students who take significantly more courses online are less likely to graduate or attain their certificates. James et al. discussed the variability across studies, noting that some studies indicated that long-term outcomes for online students are better than expected. Delving into this information, it should be noted that authors do not discuss engagement as one of the factors in student persistence. As such, they are not able to discuss the effect of whether students taking an online class with no professor engagement versus an online class with high levels of professor engagement levels feel more invested in the classroom, which could potentially decrease the withdraw rate. Their research went on to detail that the retention rate of students who take some traditional classes and online classes have a higher retention rate than those who took fully online classes. This finding ties directly into the literature that students, regardless of course delivery method, need to feel connected to something whether it be the professor, the university, or their peers.

In a study completed by The Boston Consulting Group (2018), Bailey, Vaduganathan, Henry, Laverdiere, and Pugliese showed that universities that commit to digital learning generate significant returns on the investment. Bailey et al. showed that students persist and may even complete their degree in less time than in a traditional

mode; access to education is improved, particularly for students that are considered at a disadvantage; and the university itself can lower operating costs. Access is more readily available for those working full time or raising families who may not have the flexibility to attend a traditional class at a university. Operating costs are lowered and revenues are increased as there is less need for classroom space and more classes can be offered at the same time as there are no seat or room restrictions. As mentioned, students are agreeable to digital formats of learning for the convenience and accessibility of it. Universities, looking to continue to grow enrollment, are interested as this enables the student population to rise, while minimizing the additional cost of adding the students. These three factors help to accelerate the trend toward online classes and the ability of students to select an online option or a face-to-face option when determining which courses to enroll in for their education. As online education continues to grow, it is imperative that universities embrace the digital technology and determine how to improve the experience for the students.

As the growing body of scholarship focuses on the effects of online courses and student performance in online classrooms, additional analyses are also provided. For example, in a recent study, Bettinger, Fox, Loeb, and Taylor (2017) found that students taking courses online have significantly lower outcomes than their counterparts enrolled in traditional face-to-face courses. The researchers also found that not only are there negative effects, but these negative effects are amplified when students have lower prior GPAs. Bettinger et al. mentioned several reasons why this could be, including students' personal challenge of managing their time and that students may feel less pressure to interact with their professors as there could be little engagement between the two. This

study did not address what motivated the student to take the course online; the authors made some assumptions about distance from campus but did not include demographic or student characteristic information.

Hart, Friedman, and Hill (2018) found that the negative correlation toward outcome for Black students was not statistically significant and that females performed lower than males when compared against outcomes in the online versus face-to-face classroom. This is a variance from the previous findings noted and a veer from what previous research has stated. These findings indicate that there is future research needed and contributes to the thought that perhaps as online education is evolving, various students are adapting their learning style or that professors are finding ways to reach students who may have previously struggled. The authors also found that there was a positive correlation with student performance and online courses in information technology and no negative correlation to students enrolled in online courses for business and management. This is of particular interest for the current research as the previous study indicated a negative relationship between business courses and online education and the focus of this dissertation is on a course focused on information technology utilized in a business environment taught in a business school.

<div align="center">Interaction/Engagement</div>

The link between student–instructor interaction and perceived quality of learning and satisfaction has been previously studied; it is no surprise that students who have frequent, meaningful interaction with their instructors felt that they learn more effectively in their coursework (Swan, 2001). The link between the student and instructor and its effectiveness in promoting learning leads to the conclusion that, in an online learning

environment, synchronous learning might be a key element in a student's successful journey. Swan (2001) also pointed out that interaction between student and content and students and classmates are equally important factors as the faculty–student link in the student's learning outcome and perceptions of quality and success in the classroom. Swan noted that students who reported engaging in high levels of in classroom activity—whether it be classroom discussion boards, course assignments, or other methods of online activity—reported higher levels of course satisfaction and significantly higher levels of perceived learning. This study was performed on a fully asynchronous population of online students where there was no face-to-face or hybrid style of meetings. What is clear from the research is that the correlation between student interaction, faculty interaction, and ability to work with the content in a hands-on approach led to greater feelings of perceived student success in the online environment.

In the *Online Report Card* survey, Allen and Seaman (2016) indicated that while there may still be reservation about the quality of online learning, they felt much more comfortable about courses that combine both the elements of an online instruction and traditional face-to-face teaching. Allen and Seaman reported, "Academic Leaders consistently rate the promise of blended or hybrid courses as superior to that of fully online courses" (p. 2) and detailed that the statistic has remained stable over time.

In a separate study of tools that educators can utilize to engage students, Revere and Kovach (2011) posited that the traditional approach to instructor-led pedagogy is going by the wayside and that students are much more responsible for their own success in today's classroom environment. They cited several studies that indicated that the student is at the center of the engagement process, and utilization of technology from the

faculty member is what will lead to ultimate student success and deeper knowledge. The authors also indicated that today's students are "clamoring for more technology; technology for building relationships, communicating in real time, collaborating within an online community, and engaging in the learning process" (p. 114).

As students are moving toward online courses, while still requiring interaction and engagement in the classroom, focus must be made on how to coach faculty to provide that engagement in variable environments. The lens of advising should also widen to clearly understand what characteristics a student should possess when making the decision to enroll in an online course during their studies. The combination of face-to-face engagement in a virtual environment is not always a quick transfer of knowledge. Delivering engaging coursework over the computer requires creative thought and reception to trying the methodology in a new way.

Teaching in an online environment, an online class, or even a flipped classroom presents many challenges that may not be present in a traditional learning environment. In *The Challenges of Being an Online Professor*, eLearners (n.d.) stated, "Now, an online educator is charged with the task of coming up with innovative ways to create a remote atmosphere of understanding and at times, a communal sense of learning" (p. 1). The goal is often achieved through various engagement tools such as discussion boards, classroom chats, or Facebook-like course pages. In the same article, Jeremy Bond, an online instructor of educational technology, provided his opinion: "The best interaction happens when I empower my students to engage with each other." Utilizing discussion boards and in-class, live discussions is often a means to achieve this goal in online learning.

Faculty members teaching in online classes or environments are typically looking for new and innovative ways to engage students, increase their participation in class, and focus their attention on working through the material rather than a course based on a strictly traditional lecture. This may also push the instructor to become less of a director of classroom activities and more of a facilitator of discussion and understanding— guiding students toward the correct answers but allowing them to come to the conclusions in a collaborative way.

The challenge of engaging students in a non-face-to-face environment is not new. Bullen (1998) examined the limited interaction between instructors and students in a distance learning environment and the effect that it has on the perceived student learning. Bullen identified four distinct characteristics for success emerged and concluded that a successful distance course should include a means of facilitating interaction and critical thinking. Bullen noted both the positives and negatives that students reported on the interactivity of the class and their perceptions of these interactions. He concluded, "Having some face to face sessions might help as students perceive the online participation as critical to their success in the course" (p. 27). While this study occurred in the early days of online learning, it is important to note that Bullen's study focused on an asynchronous class with an electronic discussion board and no face-to-face interaction. Nonetheless, it is an important study to include in this discussion as we can see that the roots of interaction and determining what will enhance students' learning experience are crucial to the online or virtual learning environment.

Kahu, Stephens, Zepke, and Leach (2014) also cited that critical to students' success in higher education is their engagement, emotional, behavioral, and cognitive

connection to the coursework and their study. These characteristics are broad, yet all cycle down to the inherent makeup of the student and his or her interaction with the educational materials presented. Student engagement in the classroom can be influenced by a number of things, including but not limited to the professor, the student's confidence levels, and comfort with the materials. Comfort with the materials can be tied into the student's preparedness for class and understanding of the coursework. Students' confidence level is likely an inherent characteristic as to whether or not they will feel comfortable presenting or speaking up; however, in an online environment, the professor can take control of the engagement and interactions to provide the students with the best possible opportunities. Utilizing in-class virtual discussions, asynchronous discussion boards, and in-class activities can provide students with ample opportunities to interact with the faculty and their peers. It is incumbent on the professor to provide these opportunities within the course design.

A study completed by physics professors at the Massachusetts Institute of Technology, Colvin et al. (2014) indicated that learning does take place in an online environment and that students learn as much, if not more, than in a traditional classroom. Colvin et al. studied students taking a physics class in both the traditional classroom and in an online environment and showed that students who started out with very little knowledge of the topic or not prepared at all for the course were able to catch up and increase their level of awareness about the topic. Another finding was that students who took part in an *interactive engagement pedagogy*, where they frequently interacted with small groups to work on concepts and questions, had better results in the class than those in a traditional or online environment. Participation in interactive engagement may

indicate that when students can collaborate on a topic, rather than simply working independently, collaboration leads to a deeper understanding that the students can use to increase their awareness and ability to process the information. Sharing information in a collaborative way may reinforce the topics and allow for students to communicate on a peer-to-peer level in a comfortable environment. This also supports the idea that engagement in an online classroom is one of the factors that will help motivate the students and ultimately lead to better outcomes in the course.

Braun (2008) studied graduate students taking purely online courses versus a hybrid face-to-face/online courses in a teaching program and found that 52% of the students felt less engaged with their instructor in the online class versus a face-to-face course. Braun also showed that both groups felt that the coursework had made them more knowledgeable in the content presented, but the hybrid subgroup had a 9% higher agreement that the course had a stronger impact on their teaching—98%-89%, respectively (p. 73). This research again lends to the interaction between students and faculty as a positive contributor to the learning environment. Braun posited that it is no longer possible for universities to present only a traditional option, and that students should have access to online environments. Today's university must determine the best way to shape the course to contribute to the student's learning retention.

As evidenced in the research, collaboration and interaction are keys to a student's perception of engagement and understanding of the material. This may also provide insight to the delivery of face-to-face classes, as technology is prevalent and students value the interaction with their peers, instructors of traditional face-to-face sections of course should look to incorporate changes in the physical classroom that enable students

to utilize technology as the key resource. This is becoming apparent as more faculty members utilize discussion boards outside of the classroom to share ideas, commentary, and additional materials.

<div align="center">Active Learning</div>

The research presented showcases the need for the conversation around online education, the need to feel part of a community, and the necessity of student–instructor engagement for positive classroom outcomes. Additional discussion around the concept of active learning in the classroom ties in here as it relates to engagement and student interaction. Active learning also requires the student to engage in the course material, not simply memorize and forget the topics. The application of the knowledge helps to build critical thinking skills and may also reinforce the student's connection to the material.

Felder and Brent (2009) defined *active learning* as "anything course-related that all students in a class session are called upon to do other than simply watching, listening and taking notes" (p. 2). The authors separated out what is considered active learning and what is not—active learning can be categorized by any course related activity that is open for action by the entire class—a challenge, a group-based activity, or a question posed that anyone can answer. For the purposes of the current study, active learning encompasses any activities or challenges that are open to completion by the entire class that are neither lecture nor engage only a handful of students in the classroom.

In the survey *It Takes More Than a Major*, Hart Research Associates (2013) shed light on many indices of a graduate's future success and showcased that which is important to employers when evaluating potential job candidates. Hart Research Associates demonstrated that employers are looking for students to be well rounded

educationally, civically, ethically, and professionally. They indicated that students should have a breadth of knowledge that includes much more than just their specific major but also include the ability to think critically about complex topics in a real-world environment. The study further indicated that 94% of potential employers stated that students should demonstrate the capacity for professional development and continued learning. Employers are also interested in reviewing projects that students completed during their education to gain a better understanding of how the student will perform in the future.

A simple earned GPA is not enough to showcase the student's talent. Employers want students to be critical thinkers and showcase their ability to connect to the material. There are previous conceptions around online learning that students simply watch videos, chat on a discussion board, and take exams with little to no interaction. If students do not inherently possess this skillset, they may ultimately be unsuccessful in their transition to the workforce. The dive into active learning is critical to this discussion as it provides insight into what students expect from online education and what faculty should provide when delivering the coursework.

In "The Keys to Learning for Online Success," Zorn-Arnold and Conaway (2016) stated, "Educators need to demonstrate to students that the 'right' answer is not always as important as the thought process that led to a solution" (p. 2). As part of the engagement process in the classroom, whether online or face-to-face, it is important to work through the thought process of arriving at the answer. Often, in an instructor-posed query, students may feel uncomfortable, as during the engagement process of completing the activity, there may not always be a right or wrong answer. What may be important is

demonstrating the thought process of walking through the activity and the thought process of getting from beginning to end. Zorn-Arnold and Conaway said,

> In this scenario, it is communicated to students that the assessment focuses on the underlying concepts, completion, and a discussion of the results that were found rather than a specific set of numerical results. Even if the experiment is a disaster, a student can still earn a respectable grade by explaining the process that led to the errors and how they can be corrected. This enhances students' self-confidence and their ability to think independently rather than simply seeking out what is perceived to be the "right" answer. (p. 2)

When the activities completed are a representative of a thought process and procedure, it is important that students realize there is a certain level of flexibility in arriving at the result and that building the solution is often as important as the solution itself. This leads to engagement in both the current activity and future activities. If students can understand the underlying value in arriving at the decision, they may be more willing to engage in future activities and not focused on the right or wrong answer. Zorn-Arnold and Conaway (2016) summarized that course content design should focus on problem-solving activities to keep students engaged throughout the course. This concept to arrive at the conclusion together should be pervasive in the classroom— regardless of delivery method. As noted, success is based on the ability to think through how to arrive at the conclusion, not simply *get the right answer*. Active learning in an online classroom should be a tool that is focused on when developing the curriculum— rather than a passive approach with little interaction between students and faculty.

Bonk and Reynolds (1997) discussed many options for what is possible in online education by using the World Wide Web as the basis for educational delivery. They discussed various ways that students and instructors can be successful in the classroom and "new routes for student social interaction and dialogue" (p. 168). Bonk and Reynolds

posited that the creativity that pushes student learning forward can be found by using the World Wide Web as a collaborative tool in the classroom and as a tool for nurturing of student's classroom experience. The authors again focused on electronic discussion boards in an asynchronous online environment as a means of interaction between students and instructors. The authors also indicated that the Web allows for a more in-depth critical thinking path in that the students have information readily available at their fingertips, which could lead them to dig deeper into a topic and contribute with more thoughtful responses. Finally, they stated that promoting critical thinking online requires challenging activities that provide students with the ability to use their abilities to synthesize information. This type of learning takes place when led by the professor or the instructional strategy and not the technology. Thus, it is important to recognize that, often, whether or the not the technology is present, the critical thinking skills developed by students must be part of the instructor's course layout and the technology used to facilitate the interaction.

Connectivism and Cognitive Learning

Ally (2008) proposed the theory of connectivism in an online educational environment. Connectivism, according to Siemens (2005), is the "integration of principles explored by chaos, network, complexity and self-organization theories" (p. 5). Investigating connectivism further, Siemens stated,

> Connectivism is driven by the understanding that decisions are based on rapidly altering foundations. Information is continually being acquired. The ability to draw distinctions between important and unimportant information is vital. The ability to recognize when information alters the landscape based on decisions made yesterday is also critical. (p. 5)

Having stated earlier that critical thinking skills are imperative for today's college student and that they are key hiring factors for potential employees, this theory of connectivism feeds into the development of the student's ability to analyze a problem and think independently on how to provide a solution. Students continue to learn as the environment around them changes and more knowledge is gained.

Anderson (2008) highlighted the implications of connectivism in online education. In a global, digital age, students must be able to interact with each other, the faculty, and their larger network in an online environment where they can all continue to learn from each other as new technologies and ideas come to light. Anderson posited that instructors need to determine how to weave the connectedness of the students and faculty into online classrooms, but much research is still to be done in this area.

When evaluating students' connectedness to a university, through their own self-perception and their participation in the classroom, it is important to understand what connectivism means in a classroom. That is, students may perform better if they feel as though they are connected to the faculty and the other students. As stated, in more recent studies, the analyses of student success in an online environment may be shifting. Could this have something to do with the theory that students are learning and adapting as they feel more connected to their environment?

Ally (2008) also proposed the theory of cognitive learning in an online environment where the instructor must present the materials in a way that the students can process, which might also feed into engagement and use of activities in the classroom to promote such engagement. Ally proposed that, under cognitive theory, online strategies should enable learners to become aware of their "cognitive capabilities and

then utilize those capabilities to apply the learning" (p. 41). This can be accomplished by giving the learners the "opportunity to reflect on what they are learning, collaborate with other learners and check their progress" (Ally, 2008, p. 41). This allows students to check their progress and perhaps adjust their focus if needed.

Ally (2008) posited that the implications for online learning are that the learning should be an active process in which meaningful engagement occurs so that students can process and facilitate a personal connection with the materials. Ally wrote, "Asking learners to apply the information in a practical situation is an active process and facilitates personal interpretation and relevance" (p. 30). Ally delivered several key insights into students' ability to learn and how it can play out in an online environment. Some of the highlights include the ability of learners to reflect and find meaning in the material. Once they have reflected, interacting with instructors and other students leads to a deeper understanding and thus internalizing of the material. Learning to review material and look for key indicators will enable students to quickly process the material and think critically about the topics by identifying what is important and what is superfluous information. It is obvious that student interaction with course material is a theme throughout the research. For institutions, then, connecting this to online learning and providing an atmosphere where students can interact and engage with the material in the same manner as a traditional face-to-face environment should be of the utmost importance.

Kelly (2016) recently conducted a study of 524 people who teach with technology in some way. Nearly 90% of them said that technology has helped them teach, and 84% of these faculty members indicated that technology helps their students learn. In the recap

article, one humanities professor said, "Technology is making education magical. We have the ability to engage each student one-on-one" (p. 21). In an online environment or a flipped classroom, it is increasingly important that instructors take advantage of the technology and the increased engagement capabilities to provide a collaborative, engaged learning process for the students. Ninety-seven percent of respondents believed that technology will play a positive role in the future of education. With that level of response rate, educators should be focused on incorporating technology into providing the students in a virtual environment with a collaborative, highly engaged learning experience.

In summary, the picture of the online student who will be successful in the classroom is grounded in the same characteristics that have been found to lead toward success in the traditional classroom environment. While research has indicated that students with certain demographics or characteristics perform at a lower rate in an online classroom than the traditional delivery method, the student makeup is still not entirely clear. Research has shown that there are some demographics that perform better or worse, some majors that perform better in online classes and some characteristics that online students should possess, but there is still much research to be done in this field as the outcome differs from study to study. Also, as technology becomes less of a barrier to entry in the online classroom and institutions offer additional courses online, faculty need to be aware of what actions can be taken in the online classroom to invite the same success as they would in a traditional face-to-face environment. Grounded in theory around connectivism and cognitive learning, could it be that the student demographics and characteristics are not the determining factors of success for the student in a particular delivery method but rather the course design that holds the key for student

success? Are there characteristics of the course itself that could be designed to provide

the student with the opportunity to succeed?

CHAPTER 3

METHODOLOGY

This study builds upon prior work analyzing student achievement in both online

and traditional environments by examining achievement outcomes for an undergraduate

business school required course, MS107. Directly related prior work includes Jennifer

VanDeWoestyne's (2016) dissertation, *Assessing Achievement Outcomes and Student*

Engagement Perception in an Upper Division Business Management Course.

Research Setting and Participants

A public, 4-year institution with a student population of over 36,000 comprised of

undergraduate, graduate, and professional students was used as the basis for this study.

The mission of the institution is to provide superior education utilizing superior faculty

and research to all students, regardless of their status. According to the university's 2017

Fact Book, of the 17 schools and colleges and hundreds of degree programs that make up

the university, the business school enrolls the largest number with over 9,000 full-time

undergraduate students enrolled.

The Business School has been offering online degree programs to their students

since the 2012-2013 academic year. Students are able to obtain a degree fully online

through the Online Bachelor of Business Administration (OBBA) program or select

online courses as part of their traditional coursework enrollment. The course that serves

as the focus for this research is MS107. MS107 is a required course of all business

undergraduates and is offered by the Department of Management Information Systems.

While open to freshmen, it is typically taken in the sophomore or junior year. In this

course, students learn concepts around the usage of technology in business and the role

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that information systems will play in their future careers. Failure to complete this course in three attempts results in students having to change their major out of the school.

The units of analysis for this study consisted of students who completed MS107 via online course delivery and students who completed MS107 via the traditional, face-to-face classroom setting. The students taking this course will likely be declared business majors, though the specific major of the student will vary. The time frame of this study focused on the fall 2017 semester and spring 2018 semester.

Data Collection Procedures

Data were collected from the university's Enterprise Resource System, Banner, on student demographics and earned letter grade in the course. These data were analyzed to determine the percentage of letter grades earned (i.e., percentage of As, Bs, and so forth) across both the online and face-to-face sections to compare the outcomes in each. The demographic data were utilized to construct a demographic profile of each student, including their academic standing (i.e., class year), major, race, age, gender, and whether they entered the university as a transfer student or a freshman.

The demographic data were originally gathered by the Measurement and Research Center, and then student NSQ responses were appended to the student demographic and course data and finally anonymized. These data were then analyzed to determine the correlations, if any, to the students' success rate in the courses and their self-reported answers on the NSQ when they entered the university. Additionally, student feedback data were gathered from the Measurement and Research Center's student course feedback evaluation reports and analyzed to determine if there was a significant difference between students' satisfaction in online and face-to-face classes.

Data Analysis

A demographic profile of the students enrolled in these courses was constructed using readily available data from the university's Banner system. The demographic information collected included ethnicity (as defined by the university's categories), major academic classification, student major, student gender, and age. The final course grade information was also collected from Banner. Data were gathered from students' self-reported answers when completing the NSQ upon their entrance to the university. The NSQ is administered to all students entering the university as either new or transfer students. The content covered in the NSQ meets the criteria for content validity in that students are asked questions about academic, social, and administrative issues within the context of attending college. This is what one would expect to see in a survey regarding entering a university.

The data from the NSQ were procured from the university's Office of Measurement and Research (MARC). The purpose in collecting and linking these data points was to construct a clear picture of the student and the students' self-reported characteristics and to determine if there is any relationship between those data and the students' outcome in an online or traditional classroom.

As mentioned, the NSQ is issued to all incoming students at the university. This questionnaire asks students 82 questions about themselves, their expectations, and their previous educational performance. All students are required to complete this survey as part of the orientation process. "The results of the questionnaire are used to monitor trends in student characteristics, attitudes, intentions, and aspirations" (Temple University, 2018). Of particular importance to this study are 16 questions, selected by the

researcher, that students respond to around their reasons for attending college, dedication to studying, and their own personal motivation or drive during their academic experience. The questions that this dissertation focuses on for the data analysis follow:

16.   What scholastic average do you expect to obtain in college?

21.   During the school year, on average, how many hours do you plan to study per week?

47.   How important was the social atmosphere at the university when influencing your decision to attend?

54.   How important was the advice or experience of family when influencing your decision to attend?

60.   How likely is it that you will become a student leader while studying at the university?

61.   How likely is it that you will work full time while attending the university?

62.   How likely is it that you will join a social organization or club while attending the university?

70.   How likely is it that you will take an online course while attending the university?

75.   Most of my teachers considered me one of the harder workers in their class.

76.   I find it difficult to keep a plan of action in my school work.

77.   I enjoy studying and reading about things on which I am working.

78.   I know how to manage my time well.

79.   I am self-confident.

80.   My plans have frequently seemed so full of difficulties that I have had to give them up.

81.   I am organized and have good study habits.

82.   I prefer to be independent of others in deciding what I want to do.

Additionally, an analysis of the student course evaluations was completed to determine what, if any, differences or themes are apparent in how the students evaluate the online versus the face-to-face sections of the course. The evaluation data were anonymized, removing the professors' personal information so that the only identifiable variable is whether the course was an online or face-to-face course.

Several types of analyses were performed on the data in an attempt to provide an understanding of each question. For Question 1, an analysis of variance (ANOVA) was performed to determine whether or not there are statistically significant differences between the students taking courses in online format versus face-to-face delivery. In Question 2, in addition to the analysis of the means through a t test, a Mann Whitney U test was utilized to confirm the significance of the difference (or lack of significance) in the difference of the means in the two groups, face-to-face and online, and the means of the student course satisfaction surveys. In order to better understand the detail provided by the students in the course surveys, a thematic analysis was performed on the anecdotal responses. The researcher reviewed the responses for key, repeating themes in the responses. To analyze the students' course selection and determine whether or not there were any significant differences in the NSQ or demographic variables on why a student would select the particular course delivery method, a chi-square test was used and then a

Cramer's V performed to analyze the fit of the model. Additionally, to distill the 16 NSQ questions into correlated themes, a factor analysis was performed on the data. In Question 4, multiple regressions were performed on the sample to determine students' predicted outcomes in the course based on NSQ responses and demographic values.

Role of the Researcher and Ethical Considerations

I am currently an assistant professor in the department that is responsible for teaching MS107 in the business school. There are currently at least nine professors teaching MS107, spread out over the face-to-face and online classrooms. I teach both online and face-to-face sections of this course.

Data for this study were obtained from the following sources:

- Banner: Class registrations, final grades, student demographics, and student academic status

- Center for Innovation for Teaching and Learning: student feedback forms reporting on course satisfaction

- MARC: Student self-reported data from the NSQ

The student enrollment in MS107 was gathered from Banner and then provided to MARC, who appended the student characteristics and demographic data, aggregated the results, and provided them back for analysis.

Ethical considerations to this study are limited to any harm that may come of providing commentary on experiences or from the disclosure of academic records. All personally identifiable information was removed from the data prior to analysis, reducing the possibility of identifying any student in particular.

CHAPTER 4

RESULTS

The purpose of the current study was to review data connected with students who take online and/or face-to-face classes while enrolled in an undergraduate business course in a university setting. Specifically, the data were focused on both course performance and what, if any, personal characteristics correlate with performance in an online class as evidenced by class grade. In this chapter, characteristics of the data, the course, and the sample are discussed as well as the findings of the data analyses.

Characteristics of the Sample: The Students

The sample used in this study consisted of all students enrolled in an undergraduate business class, MS107, at a particular public university. Students were enrolled in either a face-to-face classroom or an online classroom, conducted virtually, via the WebEx conferencing application. In all cases, regardless of whether face-to-face or online, the students received identical course content, including online videos, selected readings, and exams. The students in both delivery methods engaged in in-class activities with the professor during class sessions. The overall enrollment in MS107, regardless of delivery method, for the fall 2017 and spring 2018 semesters was 2,570 students—2,390 in a face-to-face classroom and 180 in an online classroom. Looking into the larger number of students in the face-to-face sections, it is worth noting that these classes are often comprised of 120 students or more, whereas the online sections of MS107 cap enrollment at 40 students.

Characteristics of the Sample: The Course

Information Systems in Organizations (MS107) is an undergraduate course required of all business majors in the university. The course is currently offered in two formats. The first is face-to-face, typically held in a large lecture hall with roughly 120 students in each section. The online course is offered synchronously to students via WebEx—a virtual classroom—in which all students are required to log in weekly while the professor lectures and promotes discussion and in-class activities that must be completed for credit. The students enrolled in both delivery methods complete the same assignments, utilize the same lecture decks, and take similar exams. Professors who teach MS107 teach both face-to-face and online courses interchangeably.

Course management is completed through the MIS Department's WordPress website, with all student coursework distributed through this platform. Students are provided with all course decks, assignments, readings, and schedules through the WordPress platform. The professor may also utilize this platform to provide students with updates on course-related activities or grading information.

It is worth addressing at the onset of the analysis that there is a large differential in the groups within the sample size: face-to-face ($n = 2,390$) and online ($n = 180$). As the university is traditionally made up of face-to-face course offerings and traditional students, the online population is absolutely going to be much smaller. The online student sample ($n = 180$) does represent several course offerings over two semesters. In order to confirm and provide more conclusive results, additional analyses on the sample sizes were conducted and detailed below within each question.

Findings

This study addresses several key questions that relate to students' achievement in online versus face-to-face classrooms. Specifically, students' performance as measured by the grade earned in the class was used to determine whether students perform better or worse in either learning environment. Second, this study investigates the differences, if any, in the types of students who enroll in an online class versus the traditional learning environment of a face-to-face classroom. As the students self-select the delivery method of the course, it was important to determine if there were some defining characteristics that would both lead a student to choose to enroll in an online class and affect their performance in the class. Delving deeper into that question sheds light on what, if any, specific characteristics might lead a student to be more successful in an online class versus a face-to-face class. Last, through a review of student feedback on the courses, this study evaluates whether there is a significant difference in the students' ratings and evaluation of the course based on the delivery method.

Research Question 1

RQ1:   Is there a significant difference in student achievement as measured by

final course grade in an online versus face-to-face course?

This question focuses on student achievement outcomes in a face-to-face environment versus online. To address this question, a one-way ANOVA was conducted to assess whether students performed better in either course delivery method. The sample was split into two groups: face-to-face ($n = 2,390$) and online ($n = 180$). Table 4.1 presents the means and the standard deviations for the GPA of the students enrolled in the two types of course delivery methods.

Table 4.1. Descriptive Statistics for GPA in Face-to-Face Versus Online Course Delivery

Group	M	SD	N
Face-to-face	2.8500	0.9300	2,390
Online	2.5200	1.10000	180
Total	2.8306	.94887	2,570

The difference between the means was significant with a small effect size ($F_{1, 2568} = 20.459$, $p = .000$, partial eta squared $= .008$). Analyzing the data for Research Question 1, it is clear that the mean for face-to-face classes is significantly higher than the online sections; however, the difference is too small to be considered meaningful.

Research Question 2

RQ2: Is there a significant difference in the SFF data for an online course versus a face-to-face course?

For this analysis, the unit of analyses was the class mean. The means for the two types of courses and their significance, if any, are presented in the first two columns of Table 4.2. As the sample size was relatively small, a Mann-Whitney test was also performed on the data. The Mann-Whitney U test is often used to compare differences between two independent groups when the dependent variable is not normally distributed. The Mann-Whitney results confirmed the outcome of the *t* test.

Table 4.2. Results of Mann-Whitney Test

SFF questions	Face-to-face ($N = 27$)	Online ($N = 8$)	t test and significance level
I came well prepared for class	3.979	4.188	.001
The instructor clearly explained the educational objectives of this course	4.163	4.262	NS
The instructor was well organized and prepared for class	4.316	4.438	NS
The instructor was conscientious in meeting class and office hour responsibilities	4.268	4.450	NS
The instructor promoted a classroom atmosphere in which I felt free to ask questions	4.332	4.513	.041
The instructor provided useful feedback about exams, projects, and assignments	3.863	3.950	NS
So far, the instructor has applied grading policies fairly	4.2	4.213	NS
The instructor taught this course well	4.058	4.213	NS
The course content was consistent with the educational objectives of this course	4.23	4.35	NS
The course increased my ability to analyze and critically evaluate ideas, arguments, and points of view	3.984	4.0	NS
I learned a great deal in this course	3.958	4.038	NS

It is evident that the means for the online course are generally higher than the means for the face-to-face course. To ascertain if these differences were significant, a two-group multivariate analysis of variance (MANOVA) was conducted on these data, which was not significant (Wilks' Lambda = .385, p = .080). This analysis, however, has minimal power because of the small sample size. Because of the issue with small sample sizes, univariate t tests were computed on each of the questions. Of the 11 questions analyzed, two of the questions showed a significant difference: Question 1, "I came well prepared for class," and Question 5, "The instructor promoted a classroom atmosphere in

which I felt free to ask questions." For both questions, students in the online sections of MS107 had higher means. That is, the online students indicated that they were more prepared for the course each week than their counterparts in the face-to-face sections and that the instructor more strongly promoted an atmosphere in which they were free to ask questions.

Because the online sections have a compressed schedule (7 weeks instead of the traditional 14), the students may feel that they prepare more because there is a focus on the preparatory work of watching videos, readings, and online discussion board posts prior to each class. While the instructions to the face-to-face students are to complete the readings and videos prior to the class starting, the online students might feel that they need to do more work on their own to prepare. The response to Question 5, in which the student rates the professor's receptiveness to questions in the classroom, may be higher because the online course often focuses on student discussion. When teaching in the online environment, professors are discouraged from lecturing but rather encouraged to focus on activity-based learning that will enhance the materials presented. Instead, the students are required to watch prerecorded lectures, and the class time is utilized to apply the knowledge gained through student discussion, professor experience, and hands-on application of the knowledge. In the face-to-face sections, while the students are expected to watch the prerecorded videos as well, the focus of at least 50 minutes of class is on professor lecture and distillation of the course objectives.

What is interesting to note is that the differences for Question 8, "I learned a great deal in the course," and Question 11, "The instructor taught this course well," were not significant. These two questions are closely monitored by the university as indicators of

classroom performance. In this case, then, it is fair to say that the instructors in the online classes are doing as well as the face-to-face instructors and there is no significant difference in how the students feel about the course.

As the sample size for this data is small ($N = 8$ for online evaluations), it was critical to dig deeper into the details around the student feedback. While it can be explained that the reason the sample size is small is because there are fewer classes taught online, it is important to understand the details in the anecdotal data so as not to interpret the findings in a misleading way (Faber & Fonseca, 2014). Thus, a thematic analysis was performed on students' SFF comments for MS107 on the end of semester survey.

For this analysis, SFF data from spring 2018 were selected, as four sections of MS107 were taught online, while in previous semesters only two sections were offered. The anecdotal feedback was reviewed for themes in both the online and face-to-face sections. As mentioned, in MS107, students perform in-class activities during class to strengthen and deepen their understanding of the material. A 3-credit hour class typically consists of one lecture hour and two in-class activities per week. In the traditional face-to-face sections of the class, this interaction happens over the course of the 14-week semester. The online class is structured quite differently, with 2-hour meetings per week, over the course of 7 weeks. Repeatedly through the text analysis, students mentioned that the in-class activities were one of the aspects of the course that contributed most to their learning. Students commented that the hands-on nature helped them to apply the concepts covered in the material in a tangible and practical way. This comment was threaded

throughout the feedback, regardless of whether the course was a face-to-face section or an online section.

The second theme that appeared heavily throughout the anecdotal feedback was engagement. Whether the class was online or face-to-face, the students indicated that faculty members engaging with the classroom and relating the topic of the day to practical experiences contributed to their learning experience. Again, this theme was prevalent in both versions of the course. Students in the online sections included comments such as: "I really enjoyed the highly interactive nature of the course" and "Professor X made the entire class engaging and appreciated the ongoing colloquy in every lesson as it reinforced the required reading and gave it more substance in some areas that were labyrinthine." Similarly, in the face-to-face sections, students provided comments, including "I loved the in-class activities, collaborating with other people was very helpful" and "He kept the class actively engaged at all times and provided many genuine examples of how the course matter could be applied to the real world."

As these two themes emerged from the analysis, it is clear that the core of the class, regardless of delivery method, is grounded in engagement and practical application of the concepts through in-class activities. The fact that professors utilized these tools, regardless of how the course was conducted, is likely the reason that the SFF scores are consistent across the online and face-to-face formats. It is worth noting that the online sections are capped at 40 students, while the face-to-face sections are typically filled with 120 students but may have up to 250 in a section. Coupling the students' anecdotal responses around engagement and the higher ratings of the students' comfort level in

participation in class, it becomes apparent that adapting an online class to include

student-faculty interaction promotes a better learning environment.

<center>*Research Question 3*</center>

RQ3:   Are there significant differences in the types of students that select an

online class versus a face-to-face class?

The data to answer this question came primarily from student demographic data

and the NSQ, which is given to all incoming freshmen during the summer before

matriculation. To analyze these data in detail, several different tests were used to cover

the various analyses that are part of the question. First, the questions on the NSQ were

compared through a chi-square test. Since this is a large number of analyses, only

differences that were significant at the .01 level are discussed. The Cramer's V test was

performed to analyze the strength of the relationship between the variables. In addition,

only *large* differences according to Cramer's V statistic are presented. The benchmarks

for the Cramer's V analysis are presented in Table 4.3. The benchmarks for partial eta

squared are presented in Table 4.4.

Table 4.3. Benchmarks for Cramer's V

Rating	Description
01 to .05	No or negligible relationship
.06 to .10	Weak relationship
.11 to .15	Moderate relationship
.16 to .25	Strong relationship
.26 or higher	Very strong relationship

Table 4.4. Benchmarks for Partial Eta Squared

Rating	Description
.01 to .05	Small
.051 to .09	Medium
.091 or above	Large

First, students' reported demographic information, including race, sex, age, and class level, were analyzed. Table 4.5 presents a summary of the significant findings on the students' demographic data. The complete chi-square tables are presented in Appendix A.

Table 4.5. Significant Demographic Characteristics

Variable	Result
Race	Asian students take online courses less than other racial groups.
Sex	Men take more face-to-face classes than females. In the online sections, women are just as likely to take online classes as men.
Age	Mean age is almost 4 years older in online sections.
Class Level	Seniors enroll in online classes more than any other class level.

For the category of race, the Pearson chi-square test of association is significant ($\chi2(1) = 20.211$, $p = .005$). Data regarding race shows that of the 2,451 students enrolled in MS107, the largest percentage were White at 55.9% face-to-face and 61% for online enrollment. The largest disparity in the group is for Asian students. Asian students make up 17% of the overall enrolled students in the course; however, while the Asian students make up 17.6% of the face-to-face population, they account for only 9.2% of the online enrollment.

In the chi-square calculation for sex the association is again significant ($\chi^2(1) = 12.588$, $p = .002$). Of the 2,646 students registered for MS107, 60.4% are male, 39.5% are female, and 0.1% are unknown. The face-to-face sections are heavily skewed male (61.3% male and 38.6% female), while the online sections are evenly split across sex at 49.7%.

To address the question of age, a *t* test was conducted to determine if the mean of ages were significantly different from each other by online or face-to-face. The data show that the mean age was higher in the online delivery (24.6), and the difference is

significant ($t = 8.202$, $p = .000$). The mean age of the online student is almost 4 years older than the face-to-face.

To analyze class level, a cross-tabulation of the variable delivery method by the variable class level (i.e., senior, junior, sophomore, and freshman) was constructed. In the chi-square calculation on class level, again, the association is significant ($\chi^2(1) = 104.765$, $p = .000$). These results indicate that the students who take online classes tend to be farther along in their coursework. Per this dataset, MS107 is taken largely during the students' sophomore year, making up 52.2% of the population of enrolled students. Junior year is the second-highest enrollment, with freshmen and seniors making up less than 20% of the enrollment. The face-to-face enrollment is consistent with the overall enrollment as evidenced by the data. However, the online class looks quite different. The enrolled percentage of seniors who take this course online is over three times as much as those that take it in the classroom. Sophomores make up only 30.3% of the online classrooms versus 53.9% in the face-to-face.

The answer to Research Question 3 from a purely student demographic perspective, yes, there are significant differences in the types of students that choose to enroll in online classes versus face-to-face. As evidenced by the analysis, while students who classify as White are the largest proportion of enrollees in both delivery mechanisms, students who classify as Asian are much less likely to enroll in an online class than in a face-to-face class. Analyzing the data on gender enrollments, the enrollment of women is consistent in the overall population and the face-to-face classes, indicating that women are proportionate to men when selecting face-to-face classes. However, in the online environment, women are equally represented or as willing to

select online classes as the men. The age of the student skews 4 years higher in the online delivery method than the face-to-face. Lastly, looking at the class level of the student, there is a tendency for upperclassmen (juniors and seniors) to enroll in online courses, while the students in the sophomore class tend to enroll in the face-to-face course.

To further analyze the characteristics of students who take online classes versus face-to-face classes, I selected 16 questions from the NSQ to determine if the way that students classified themselves during the questionnaire or the way that they answered the questions had any correlation to their selection of course delivery method. These 16 questions were selected based on their correlation to a student's particular behavior. For this analysis, the unit of analysis was the course delivery method. The variables and their significance, if any, are presented in Table 4.6. For the behavioral questions, a Pearson chi-square test for association was conducted between students' self-reported NSQ answers to the 16 behavioral questions and course delivery method (online vs. face-to-face). Cramer's V statistic was then applied to measure the effect size for the chi square. The Pearson chi-square test of association was significant only for some behavioral questions, which are presented in Table 4.6. A full analysis of the significant questions is included in Appendix A.

Table 4.6. Significant Behavioral Questions

Variable	Result
Scholastic average expected to obtain in college	Students in online classes tend to expect lower scholastic averages than their face-to-face counterparts.
Expectancy to join a club or social organization.	Students in online classes have lower expectations to join a club or social organization.
Likelihood of becoming a leader	Students in online classes have lower expectations of becoming a leader on campus.
Working full time	Students in online classes have a higher expectation of working full time while attending college.
Expectations for enrolling in an online class	Students in online classes have a higher expectation for enrolling in online classes than those in face-to-face classes.

NSQ Question 16 asks students to indicate what they expect their scholastic average to be when graduating from college. As evidenced by the data, students in online classes tend to expect lower scholastic averages than their face-to-face counterparts ($p = .002$, $V = .081$).

Also significant is the question on how likely it is that students will join a social organization or club while attending college. For Question 47, students in online classes have lower or nonexistent expectations for a social atmosphere while attending college than their face-to-face counterparts ($p = .000$, $V = .145$). NSQ Question 60 asks students how likely it is that they will become a student leader while on campus. The data show that students in online classes have lower or nonexistent expectations of acting as a student leader while attending college than their face-to-face counterparts ($p = 001$, $V = .083$).

Question 61 on the NSQ asks students how likely it is that they will work full time while attending college. As shown in Table 4.6, students in online classes have a higher expectation of working full time while attending college than their face-to-face

counterparts ($p = 000$, $V = .181$). Question 62 asks students how likely it is that they will join a social organization while in college. The data show that students in online classes have a lower expectation of joining a social organization while attending college than their face-to-face counterparts ($p = .000$, $V = .151$). The last significant difference was Question 70, which asks how likely is it that students will take an online course while in college. The data show that students in online classes have a higher expectation of enrolling in an online course while attending college than their face-to-face counterparts ($p = .000$, $V = .218$).

To further analyze any differences between the students' answers to the NSQ and their course delivery method, a MANOVA was performed on Questions 60-73. These questions were chosen because they represent various aspirations that students have about attending school. This produced a significant difference with a medium to large effect (Wilks' Lambda = .905, $p = .000$, partial eta squared = .095). Table 4.7 presents the means for each of the questions. Of these questions, again, the data indicate that the probability that students respond positively to questions regarding whether they will take online classes and work full time while attending the university is significantly different from zero. Alternatively, students enrolled in online courses indicate that they do not strongly intend to become a student leader or join a social club while enrolled. This analysis is consistent with to the profile of the online student that is developing throughout the data. The picture is becoming clearer that students enrolled in online coursework are not interested in the social aspects of higher education and do not only expect to take online courses but also to work full time while earning their degrees.

Table 4.7. MANOVA Analysis on NSQ Questions Regarding Expected Behavior

Tests of Equality of Group Means

NSQ question	Wilks' Lambda	F	df1	df2	Sig.
i60	.996	8.877	1	2291	.003
i61	.973	64.695	1	2291	.000
i62	.983	40.083	1	2291	.000
i63	.992	18.362	1	2291	.000
i64	1.000	.801	1	2291	.371
i65	.966	81.678	1	2291	.000
i66	.997	6.305	1	2291	.012
i67	.999	1.585	1	2291	.208
i68	.999	1.902	1	2291	.168
i69	.998	5.082	1	2291	.024
i70	.964	86.163	1	2291	.000
i71	1.000	1.019	1	2291	.313
i72	.996	8.166	1	2291	.004
i73	.992	18.689	1	2291	.000

To further analyze the responses to the selected behavioral NSQ questions and confirm the chi-squared analysis, a factor analysis was performed on the full sample and the variable of their course delivery method. Table 4.8 showcases the factor analysis findings and the interrelation of the question with the course delivery method.

Table 4.8. Factor Matrix of NSQ Questions

NSQ Question	1	2	3	4
I manage my time well.	.774	.137	.095	.054
I am organized and have good study habits.	.736	.162	.211	.077
I am self-confident.	.622	.002	-.066	.135
I find it difficult to keep a plan of action in my school work.	-.569	.479	-.024	.288
Most of my teachers consider me a hard worker.	.513	.047	.254	.170
My plans have frequently seemed so full of difficulties that I have had to give them up.	-.430	.594	.025	.264
Likeliness of taking an online course.	.082	.576	.014	-.204
Likeliness of working full time.	.146	.550	-.024	-.099
I prefer to be independent of others in deciding what I want to do.	.283	.345	.000	.094
Average number of hours planned to study per week.	.045	-.045	-.712	.085
Expected scholastic average.	.159	-.122	.607	-.046
I enjoy studying and reading on things which I am working.	.371	.177	.516	.142
Importance of a social atmosphere.	.120	-.153	-.116	.734
Likeliness of joining a social club or organization.	-.009	-.207	.355	.558
Importance of advice or experiences of a family member.	.145	.124	-.069	.475

The factors were then modelled into linear combinations to find the

interdependent variables and reflect some of the unobservable NSQ answers from the

observed differences. The exploratory factor analysis was completed to identify the

interrelationships of the variables around why students self-select their course delivery

method. To further explain the factor analysis, the factors were assigned descriptions

based on the question posed. The descriptions and the descriptive statistics for each factor

are identified in Table 4.9.

Table 4.9. Descriptive Statistics for Factor Analysis on NSQ Questions

Factor	Group	*N*	*M*	*SD*	*SEM*
Positive characteristics	Face-to-face	2,451	50.19	9.70	.196
	Online	195	47.56	9.70	.695
Negative characteristics	Face-to-face	2,451	50.38	9.67	.195
	Online	195	45.23	9.10	.652
Scholastic/Academic	Face-to-face	2,451	49.91	9.72	.196
	Online	195	51.09	9.72	.696
Social aptitude	Face-to-face	2,451	49.52	9.32	.188
	Online	195	56.00	12.37	.886

In analyzing the significance of each factor, an ANOVA was performed to assess the difference between the online and face-to-face responses. Factor 4, the students' assessment of their expected social aptitude and engagement while in college, was the most significant difference ($F = 34.812$, $p = .000$), indicating that students who select face-to-face courses have a much higher social aptitude. There were almost no differences in the mean when examining Factor 3, expectations of good grades and academic standing, between the two groups ($F = .252$, $p = .105$); this indicates that students have similar expectations around academic standing and obtaining good grades, regardless of delivery method.

For Factors 1 and 2, positive and negative characteristics around student skillsets, the means for the students enrolled in online courses was significantly lower than that of the face-to-face students ($F = .019$, $p = .000$, and $F = .058$, $p = .000$, respectively). These data highlight some NSQ differences that are not readily apparent from the initial tests. Through the factor analysis, a broader picture of the students is drawn. The positive characteristics are significantly higher for face-to-face students, showing that those who select face-to-face classes can manage their time well, are organized and self-confident, stick with their plan of action, and are considered hard workers by their teachers. The

negative factor is also significantly higher for the face-to-face students, which is interesting. The variables for this factor include the concepts that students will give up their plans, prefer to be independent, and will likely take an online course. This may be because the students whose course selection is highly correlated with Factor 2 feel similarly about their potential for social activity while enrolled in college.

Finally, a Probit was constructed to estimate the probability that students choose to enroll in online or face-to-face courses based on specific characteristics. In the Probit, to enhance the analysis above, independent variables that seemed to correlate to students' course delivery selection were chosen to analyze their significance, if any. The variables selected were age, women, and students' expectation of working full time. The Probit confirmed that all these variables significantly affected the likelihood of enrolling in online courses. The results of the Probit are detailed in Table 4.10.

Table 4.10. Probit Analysis of Independent Variables on Course Delivery Method

donline		Coef.	SE	z	$P > |z|$	95% CI
age		0.17108	0.065882	2.6	0.009	[0.041953, 0.300206]
agesq		-0.00181	0.001143	-1.58	0.113	[-0.00405, 0.000429]
dfemale		0.220118	0.084523	2.6	0.009	[0.054456, 0.38578]
i61		-0.21213	0.046380	-4.57	0	[-0.30303, -0.12122]

Note. CI = confidence interval.

Older students in both their coursework and in age tend to enroll in online classes; this may also tie into the personal characteristic that the online enrollees intend to work full time while taking courses and tend to have lower expectations around social engagement while in school. Women tend to enroll more often in online course work, which ties back to previous findings and discussion that is perhaps because of commitments outside of the classroom.

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As the data were available, a cross-tab analysis was performed on the online versus face-to-face students and their answers to the entire NSQ block of 82 questions. While the initial decision was made to focus solely on the 16 behavioral questions, the decision was made to take the opportunity and analyze all of the students' NSQ responses in relation to their course delivery selection to determine if there were other factors aside from those questions that might affect the decision to enroll in online or face-to-face questions. The significant NSQ questions and their statistics are presented in Table 4.11.

Table 4.11. Additional NSQ Questions

Variable	Sig.	V	Result
English as a native language	.26	.044	English speaking students have a higher tendency to take online classes
Hours planned to work	.000	.236	Students who intend to work more take online classes
Residence	.000	.139	Students who take online classes are less likely to live on campus
Income level	.000	.186	Students in online classes have higher income
Father's education	.009	.073	Fathers of students in online courses have lower levels of education
Mother's education	.005	.077	Mothers of students in online courses have lower levels of education
Sibling's education	.000	.128	Siblings of students in online courses have lower levels of education
High school average	.037	.064	Online students report lower high school averages
English courses	.034	.065	Online students took less English courses in high school
Family influence	.032	.053	Family influence is lower for students taking the online course
Get away from home	.000	.086	Getting away from home is not as important for students enrolled in online course
Transitioning to work	.002	.076	Going to college was less about a transition to work for students enrolled online

Table 4.11 continued

Variable	Sig.	*V*	Result
University's social media as an influence	.028	.062	The university's social media were not as important to students enrolled in online courses when deciding to enroll
University's website	.005	.073	The university's website was more important to students in online classes when deciding to enroll
Student body size	.007	.064	The student body size is less important for students deciding to enroll in online classes
Urban location	.000	.123	The urban location was less important to student's enrolling in online classes
Variety of academic programs	.037	.052	The variety of academic programs available is more important to students who enroll in online classes
Variety of cocurricular activities available at the university	.037	.052	The variety of cocurricular activities available at the university had greater influence on the students who enroll in online classes and their decision to join the university
Reputation of the university	.003	.068	The reputation of the university was more influential to the student's enrolled in online sections
Meeting similar students	.025	.055	Meeting similar students was less important to students enrolled in online classes
Meeting students with different backgrounds	.005	.066	Meeting students with different background was less important to students enrolled in online classes
Likelihood of changing majors while at the university	.000	.095	Students enrolled in online sections are less likely to change their major
Likelihood of playing varsity sports	.000	.089	Students enrolled in online sections are less likely to play varsity sports
Make close friends	.000	.197	Students enrolled in online sections have lower expectations of making close friends
Work with a professor	.008	.069	Students enrolled in online sections have lower expectations of working with a professor
Receive encouragement from family	.011	.068	Students enrolled in online sections have higher expectations of receiving support from family

Table 4.11 continued

Transfer to another institution	.010	.069	Students enrolled in online sections have lower expectations to transfer
Participate in a volunteer activity	.000	.090	Students enrolled in online sections have lower expectations of participating in volunteer activities
Study abroad	.000	.110	Students enrolled in online sections have lower expectations of participating in studying abroad
Live and work in Philadelphia after graduation	.013	.075	Students enrolled in online sections have higher expectations to live and work in Philadelphia after graduation

Some of the significant NSQ variables seem consistent with what we understand of online students—they have lower expectations to participate in social or on-campus activities than their face-to-face counterparts and the online students expect to work while enrolled in school and also report higher income. Some of the more interesting findings include the lower levels of familial education that are significant in online students. For example, students enrolled in online classes report lower levels of parental and sibling education than those students who select the face-to-face delivery method of a course. The online students also indicate that they expect a lower level of familial support than the face-to-face students.

Research Question 4

RQ4:   Are there specific characteristics that will determine success in an online course that differ from the predictors of success in a face-to-face course?

After reviewing the NSQ questions and further, some of the characteristics of students who choose to enroll in the different course delivery methods, a multiple regression analysis was performed on the entire sample and then on both the subsample of online enrolled students and the subsample of traditional face-to-face students to determine what, if any, characteristics would predict the student's grade in the classroom.

Additional predictor variables were added to the regression after the initial analysis to determine if there were other predictors that would contribute to the total variance in the students' grades earned in MS107.

Table 4.12 details the regression analysis for the entire sample of students—enrolled in both online and face-to-face classes. In this initial analysis, $F = 4.75$ (16, 2277, $p = .000$), and the adjusted $R^2 = .0323$. The R^2 is low, but the F statistic indicates that the regression as a whole is significant. The results of the regression listed in Table 4.12 indicate that the NSQ questions that influence the students' grade in the course are Questions 16, 54, 61, 62, 75, and 79. These questions represent that students expect higher outcomes in their classes (NSQ 16), value family input in their decision to attend college (54), do not expect to work full time (NSQ 61), are likely to join a social organization (NSQ 62), their teachers thought they were hard workers in high school (NSQ 79), and reported high levels of self-confidence (NSQ 79). Questions around average number of hours spent studying, enjoying studying, time management, and independence did not represent a significant relationship to the students' expected grade.

Table 4.12. Multiple Regression on Total Sample Using NSQ Questions

NSQ auestion	Coef.	SE	t	P > |t|	95% CI
i16	-0.15198	0.041032	-3.7	0	[-0.23244, -0.07152]
i21	0.018136	0.028024	0.65	0.518	[-0.03682, 0.073092]
i47	0.002498	0.048111	0.05	0.959	[-0.09185, 0.096843]
i54	0.086617	0.035798	2.42	0.016	[0.016418, 0.156816]
i60	0.046555	0.038841	1.2	0.231	[-0.02961, 0.122722]
i61	0.06142	0.028682	2.14	0.032	[0.005175, 0.117665]
i62	-0.08103	0.040720	-1.99	0.047	[-0.16088, -0.00117]
i70	-0.02392	0.029959	-0.8	0.425	[-0.08267, 0.034828]
i75	-0.13352	0.033799	-3.95	0	[-0.1998, -0.06724]
i76	0.021724	0.026712	0.81	0.416	[-0.03066, 0.074106]
i77	0.025996	0.034292	0.76	0.448	[-0.04125, 0.093242]
i78	-0.00992	0.036794	-0.27	0.788	[-0.08207, 0.062238]
i79	0.114095	0.033597	3.4	0.001	[0.048211, 0.179978]
i80	0.024128	0.025924	0.93	0.352	[-0.02671, 0.074966]
i81	-0.03389	0.038799	-0.87	0.383	[-0.10998, 0.042196]
i82	-0.05174	0.028946	-1.79	0.074	[-0.1085, 0.005027]
_cons	2.961044	0.212694	13.92	0	[2.54395, 3.378137]

Note. CI = confidence interval.

While this model addresses the selected NSQ questions, to improve the fit of the model, additional variables were added to prevent omitted variable bias and to determine if the relationship to the grade in course could be better explained when controlling for other variables. To improve the fit of the model, cumulative GPA was added, which generated an adjusted $R^2 = .0553$, more than doubling from the initial model's adjusted R^2 of .0255. Next, a dummy variable indicating a MIS major was added, further improving the fit to an adjusted $R^2 = .0617$. When age was added in as an independent variable, the adjusted R^2 did not improve—as the R remains similar at $R^2 = .0618$.

To determine if any additional variables could impact the model, variables were constructed and added that include Asian, White and Hispanic ethnicities, students enrolled in their junior or senior year, and women. Age, Asian ethnicity, and women had

no effect on the model, so the variables were removed, and the final multiple regression

included independent variables of Selected NSQ questions, Cumulative GPA, MIS

Majors, White Ethnicity, Hispanic Ethnicity, and Students who are Juniors and Seniors.

The regression analysis with these variables included is detailed in Table 4.13. In this

analysis, $F = 9.48$ (19, 2279, $p = .000$), and the adjusted $R^2 = .0655$.

Table 4.13. Regression Analysis With Additional Variables on Total Sample

gradeincourse	Coef.	SE	T	P > |t|	95% CI
i16	-0.132270	0.040457	-3.27	0.001	[-0.211610, -0.052930]
i21	0.026741	0.027549	0.97	0.332	[-0.027280, 0.080765]
i47	0.017739	0.047516	0.37	0.709	[-0.075440, 0.110919]
i54	0.095065	0.035212	2.70	0.007	[0.026014, 0.164116]
i60	0.053833	0.038185	1.41	0.159	[-0.021050, 0.128714]
i61	0.033967	0.028443	1.19	0.233	[-0.021810, 0.0897440]
i62	-0.022880	0.040561	-0.56	0.573	[-0.102420, 0.056660]
i70	-0.057170	0.029866	-1.91	0.056	[-0.115740, 0.001397]
i75	-0.121960	0.033233	-3.67	0	[-0.187130, -0.056790]
i76	0.027606	0.026032	1.06	0.289	[-0.023440, 0.078656]
i77	0.020295	0.033554	0.60	0.545	[-0.045510, 0.086095]
i79	0.099668	0.032137	3.10	0.002	[0.036647, 0.162689]
i80	0.017133	0.025496	0.67	0.502	[-0.032860, 0.067131]
i81	-0.035960	0.033565	-1.07	0.284	[-0.101780, 0.029859]
i82	-0.047190	0.028422	-1.66	0.097	[-0.102930, 0.008544]
cumulativegpa	0.167096	0.020405	8.19	0	[0.127082, 0.207111]
mismajor	0.468479	0.115648	4.05	0	[0.241693, 0.695265]
dafam	-0.246020	0.094624	-2.60	0.009	[-0.431580, -0.060460]
dhisp	0.206951	0.106227	1.95	0.052	[-0.001360, 0.415262]
djrsr	-0.062330	0.05246	-1.19	0.235	[-0.165200, 0.040546]
_cons	2.492595	0.216406	11.52	0	[2.068222, 2.916968]

Note. CI = confidence interval.

The significant independent variables that appear in the improved model and are

used to test the differences between the online and face-to-face populations follow:

1. Students' expected scholastic average while in college (NSQ 16)

2. Importance of advice or experiences of family when influencing their decision to attend the university (NSQ 54)

3. Most of their teachers considered them to be hard workers in their classes (NSQ 75)

4. Students who reported they were self-confident (NSQ 79)

5. Students with higher cumulative GPAs prior to enrolling in the course

6. Management Information Systems majors

7. Students who are White

To determine if there were different relationships between the independent variables and the students' performance in the different course delivery methods, a Chow test was performed. To do this, I first performed the regression analysis separately on online students and face-to-face students. Table 14.14 depicts the face-to-face group, while Table 14.15 depicts the online group.

When the regression model was applied to the face-to-face group, the variables that indicated a significant relationship to course outcome are the same as the variables for the total sample, $F = 8.98$ (19, 2126, $p = .000$), and the adjusted $R^2 = .0660$.

1. Students' expected scholastic average while in college (NSQ 16)

2. Importance of advice or experiences of family when influencing their decision to attend the university (NSQ 54)

3. Most of their teachers considered them to be hard workers in their classes (NSQ 75)

4. Students who reported they were self-confident (NSQ 79)

5. Students with higher cumulative GPAs prior to enrolling in the course

6. Management Information Systems majors

7. Students who are White

Table 4.14. Multiple Regression of Face-to-Face Group

Grade in Course	Coef.	*SE*	*t*	*P > |t|*	95% CI
i16	-0.1007336	0.0407509	-2.47	0.014	[-0.1806494, -0.0208177]
i21	0.0399612	0.0273447	1.46	0.144	[-0.0136639, 0.0935863]
i54	0.0971487	0.0350779	2.77	0.006	[0283581, 0.1659393]
i60	0.0446824	0.0387045	1.15	0.248	[-0.0312203, 0.1205851]
i61	0.0310574	0.0288039	1.08	0.281	[-0.0254294, 0.0875442]
i62	-0.0355773	0.0410745	-0.87	0.386	[-0.1161277, 0.0449731]
i70	-0.0503871	0.0301703	-1.67	0.095	[-0.1095535, 0.0087792]
i75	-0.1259485	0.0334516	-3.77	0	[-0.1915498, -0.0603471]
i76	0.0202705	0.0261202	0.78	0.438	[-0.0309532, 0.0714943]
i77	0.0350551	0.0338292	1.04	0.3	[-0.0312867, 0.1013968]
i79	0.0999929	0.0318685	3.14	0.002	[0.0374961, 0.1624896]
i80	0.0151176	0.0255099	0.59	0.553	[-0.0349093, 0.0651445]
i81	-0.0276956	0.0335546	-0.83	0.409	[-0.0934988, 0.0381077]
i82	-0.0477486	0.0282925	-1.69	0.092	[-0.1032325, 0.0077353]
cumulativegpa	0.1645629	0.020386	8.07	0	[0.1245844, 0.2045414]
mismajor	0.5169835	0.1149151	4.5	0	[0.2916256, 0.7423413]
dafam	-0.2488188	0.0953103	-2.61	0.009	[-0.4357301, -0.0619075]
dhisp	0.1216330	0.1082824	1.12	0.261	[-0.0907175, 0.3339835]
djrsr	-0.0079391	0.0523619	-0.15	0.88	[-0.1106251, 0.0947468]
_cons	2.4469340	0.2128642	11.5	0	[2.02949, 2.864377]

Note. CI = confidence interval.

When the regression model was applied to the online group, the variables that indicated a significant relationship change significantly. The only statistically significant NSQ question is Expected Scholastic Average while in college (NSQ 16). Cumulative GPA prior to enrolling in the course, Hispanic ethnicity and the students with a class level of Junior or Senior were also significant, $F =1.83$ (19, 133, $p = .0258$), and the adjusted $R^2 = .0935$. The coefficient for class level becomes significant with a negative relationship in this model. Tying this back to the results from Research Question 3,

juniors and seniors tend to register for more online classes, but they tend to do worse

there than in the face-to-face sections.

Table 4.15. Multiple Regression of Online Group

gradeincourse	Coef.	*SE*	*t*	*P > |t|*	95% CI
i16	-0.4904119	0.2084262	-2.35	0.02	[-0.9026708, -0.0781529]
i21	-0.0897771	0.1525252	-0.59	0.557	[-0.3914661, 0.2119119]
i54	0.0867049	0.1871212	0.46	0.644	[-0.2834135, 0.4568233]
i60	0.1214648	0.1847735	0.66	0.512	[-0.2440101, 0.4869397]
i61	0.0637831	0.1706504	0.37	0.709	[-0.2737567, 0.4013229]
i62	0.1210085	0.181784	0.67	0.507	[-0.2385532, 0.4805703]
i70	-0.2736619	0.1859121	-1.47	0.143	[-0.6413888, 0.0940649]
i75	0.0807178	0.1698324	0.48	0.635	[-0.2552041, 0.4166398]
i76	0.1862166	0.1455521	1.28	0.203	[-0.1016798, 0.4741130]
i77	-0.0491834	0.1725987	-0.28	0.776	[-0.3905770, 0.2922102]
i79	0.0325592	0.1986942	0.16	0.87	[-0.3604502, 0.4255686]
i80	0.0268686	0.1436951	0.19	0.852	[-0.2573548, 0.3110919]
i81	-0.1035766	0.198157	-0.52	0.602	[-0.4955236, 0.2883703]
i82	-0.0901000	0.1732908	-0.52	0.604	[-0.4328624, 0.2526624]
cumulativegpa	0.2474194	0.1175982	2.1	0.037	[0.0148147, 0.4800242]
mismajor	-0.1611783	0.7401696	-0.22	0.828	[-1.6252050, 1.3028490]
dafam	-0.1947175	0.4745093	-0.41	0.682	[-1.1332780, 0.7438434
dhisp	1.0126730	0.4914889	2.06	0.041	[0.0405273, 1.9848190
djrsr	-0.9915848	0.298838	-3.32	0.001	[-1.5826750, -0.4004949
_cons	2.9715990	1.315027	2.26	0.025	[0.3705261, 5.5726710

Note. CI = confidence interval.

To test whether the regression results are different for the subsamples, a Chow

test was performed. The Chow test is a summary statistic that enables the determination

of whether the determinants of performance are different for online versus the

performance of face-to-face regression overall, as opposed to completing a coefficient by

coefficient comparison. The Chow test confirms that yes, the regressions are different.

The calculation for the Chow test follows:

$$\frac{\left(SSR_P - (SSR_f + SSR_o)\right)/k}{\left(SSR_f + SSR_o\right)\Big/(N_f + N_o - 2k)} \sim F_{k, N_f + N_o - 2k}$$

Using the results of the above regressions yields the following:

$$(\{3206.72\text{-}(2799.67 + 344.54)\}/19) / ((2799.67 + 344.54)/(2146+153\text{-}38)) \sim F_{19,\ 2260}$$

In reviewing the data for Research Question 4, the indicators of higher course outcome for the online population are different than those of the face-to-face enrolled students. The same predictors of success in the course cannot be applied to the online students. The online students with better course outcomes are those that expect to do better in the course and those with higher previous GPAs—which can really be said of the entire enrolled population—but the other NSQ variables that indicate success in the traditional face-to-face classroom do not apply to the online students.

Key Points From the Data Analysis

Engagement is a critical factor in education and a student's level of learning in a classroom. Regardless of delivery method, students will do better when they feel some level of connectedness to the professor, other students, and the materials. The findings in previous research support the findings of the current analysis on student feedback on online and face-to-face courses—that students value the interaction and engagement in a classroom regardless of delivery method. Students provided similar feedback to both face-to-face and online professors who provided engaging classroom atmospheres. It is critical that as online education increases in the higher education marketplace, online instructors continue to move away from the previous synchronous delivery methods, consistent with online education, and include more ways to incorporate activity-based learning into their course construction.

Examining the demographics of the successful online student, this analysis supports the research that older, female students tend to enroll in online classes; however,

none of these variables were predictors of success in the classroom when reviewing the regression analysis. Likewise, when examining ethnicities, the research proposes that Blacks and Hispanics tend to do worse in an online class than other ethnicities. While the regression analysis confirms that the Hispanic ethnicity tends to do worse in online education than other ethnicities, there was no evidence to support the previous research on Black students found in other analyses. Previous research also indicated that students with higher GPAs when enrolling in online courses would do better when enrolling in online courses. This is supported in my findings; however, this evidence supports a broader perspective that students will do better in a course when they have a history of good classroom performance.

Research on a student's inherent characteristics that may lead to success in an online classroom is limited at this time, focusing mainly on the traditional characteristics that are purported to lead to success—determination to succeed, self-discipline, and student-cited characteristics such as technology proficiency and clear understanding of the coursework. In the current analysis, the goal was to further that research and determine what, if any, self-reported characteristics a student who is successful in an online environment might possess. In addition to determining whether specific student characteristics could predict success, this study also analyzed what characteristics might lead a student to select an online class versus a face-to-face section of the same class.

In analyzing the characteristics that lead to student success, a clearer picture of overall contributing factors arises—students who are self-confident, consider themselves hard workers, have a higher scholastic average expectation (NSQ 16), are taking classes in their major, have a higher cumulative GPA when entering the course, and are White

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demonstrate better performance in the classroom regardless of delivery method. These same characteristics hold true in a traditional face-to-face classroom as well.

Interestingly, the landscape changes drastically when applying the model to online students. When the same model is applied to students enrolled in online classes, the predictors of success mentioned largely disappear. It is important to note that there is a large difference in sample size in the face-to-face and online populations, which could have an effect on the outcomes. The research is limited by the enrolled students and the number of courses offered. As online courses are offered in lower proportion to face-to-face at the university, it is critical to continue evaluating these factors as the population of online students continues to rise. The predictors for the online population include only previous GPA and the expectation of a higher scholastic average while enrolled in college. There is also a negative correlation that appears between the student's class year—as the student rises in class year, their class outcome is negatively affected. These data may indicate that while a traditional student possesses the same characteristics for success in a face-to-face class, these characteristics are less important or critical for the online students. Potential success in an online environment may solely be predicted by a student's previous GPA and class level. Variables like whether they had a higher high school GPA or have self-confidence have no effect on whether or not they will be successful in the classroom.

In analyzing the type of students that enrolls in online classes, the demographics support some of what is found in the research—students are older in age and class level, more likely female, and less likely Asian. This information correlates to some of the other NSQ answers that were found to be significant throughout the research. Students

choosing to enroll in the online sections of MS107 tended to be more likely to work while attending school, have higher income, and be less focused on engaging socially throughout their studies. These findings have implications for higher education around advising, resources, and course development. Understanding the mindset and lifestyle of the student who chooses to enroll in online classes may assist the university in developing specific resources, such as evening advising sessions and virtual tutoring, that would provide support for these students.

These findings may also assist the university in its marketing of programs, focusing on older, working females when developing campaigns to grow online programs. From a course delivery perspective, understanding that there is a desire to connect and engage, courses could be designed to incorporate work experience and the application of fundamentals within the online sections. Faculty members, used to teaching traditional undergraduate populations, may need additional resources and training to understand the mindset of the online student and how to engage them in an effective manner.

Finally, as shown in the thematic analysis of the SFF data, students enjoyed the interaction and engagement of the MS107 course regardless of delivery method and these components of the course were critical to the success in the classroom. As the instructors of the courses, whether online or face-to-face, utilize activity-based learning, students feel connected to the material and have the ability to apply concepts in a material way. This supports the research cited that students who feel connected to the material will have a better grasp of it and feel more connected to the course itself, regardless of the delivery

method. This finding can be utilized by course designers and faculty when developing

online sections of previously delivered face-to-face classes.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The current study attempted to determine if there was a significant difference in student course outcome based on the delivery method of the course in which students enroll. Student evaluations were reviewed to determine if students' perceptions of the course differed by course delivery method. Finally, this study attempted to determine if there were specific student characteristics—whether demographic or intrinsic—that lead to students' selection of online or face-to-face courses or in better course outcomes. This chapter includes a discussion of the major findings as related to the literature on online education, active learning, and student characteristics for success in an online environment. Also included in this chapter is a connection to the literature on student outcomes, connectivism, and activity-based learning. This chapter concludes with a discussion of the limitations of this study and areas for possible future research.

This chapter contains discussion and future research possibilities to help answer the research questions:

RQ1:   Is there a significant difference in student achievement as measured by final grade in an online course versus a face-to-face course?

RQ2:   Is there a significant difference in the SFF data for an online course versus a face-to-face course?

RQ3:   Are there differences in the types of students that will select an online class versus a face-to-face course?

RQ4:   Are there specific characteristics that will determine success in an online course that differ from the predictors of success in a face-to-face course?

As the population of students who enroll in online courses continues to grow, it is the responsibility of the universities providing these courses to guide students to the right course delivery method to promote a successful student experience. It is equally important for universities and faculty to understand what tools should be utilized in an online classroom to ensure that students are able to engage in the classroom experience, just as they would in a traditional face-to-face lecture.

<div align="center">Interpretation of the Findings—Relationships to the Literature</div>

In Chapter 4, data were analyzed around the students enrolled at the university, how they answered questions specific to their own self assumptions, how they performed in the classroom and how they evaluated the classroom setting. Several of the findings are consistent with the current bank of literature reviewed in Chapter 2, while some of the findings provide opportunity for future research and analysis. The discussion showcases the findings for each question and applicable literature.

RQ1:   Is there a significant difference in student achievement as measured by final grade in an online course versus a face-to-face course?

When the data for this question were analyzed, there was a clear answer that yes, students perform better in a face-to-face course than an online course when using final grade as the outcome measurement. As mentioned previously, the sample size for online students was significantly smaller than the face-to-face due to the nature of the number of face-to-face sections offered versus online. This finding is consistent with Xu and Jaggars' (2013) study, who found that typical college students do not fare as well in an online environment as they do in the traditional classroom.

RQ2: Is there a significant difference in the SFF data for an online course versus a face-to-face course?

Research tells us that students who have meaningful engagement and interaction with their instructors felt they learned more effectively in a classroom setting. Students who felt involved in the classroom with their peers, faculty members, and coursework demonstrate higher perceived success and satisfaction rates with the courses in which they are enrolled. Per Braun (2008), students taking wholly asynchronous classes often felt detached and less engaged than in a face-to-face classroom, which could lead to lower feelings of satisfaction with the course. The data analysis performed in this dissertation indicate that, in this case, the students did not demonstrate lower feelings of satisfaction with the course or the instructor.

In an attempt to understand the differences between the literature and the findings, a thematic analysis of students' responses within the course evaluations was performed. Within that analysis, and likely what supports the similar course ratings, is the theme of engagement. In this particular course, the students and faculty members engage in real-time virtual dialogue about the course topics and perform a series of hands-on, in-class activities—mirrored in the online and face-to-face settings. These findings support the idea that regardless of delivery method, engagement within the classroom is a critical feature in the classroom. Tying this back to the theory of connectivism as portrayed by Ally (2008), students should be engaged in an active process that will facilitate a personal connection with the materials.

RQ3: Are there differences in the types of students that will select an online class versus a face-to-face course?

Demographic data seemed like a natural place to start to analyze the data for this question. The findings indicate that the students who chose to enroll in online courses from a purely demographic standpoint are different. Students who enroll in online classes do possess different demographic characteristics than those who chose face-to-face. The average age of the online student skews 4 years higher than that of the traditional face-to-face student. The proportion of women enrolled in online classes is also significantly higher than in the traditional face-to-face classroom. This is consistent with earlier research by Wilson and Allen (2011), who found that online students were typically older and female. Since students were not asked why they chose one course delivery method over the other, one can only surmise based on anecdotal data that many students who are enrolling in online classes may be doing so in addition to other life events including, but not limited to, full-time employment and familial status.

To further analyze student characteristics and their relationship to a student's possible selection of an online or face-to-face class, 16 questions from the NSQ were selected to analyze against student enrollment. Students who chose to enroll in online classes tend to expect lower GPAs and to be less involved with on-campus social events and leadership opportunities. Students who selected to enroll in the online classes did, however, expect to work more hours than those enrolled in face-to-face classroom settings. The student's expected social aptitude was the most significant difference in the questions as showcased in the factor analysis. The face-to-face and online groups seemed extremely similar when analyzing their expectations around grades and academic standing while enrolled in college. Interestingly, when looking at skills like time management and ability to stay on task, the online students skewed more negative, while

the face-to-face students also reported a higher tendency toward self-confidence, organization and success from previous classroom experiences. As mentioned in the literature review, there is not a substantial body of research around what characteristics, other than demographic, lead a student to select an online class versus a traditional face-to-face section, so there is an opportunity to spend more time surveying students as to why they chose the course method and their motivation and then correlating that to their behavioral characteristics.

Finally, as the opportunity and data were available, the analysis of the students' entire response to the NSQ and their course selection was analyzed to determine if there were any other significant characteristics, outside of behavioral, that might lead a student down the path of an online or face-to-face enrollment. In this additional analysis of the data, findings indicate that students who enroll in online classes expect lower levels of support from their families, their families are less likely to have attended college, and school characteristics like location and size are not as important to the students.

The lower levels of expected familial support reported by the online students is interesting and in contrast to what Kahu et al. (2014) found—familial support is critical to a student's success in an online classroom. Perhaps, while the students are balancing their coursework, it is critical to find a way to remind these students that familial support will be imperative to their success. This may also be an opportunity for counseling at the advising level on enlisting the support of those within the household, especially when working with students who are balancing life and work in addition to the classroom. Other characteristics like transitioning to work and getting away from home are not as important for those that selected online enrollment. These findings could correlate to the

older, female demographic findings in that these students are attending school in addition to other life events like working full time and managing families while obtaining their degrees.

RQ4:   Are there specific characteristics that will determine success in an online course that differ from the predictors of success in a face-to-face course?

After evaluating the characteristics of students who choose certain course delivery enrollments, student outcome in the courses, and student course evaluation data, the final research question posed is whether or not these characteristics could also influence how the student actually performs in the classroom. The research for successful outcomes in online education tends to focus on tangible, concrete predictors like demographics and previous GPA. Therefore, it is important to determine if these tangibles are the only predictors to be focused upon or if there are other, more intangible factors that might lead to better outcomes.

To review the data, a multiple regression analysis was performed to determine whether there were significant differences in the characteristics of students who were successful in either classroom mode. The results first looked at the performance of the students in MS107 regardless of delivery mechanism. The findings indicate that students who have better outcomes in the courses have higher expectations of performance, do not expect to work full time, have more familial support, are considered hard workers, expect to join a social organization, and have high levels of self- confidence. Students' self-reporting of higher numbers of hours studying, time management, and independence did not correlate significantly to the student's performance outcome.

Some of this ties back to the findings of Sparkman et al. (2012), who found that a lack of familial support could lead to lower success in college. There is also correlation to what Onlinecollege.org (2011) stated as characteristics that students should possess when entering college: persistence (hard-worker), self-confidence, and focus on personal and professional goals (high expectation of performance). When cumulative GPA was added to the regression, the model strength nearly doubled, indicating and supporting prior research by Wojciehowski and Palmer (2005) that regardless of any other characteristics of success, prior GPA would be the best predictor for success in the classroom. This could showcase the need to use GPA as the starting point for success in the classroom and then bring in the additional characteristics or motivators to enhance student performance. Interestingly, in the Eduventures (2015) survey, high-performing students did not indicate that time-management skills were critical to their success in the classroom. This supports the finding of this data analysis as well.

When the regression was applied to the face-to-face population, the significant variables did not change. Students who performed better in the classroom matched the same characteristics of the total population. When the same regression was applied to the online students, the significant variables changed dramatically. Everything but the student's GPA was eliminated as a predictor of success in the classroom. It must be remembered that there is a substantial difference in sample size between the two regressions. This makes directly comparing significance levels somewhat problematic. It is noteworthy, however, that two new variables did become significant—class level and Hispanic ethnicity. The class level finding is that students who are juniors or seniors (the group that has a higher percent taking online classes) tend to do worse in the class. This is

in contradiction to the Wilson and Allen (2011) study where they found that students who had higher banked semester hours tended to do better in the online classroom. This could be for a few reasons, not limited to the thought that in this case, upperclassmen are enrolling in an online section of this course as they perceive that it is not important to their studies despite the fact that it is a requirement, or they are trying to complete the requirements that do not pertain to their direct major in an efficient manner.

The negative performance of Hispanics is also different than previous studies have found. Although no research indicates how Hispanics specifically perform, the previous studies showed no indication of poor performance by this demographic group. It's also worth noting that Hispanics make up the smallest percentage of students enrolled in MS107, regardless of delivery method, with the exception of those who self-report multinational as their ethnicity.

While the purpose of this study was to determine what intrinsic characteristics might lead a student to choose and ultimately be successful in an online classroom environment, what ultimately becomes apparent is that what may be equally as important as the student is the course design and the engagement with the faculty. As noted in the research as early as Astin (1993), engagement is critical to success. The student feedback supports this idea wholly. And, while there are still many research opportunities in the growing field of online education, with each study, we are able to learn more about the characteristics of the student and the classroom that university leaders and decision makers can utilize to craft online programs. As mentioned, online programs and enrollment are in a growth trend and do not look likely to stop anytime soon. It is critical, then, for administrators to understand what success for these programs and their enrolled

students will look like. As students continue to enroll in online classrooms, emphasis should be put on the engagement factors of the online environment, providing students with the ability to feel connected and collaborate with faculty and their peers. Online courses and programs should understand that these students may be slightly older and have different priorities than the traditional undergraduate student. This could potentially shape offerings around course timing, technology utilized and overall program development.

<div align="center">Limitations of the Study</div>

Except for students enrolled in the OBBA program, students at the university are offered the freedom to enroll in either traditional face-to-face or online classes according to their preference and schedule. OBBA students are required to enroll in the online section of the courses, due to the nature of their program. As students will self-select which section to enroll in, the population is not randomly assigned. There is no ability to track the reason why the student enrolled in which section, whether it be for schedule reasons, convenience or preference.

Inconsistency in grading may also be a concern in this study, as there are at least nine different professors across the various sections. While the coursework in each section remains consistent, it may be that some professors award higher or lower grades based on outside factors, including class participation or exam score curves.

Inconsistency in communication of the course material or unfamiliarity with the teaching method may also be a concern. Starting with the fall of 2017, several professors began teaching online courses for the first time. This may lead to more variable grades as the faculty become comfortable with a new teaching mechanism. Further study could be

done comparing the courses of faculty who teach in both online and face-to-face sections on the course.

The NSQ questions were selected based on an assumption that these questions had the potential to showcase a student's personal biases or decisions when enrolling in courses at the university. There could be additional NSQ questions that would affect students' course delivery selection or their outcome in a final course that have been excluded from the analyses.

It is also worth noting that one variable that I did not include, but perhaps should for the future is whether the student has an international status or Visa on file. This could be important when looking at the demographic makeup of students who enroll in online classes, specifically with those students who may hold an F-1 Visa, which limits the amount of online classes in which a student can enroll to one.

<div align="center">Recommendations for Future Research</div>

Assess the characteristics of students enrolled as OBBA students versus all other majors. Students can now choose to major in a solely online curriculum, rather than just taking online classes at their discretion throughout their studies. Students who chose to study completely online may have wholly different predictors of success than those traditional students who enroll in an online class or two throughout their undergraduate studies. Currently, there are less than 200 students registered as OBBA majors at the university. Further research should be done on whether students who chose to enroll in a wholly online programs versus enrolling in a traditional program and taking part of their curriculum online and part face-to-face have similar characteristics and program outcomes (i.e., graduation). As online programs continue to grow in higher education,

administrators must continue to ensure that the students have the keys necessary for success. Understanding the critical success characteristics of students in online programs can assist these administrators with ensuring quality and consistency in the students that are enrolling in online programs.

Provide adequate faculty and course development support for online courses and programs. As noted by Research Question 2, students value engagement with their professors, regardless of course delivery method. Research into current online course delivery tools should be completed to further this research and identify which types of interaction (i.e., discussion boards, breakout rooms, and hands-on activities) are influential in the student's success in the classroom. Professors' understanding of these tools should also be assessed so that training can be created for the online class delivery. Finally, administrators in higher education could utilize this research to work with the academics to help determine faculty qualifications and training design to facilitate and identify engagement as a critical function of online education. It is interesting to note that in a recent survey conducted by Educause (2019), online and blended learning and the construction of courses for all environments of learning was cited as the second biggest opportunity for today's faculty. Couple that with the increased number of online enrollees and it is incumbent on the institution to encourage, support, and educate faculty to become better online teachers.

Assess the characteristics of success for students across colleges. This study was limited to students taking an undergraduate requirement in a business school. As such, the characteristics may also be correlated to business students in particular. Future research should include a similar study on students enrolled in various majors, outside of

just the business school. Research could include a deeper dive into the motivations and characteristics of students who choose online classes to determine what are the reasons that students take online sections. These findings could be used in a variety of ways, including recruiting, marketing, and course placement. These findings could also help administrators and advisors provide students with guidance into the programs in which they chose to enroll. From an administrative standpoint, this research could assist in the development of online programs and the outreach performed for advising and recruiting.

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APPENDIX

CHI-SQUARE CALCULATIONS FOR DEMOGRAPHIC AND NSQ DATA

Table A1: Cross-Tabulation of Face-to-Face and Online by Race Demographic

			Group		
			Not Online	Online	Total
Race	AFA	Count	191	23	214
		% within Group	7.8%	11.8%	8.1%
	AI	Count	3	0	3
		% within Group	0.1%	0.0%	0.1%
	ASN	Count	432	18	450
		% within Group	17.6%	9.2%	17.0%
	HSP	Count	137	17	154
		% within Group	5.6%	8.7%	5.8%
	MUL	Count	62	7	69
		% within Group	2.5%	3.6%	2.6%
	PI	Count	2	0	2
		% within Group	0.1%	0.0%	0.1%
	UNK	Count	255	11	266
		% within Group	10.4%	5.6%	10.1%
	WH	Count	1369	119	1488
		% within Group	55.9%	61.0%	56.2%
Total		Count	2451	195	2646
		% within Group	100.0%	100.0%	100.0%

Table A2: Cross-Tabulation of Face-to-Face and Online by Gender Demographic

			Not Online	Online	Total
				Group	
Gender	F	Count	947	97	1044
		% within Group	38.6%	49.7%	39.5%
	M	Count	1502	97	1599
		% within Group	61.3%	49.7%	60.4%
	N	Count	2	1	3
		% within Group	0.1%	0.5%	0.1%
Total		Count	2451	195	2646
		% within Group	100.0%	100.0%	100.0%

Table A3: Comparison of Face-to-Face and Online by Age Demographic

	Group	*N*	*M*	*SD*	*SEM*
AGE	Not Online	2,451	20.72	3.031	.061
	Online	195	24.66	6.645	.476

Table A4: Cross-Tabulation of Face-to-Face and Online by Class Level

			Not Online	Online	Total
				Group	
Class Level	Freshman 0 to 29 Credits	Count	204	7	211
		% within Group	8.3%	3.6%	8.0%
	Junior 60 to 89 Credits	Count	749	78	827
		% within Group	30.6%	40.0%	31.3%
	Senior 90 to 119 Credits	Count	154	44	198
		% within Group	6.3%	22.6%	7.5%
	Senior/Fifth Year 120+ Credits	Count	23	7	30
		% within Group	0.9%	3.6%	1.1%
	Sophomore 30 to 59 Credits	Count	1321	59	1380
		% within Group	53.9%	30.3%	52.2%
Total		Count	2451	195	2646
		% within Group	100.0%	100.0%	100.0%

NSQ Data Analysis

Table A5: Cross-Tabulation of Face-to-Face Versus Online for Expected Scholastic Average

			Group		
			Not Online	Online	Total
i16	A	Count	1365	95	1460
		% within Group	58.6%	56.9%	58.4%
	B+	Count	795	56	851
		% within Group	34.1%	33.5%	34.1%
	B	Count	160	11	171
		% within Group	6.9%	6.6%	6.8%
	B-	Count	8	3	11
		% within Group	0.3%	1.8%	0.4%
	C+ or lower	Count	3	2	5
		% within Group	0.1%	1.2%	0.2%
Total		Count	2331	167	2498
		% within Group	100.0%	100.0%	100.0%

Table A6: Cross-Tabulation of Face-to-Face Versus Online for Expectations of Social Atmosphere

			Group		
			Not Online	Online	Total
i47	Very	Count	1585	80	1665
		% within Group	69.2%	48.8%	67.8%
	Somewhat	Count	633	63	696
		% within Group	27.6%	38.4%	28.3%
	Not	Count	74	21	95
		% within Group	3.2%	12.8%	3.9%
Total		Count	2292	164	2456
		% within Group	100.0%	100.0%	100.0%

Table A7: Cross-Tabulation of Face-to-Face Versus Online for Expectations of Becoming a Student Leader

| | | | Group | | Total |
			Not Online	Online	
i60	Very	Count	658	37	695
		% within Group	29.1%	23.1%	28.7%
	Some	Count	1167	72	1239
		% within Group	51.5%	45.0%	51.1%
	Little	Count	387	42	429
		% within Group	17.1%	26.3%	17.7%
	None	Count	52	9	61
		% within Group	2.3%	5.6%	2.5%
Total		Count	2264	160	2424
		% within Group	100.0%	100.0%	100.0%

Table A8: Cross-Tabulation of Face-to-Face Versus Online for Expectations Working Full Time While in School

| | | | Group | | Total |
			Not Online	Online	
i61	Very	Count	293	61	354
		% within Group	12.9%	38.1%	14.6%
	Some	Count	663	40	703
		% within Group	29.3%	25.0%	29.0%
	Little	Count	937	49	986
		% within Group	41.4%	30.6%	40.7%
	None	Count	370	10	380
		% within Group	16.3%	6.3%	15.7%
Total		Count	2263	160	2423
		% within Group	100.0%	100.0%	100.0%

Table A9: Cross-Tabulation of Face-to-Face Versus Online for Expectations for Joining a Social Organization

| | | | Group | | Total |
			Not Online	Online	Total
i62	Very	Count	1436	69	1505
		% within Group	63.5%	43.1%	62.1%
	Some	Count	665	57	722
		% within Group	29.4%	35.6%	29.8%
	Little	Count	137	25	162
		% within Group	6.1%	15.6%	6.7%
	None	Count	24	9	33
		% within Group	1.1%	5.6%	1.4%
Total		Count	2262	160	2422
		% within Group	100.0%	100.0%	100.0%

Table A10: Cross-Tabulation of Face-to-Face Versus Online for Expectations on Enrolling in an Online Course

| | | | Group | | Total |
			Not Online	Online	Total
i62	Very	Count	1436	69	1505
		% within Group	63.5%	43.1%	62.1%
	Some	Count	665	57	722
		% within Group	29.4%	35.6%	29.8%
	Little	Count	137	25	162
		% within Group	6.1%	15.6%	6.7%
	None	Count	24	9	33
		% within Group	1.1%	5.6%	1.4%
Total		Count	2262	160	2422
		% within Group	100.0%	100.0%	100.0%