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Influence of Student Characteristics, Class Size, and Instructor Characteristics in Online Student Success

Melody K. Edmonds
East Tennessee State University

Influence of Student Characteristics, Class Size, and Instructor Characteristics in Online Student Success

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by

Melody Edmonds

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Dr. Jill Channing, Chair

Dr. James Lampley

Dr. Richard Rhoda

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ABSTRACT

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The purpose of this non-experimental quantitative case study was to compare the academic success of community college students over three academic years (2016-17 through 2018-19) before the onset of COVID-19 based on final grades and the influence of student factors, class size, and faculty characteristics using archival data from selected online and on-ground classes at a Middle Tennessee community college. Student factors reviewed include gender, full-time or part-time status, and age (traditional or non-traditional status). Instructor characteristics reviewed included full-time or part-time (adjunct) teaching status and tenure or non-tenure status of faculty. Institutional data for this study consisted of 44,568 student records comprising 34,006 on-ground classes and 10,562 online classes. For the percentages provided, audit and incomplete or missing data were excluded. In this study, the mean grade point average (GPA) of all students with prior GPAs was 2.7. Unique student registrations totaled 13,400 students and unique instructors totaled 198. Eight research questions were answered from these data using Chi-square statistical tests. The final study showed a variety of results. When comparing student success for online and on-ground, online students were generally more likely to be successful, while on-ground students were generally more likely to be unsuccessful. In online courses, female students, part-time students, and non-traditional students were more likely to be successful. Class

sizes fewer than 11 were generally more likely to produce successful students. Successful students were generally more likely to be taught by full-time faculty and tenured faculty.

DEDICATION

God placed many wonderful people in my life, and I praise Him for all of my achievements. I am dedicating this work to my support group who made this dream possible. Reaching this goal was not a solo journey. My parents Rodger and Carolyn, my daughter, Kristin, and my granddaughters, Meleah and MaKaylee helped me more than they realize. They allowed me to sacrifice some family time to accomplish this task and have always supported me through all of my educational endeavors. I want to be an example of lifelong learning; it is important to practice the advice given to others. My wish is for this milestone in my life to be instrumental in showing my grandchildren and others anything is possible through perseverance and hard work.

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Chapter 1. Introduction

Despite the fact that overall higher education enrollment is decreasing, online course demand has continued to increase in the past few years. To illustrate, according to Seaman and Seaman (2017), the consistent higher education enrollment increases that had been occurring for many years have stalled. In fact, from fall 2012 through fall 2015, total higher education enrollments decreased (Seaman & Seaman). Conversely, a higher percentage of students have registered for online courses during this same timeframe (Seaman & Seaman, 2017). Because of the increased attractiveness of online courses to students, institutions may need to place additional emphasis on the multiple factors that lead to successful online course completion. With the decline in enrollment, completion becomes even more vital to continue the pipeline of providing a credentialed workforce to employers.

According to Complete College America (2020), only 5% of associate degree students, who primarily attend community colleges, graduate within two years. Moreover, at four-year institutions the six-year graduation rate is merely 19% (Complete College America, 2020). From these dismal data, higher education institutions are now being both supported and mandated to make improvements. For example, the Complete College America initiative, which started in 2009, has a mission of supporting higher percentages of students completing postsecondary credentials and eliminating student achievement inequalities by partnering with state governments, higher education system offices, and individual institutions to create transformation and needed policy for this goal. Furthermore, some privately funded foundations are also providing support to institutions to increase the inequalities of student achievement. Among these are the Lumina Foundation, which has a goal of ensuring that 60% of Americans hold a postsecondary credential by 2025 (Lumina Foundation, 2020). These newer initiatives

have led to recent policy changes to assist institutions in this quest for higher student success rates.

Change is inevitable among all businesses and institutions. Tennessee community colleges are beneficiaries of many recent policy changes. Among these changes are the Tennessee (TN) Reconnect initiative in 2018, the Tennessee (TN) Promise initiative in 2015, and the overhauling of the funding formula based almost exclusively on retention and completion in 2010 (Johnson & Yanagiura, 2016). After decades of standard funding formulas based primarily on enrollment, changes were initiated in 2010 that focused on funding colleges for completers rather than original enrollments (Testa, 2017). Crafted from the Complete College Tennessee Act of 2010, results from completion data are compiled each year, and institutions receive funding based on a three-year average (Overview of outcomes-based funding formula, n.d.). In the new outcomes-based funding formula, community colleges are currently measured in various categories; these measures include students completing 12 credit hours, 24 credit hours, 36 credit hours, and the number of certificates and degrees awarded. Along with outcomes-based funding, Tennessee initiated other programs to increase postsecondary credential attainment in the state.

The Tennessee (TN) Promise program started in the 2015-16 academic year by an act of legislation prompted by the governor (Tamburin, 2015). This initiative allowed Tennessee high school seniors to attend a community college or a Tennessee College of Applied Technology (TCAT) center tuition-free upon graduation and completion of a list of specific requirements. Tennessee (TN) Reconnect, another state mandate, started in 2018 and provided the same type of opportunities to adult students over 24 to enroll tuition-free at these same types of institutions (Smith, 2018). Both TN Promise and TN Reconnect have spurred enrollment growth at community colleges. In fact, this enrollment growth totaled 37% from 2015 through 2017 at

Motlow State Community College in Tennessee (Motlow State sets enrollment growth for third consecutive year, 2017).

Colleges should explore many student success pathways to perform better and to provide the best resources for the students. Simultaneously, colleges must work at reducing attrition in order to compete for funding formula dollars. One of these increasingly popular paths is online instruction. Students choose online instruction for multiple reasons. Although many students simply enjoy the scheduling flexibility, some could not attend traditional weekly on-ground classes due to job and family commitments. Others take the courses online when the students' schedules conflict with necessary on-ground classes. Regardless of the reason, institutions need to study online completion factors for this growing instructional delivery method.

Throughout the last decade, online instruction in higher education has grown rapidly, especially at community colleges. By 2017, 30.9% of community college students have registered for at least one online course (Lederman). In contrast, 29% of students at four-year public institutions have registered for at least one online course (Lederman, 2018). Thus, with this proliferation of online course demands, institutions are reporting long-range plans of increasing the number of online course offerings (Allen et al., 2016).

Many high school students are taking courses online or with remote instructional technology to support the traditional on-ground instruction (Gemin & Pape, 2017). Additionally, students taking dual enrollment courses in high school sometimes take their courses online. Consequently, many students are starting college with some online course experience. This familiarity of online instruction could potentially lead to further rise in online course demands at the postsecondary level (A new pedagogy is emerging, 2020). Unfortunately, these online course sections create greater challenges for improving course retention rates than the traditional on-

ground courses (Allen & Seaman, 2015). The lower completion rates translate into decreased funding in the outcomes-based funding model. Therefore, with this enrollment growth and the subsequent rapid rise of online courses, more research is needed to explore the many variables that contribute to online student success.

During the spring 2020 semester, online learning faced an unforeseen spike in usage and a subsequent unprecedented challenge. COVID-19, otherwise known as the coronavirus, entered the United States and led to the nation's pandemic status. Abruptly in the middle of the semester, institutions were forced to pivot and adapt to some form of "remote learning" (Joosten, 2020). The term remote learning is used to describe the type of courses that were quickly converted from on-ground to a virtual environment for students; however, these were not typical online classes. An important distinction is that traditional online classes were developed for online with close attention to the needed pedagogy for success. Addressing a crisis situation without ample planning time, while necessary, should not be compared to the fully developed online classes that have been vetted and include adoption of proper pedagogies. Joosten (2020) further theorized that expeditiously converting courses from on-ground to online without conducting research on best practices may not generate the highest outcomes for students or faculty. Data for this study did not include the spring 2020 semester; however, this significant event is important to include as it could potentially lead to further transformation of online instruction moving forward.

Statement of the Problem

The purpose of this non-experimental quantitative case study was to compare the academic success of community college students over three academic years (2016-17 through 2018-19) before the onset of COVID-19 based on final grades and the influence of student factors, class size, and faculty characteristics using archival data from selected online and on-

ground classes at a Middle Tennessee community college. Student factors reviewed include gender, full-time or part-time status, and age (traditional or non-traditional status). Instructor characteristics reviewed included full-time or part-time (adjunct) teaching status and tenure or non-tenure status of faculty.

The predictor variables were delivery method (online or on-ground), student factors, class size, faculty characteristic, or some combination of these descriptors. The criterion variable was student academic success or students' final course grades. Furthermore, student academic success was generally defined as achieving a final course grade of A, B, or C. Grades of D, F, FA, and W were considered to be unsuccessful in this study. At the participating institution, the difference in an F and an FA grade is attendance; students who fail due to not attending after two-thirds of the course is completed are automatically assigned an FA grade instead of an F. However, either grade signifies the student failed the course; the difference lies in the reason for the failure. The selected courses were English, history, and the natural sciences. These disciplines were chosen because they are required by most degree-seeking students at the participating college. The courses were developed for online delivery by a full-time faculty member, and are then cloned to others teaching the class, and have the same student learning outcomes (SLOs) as the corresponding on-ground classes.

Research Questions

Investigating online student academic success led to the following research questions guiding this case study:

1. Is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between online and on-ground in corresponding classes at the participating community college?
2. Is there a significant difference in the proportion of students receiving an unsatisfactory or failing grade (D or F/FA/W) between online and on-ground in corresponding classes at the participating community college?
3. For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between female and male students at the participating community college?
4. For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between full-time students (taking 12 or more credit hours) and part-time students (taking fewer than 12 credit hours) at the participating community college?
5. For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between traditional aged students (age under 24) and non-traditional aged students (age 24 and over) at the participating community college?
6. For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) among the three class sizes (fewer than 11, 11-18, 19 or more) at the participating community college?
7. For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between courses taught by tenured or non-tenured full-time instructors at the participating community college?

8. For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between courses taught by full-time and part-time (adjunct) instructors at the participating community college?

Significance of the Study

For 14 consecutive years, online course enrollment has been accelerating (Seaman, & Seaman, 2018). Furthermore, online course demand continues to grow, especially in community colleges; by 2017, almost 31% of community college students register for a minimum of one online course as compared to 29% at public four-year higher education institutions (Lederman, 2018). Additionally, most students registering for at least one online course were also registered for at least one on-ground course (Seaman & Seaman, 2018). With many students making the choice to pursue courses online, institutions should address appropriate instructional quality and holistic online student support systems to meet retention goals.

The nimble nature of online studies combined with the homogenization of student characteristics make it a better option for some faculty (Portugal, 2015). A reduced attrition rate is the goal of almost all institutions. With any course offered, student success is paramount to both the student and the institution for achievement of retention, completion, and graduation goals. Part of the student's success may be attributed to the ease of access and understanding course information (Abell et al., 2016). Determining optimal class sizes, characteristics of successful students, and characteristics of successful faculty will aid all types of institutions in providing the correct support systems needed for students to achieve success.

Throughout the last decade, researchers have performed several studies analyzing factors contributing to online student success. Most of these focus on characteristics of online students

and their subsequent course retention and attrition. Although these are important research questions to answer, administrators still face questions of how to close the significant gap between online and traditional student success while meeting the increased demand to offer more online courses (Allen & Seaman, 2015). This gap varies among courses. Student traits, demographics, and profiles are frequently studied to identify student characteristics more likely to be unsuccessful, yet faculty characteristics should also be assessed to determine the significance of the role faculty play in both the success and the lack of success of the online students. Faculty, as a variable, has been notably concealed or even absent in many previous studies (Hutto, 2013; Martin, 2017; Tinto, 2006). Logically, student involvement and engagement at the institution are largely attributed to student affairs personnel. Yet most community college students hold jobs and generally do not live on campus; thus faculty teaching in the classroom may actually be the only opportunity for student engagement and involvement (Tinto, 1999). Determining the factors responsible for student success and attrition rates will assist administrators when making decisions regarding competitive academic demands (Kane et al., 2015).

Learning is essentially the fundamental business of higher education institutions, and effective administrators should know how students learn (O'Banion, 2010). Many studies focus on enriching the student learning emprise; however, more emphasis is needed on student success and retention (Simpson, 2012). My study adds to the literature of online student success research, which is especially significant to all institutions because of the recent growth of online learning and their missions of student learning. After identification of these underperforming groups, institutions should determine action steps to provide more focused support to narrow or eliminate success gaps.

Definitions of Terms

With the variety of higher education vernacular, the following definitions of terms are important to understand how these terms are used throughout this study:

1. *Adjunct, or part-time faculty:* Part-time instructors who teach fewer than the number of credit hours considered to be a full-time course load (Slyter, 2019).
2. *Attrition:* The non-enrollment of a student in a subsequent semester who has not completed a degree or certificate in the higher education institution (Bean & Metzner, 1985).
3. *Course load:* Total number of credit hours a student is registered for in a term (Slyter, 2019).
4. *Distance education or distance learning:* Teaching delivery method with students and instructors at different locations (Kentnor, 2015).
5. *Dual enrollment:* Program with high school students simultaneously enrolled in college-level courses for credit (The Glossary of Education Reform, 2014).
6. *Full-time faculty:* Instructors who teach the number of credit hours considered to be a full-time course load or receive release time for the difference in credit hours (Slyter, 2019).
7. *Full-time student:* Student who is registered for 12 or more credit hours during a single term (Bean & Metzner, 1985).
8. *Hybrid or blended courses:* Some synchronous class time is required for the class; however, the class has an additional required online class component (Sener, 2015).
9. *Non-traditional student:* Students who are typically 24 or older and provide for themselves without support from their parents (Slyter, 2019).
10. *Non-tenured faculty:* Faculty members at higher education institutions who have not met the requirements for tenure (Education USA, n.d.).

11. *On-ground, face-to-face instruction, classroom course:* Courses with listed class times for face-to-face instructional activities that meet specific seat-time requirements (Sener, 2015).
12. *Online course:* No face-to-face class requirements or meetings on campus are required; students complete all class obligations online (Sener, 2015).
13. *Retention rates:* Re-enrolled in the subsequent fall semester, first-time undergraduate students continuing at the institution where they started, usually expressed as a percentage (Undergraduate retention and graduation rates, 2020).
14. *Student success:* In this study, student success is a final course grade of A, B, or C.
15. *Tenure:* Full-time faculty members at higher education institutions may achieve this designation after successfully meeting prescribed benchmarks over a period of time; furthermore, once achieved, the position is essentially renewed until retirement (Education USA, n.d.).
16. *Traditional student:* Students who begin their higher education studies immediately after high school graduation. Typically, these students are under 24 and are labeled as being monetarily supported by their parents (Slyter, 2019).

Limitations and Delimitations

Despite using three years of data and multiple online courses from different disciplines, this study does contain limitations. Archival data were used to eliminate bias, and the results are believed to be accurate. Aptness of the theoretical framework, along with specific definitions of student success used, adds further limitations. Assumptions were also made regarding the capability of the chosen methodology to properly direct the study and the capability of the chosen analyses to properly address the research questions. Furthermore, because letter grades span a range of percentage points, precision is limited. Moreover,

students deemed successful had a final grade of A, B, or C; however, in some cases, a grade of D does not impede a student's progress. Additionally, I endeavored to substantiate that all statistical tests had adequate power to produce accurate results.

My study is delimited to courses in English, history, and natural sciences at a single public community college during a three-year period from fall 2016 through summer 2019. Thus, the study is not necessarily generalizable to all online students. While the results may be generalized to other public community colleges within these subject areas online, the results may not be generalizable to other institution types.

Some other factors were not studied because they were outside the scope of this study and cannot be controlled through the research. First, this study did not investigate the reason students registered for the online course. Knowledge of whether the student chose to register for an online course or was forced to register for it because on-ground courses were unavailable might make a difference in final course outcomes. Second, this study did not determine differences in online course quality that could potentially impact outcomes. Third, important factors including the reasons students dropped the course are unknown; this knowledge could provide more insight as to whether or not the reasons involved the instructor or whether life circumstances simply prevented the student from completion. Fourth, the amount of time the instructor spent online in the course and the quantity of student engagements were not included in the study. Fifth, this study did not track success in subsequent courses which could give additional information about the success of the student over time. Sixth, this study was only based on final course grades; reviewing individual sections of the courses may have produced different results because some individual sections may have higher quality than others. Seventh, faculty satisfaction surveys or student course

evaluations were not used because they were outside the scope, and these could have provided additional insights into the reasons for online course success or failure. Finally, all student and faculty characteristics that could have made a difference in final course outcomes were not included in this study.

Overview of the Study

This study contains five chapters. Chapter 1, Introduction, introduces the growth of online learning and connects online learning at higher education institutions with the current higher education landscape. This chapter also contains the statement of the problem, research questions, significance of the study, definition of terms, limitations, delimitations, and the structure of the dissertation. Chapter 2, Review of Literature, provides important background information on distance learning and describes different models of online learning that institutions have developed to capitalize on the popularity and growth. Furthermore, Chapter 2 reviews literature directly related to the research being studied regarding online and on-ground student performance, class sizes, and student and faculty characteristics and their relationships to student success. Chapter 3, Research Method, examines the research method which includes the method and type of the study, research questions, instrumentation, population and sample, data collection, and data analysis. Chapter 4, Results, reveals the research findings with an included discussion of the outcomes. Chapter 5, Summary, Conclusions, and Recommendations, presents a summary of the findings, recommendations for application of the study results, conclusions, and recommendations for further research.

Chapter 2. Review of Literature

A review of the literature relevant to the background of online instruction including current trends and findings from other studies is presented herein to demonstrate the needs and the gaps in the literature for this study. The literature review analyzed research findings in comparing online and on-ground student success along with student characteristics such as grade point average (GPA), gender, full-time or part-time status, and age (traditional or non-traditional) status. Additionally, optimal online class size and faculty characteristics of teaching online courses such as part-time (adjunct) or full-time status and tenure or non-tenure status were reviewed.

Theoretical Frameworks

Theoretical frameworks are prolific for on-ground research; however, they are sparse for online delivery. Thus, multiple theoretical frameworks provide the map for this research of online success pursuits. Scaffolding these frameworks provide direction and guidance for institutions seeking to achieve the highest student online success rates. For example, a study of on-ground and online final grade comparisons would not provide information on whether the class size, student, or instructor factors influenced the final grades. While no study can review all factors that could potentially contribute to student success, a multi-faceted approach that looks at success from multiple variables should yield greater insights.

Tinto's (1993) Model of Institutional Departure emphasized the importance of class comprehension to student retention. From Tinto's model, the final grade of students who successfully completed the class provide an indication of the level of comprehension that occurred with both delivery methods. Because both delivery methods use the same student

learning outcomes, textbook, and master syllabus, a significant difference found between the two delivery methods would indicate an area in that delivery method that needs further investigation. For example, one or more of the course modules might need additional work to improve the performance level. Tinto's model was primarily referring to on-ground classes, but the same characteristics also apply to online classes. In Research Question 1 of my study, I compared the difference in the proportion of students successfully completing the course between on-ground and online courses. Research Question 2 compared the difference in the proportion of students who did not successfully complete the course between on-ground and online courses.

Building on several earlier retention theories, Bean and Metzner (1985) asserted that the sense of belonging was not as essential to non-traditional students. Furthermore, Bean and Metzner stated that environmental variables, academic variables, background variables, and psychological variables greatly impacted student attrition rates. Specifically, background variables such as gender, enrollment status, and age were pinpointed in their theory, among others. These identified characteristics framed the student characteristics used for Research Questions 3 through 5 in my study.

Research Question 6, which examined various class sizes and their prediction for success, was derived from a study which reviewed multiple frameworks. Taft et al. (2019) proposed a framework for online class size in their study. According to this framework, a small online class size should be 15 students or fewer. Taking into account the institution class sizes of this study, a three-tiered model (10 or fewer, 11-18, and 19 and above) based on this framework was used in this study. This three-tiered model provided greater distinction between the various online class sizes to aid in the quest of determining an optimal online class size.

Tinto (2006) emphasized that faculty are the key players in student retention efforts. However, Tinto also suggested most faculty believe retention is a product of student affairs efforts. Moreover, Tinto purported that student retention is an outcome of robust student learning. From Tinto's contention, Research Questions 7 and 8 were developed to study faculty characteristics, namely full-time or part-time status and non-tenure or tenure status, along with their relationship to student success in online classes these faculty teach.

All of the aforementioned frameworks yielded guidance to develop the research questions of my study. Delivery method, student characteristics, online class size, and faculty characteristics all play a role in student retention. Multiple frameworks will provide insight into the numerous student success support systems which institutions need to meet student success goals. Institutions should research multiple factors because student success is not limited to a single support system (Hearn, 2006). Hearn (2006) affirmed that student success cannot be achieved through a simple one-step solution; rather, the solution may be as complex as the problem itself.

Beginning with the development of distance education, a review of the literature is provided. Distance education and online instruction evolved over time. Through the years many different types of distance education have been offered to students. Reviewing the background and evolution of distance education and its various delivery methods yield insight into the origins of online instruction and provide context for the current online instructional environment.

Background and Evolution of Distance Education and Online Instruction

Prior to online instruction, a variety of distance education courses were offered. These included correspondence courses, radio courses, and television courses. The first attempt to

provide a correspondence course was in 1728, when shorthand lessons were offered in England (Kentnor, 2015). Correspondence courses were also widely used in the 1920s; with these courses, the higher education student's only obligation was to have a mailbox (Caruth & Caruth, 2013). Class assignments were sent to students, and students subsequently returned completed assignments. Radio courses also started in the 1920s with lectures broadcast to students (Caruth & Caruth, 2013; Casey, 2008; Kentnor, 2015). Television courses were offered in the 1930s, but they did not ever become a significant volume distance education medium (Kentnor, 2015). Online instruction is the current distance education medium that continues to experience growth.

Online instruction, a form of distance learning, could still be considered in its early stages in higher education institutions. Origins of online instruction were first available in the proprietary colleges (Thelin, 2011). In 1989, the University of Phoenix offered the first online higher education courses (Kentnor, 2015). Public higher education institutions started online programs in the mid-1990s (Casey, 2008; Kentnor, 2015). Online instruction's primary purpose in higher education is to provide greater student access. Access barriers that are dissolved through online instruction primarily include transportation, non-traditional work schedules that do not fit the traditional on-ground class schedules, and lack of childcare which precludes students' ability to attend on-ground classes.

The growth of online classes in terms of enrollment numbers is steadily accelerating. This is true despite the fact that as of 2016, overall student enrollments at higher education institutions had declined by almost 4% between 2012 and 2016 (Lederman, 2018; Seaman et al., 2018). Online enrollment increased 8% in the academic year 2016-17, 4.5% in 2017-2018, and 10% in 2018-2019 (National eLearning survey, 2019; National eLearning survey, 2020). Almost 32% of all students enrolled in higher education courses were taking at least one online course as of fall

2016 (Seaman et al., 2018). Additionally, 62% of online students are female (National eLearning survey, 2020).

According to Seaman et al. (2018), almost 70% of the students taking online classes were enrolled at public institutions. Also, online students are more likely to be enrolled in the same state learning institutions as where they reside and are enrolled in on-ground courses where they take online courses. Furthermore, less than 1% of the students taking online courses are international students. Undergraduate students account for almost 83% of the online course enrollments. As of 2016, the most recent available data, when looking at the entire population of online students, 47.2% were exclusively taking online courses (Seaman et al., 2018).

The growth of online learning has not transpired without institutional struggles and challenges. To illustrate, over 57% of faculty need more than nine hours of training to be able to teach online (National eLearning survey, 2020). Additionally, training maintenance is needed; these annual costs must be considered in institutional budgets. According to the National eLearning survey by the Instructional Technology Council (2020), other faculty challenges include standardizing online courses and supporting students struggling with online courses. On the other hand, online learning has provided multiple opportunities for students and institutions. As with any initiative, institutions must review and overcome the challenges in order to reap the opportunities. Because of their unique mission, community colleges have different opportunities and challenges from other institutions.

Online instruction affords community colleges many beneficial opportunities. For example, community colleges may struggle to afford the cutting-edge technology often demanded by students and employers (Ives, 2019). However, actions can be taken to minimize the expense. Leveraging partnerships can help reduce this cost; partnering with other institutions,

high schools, and businesses allows knowledge and resource sharing. One example of resource sharing might be allocating the use of a single piece of equipment that is too expensive for each entity to purchase individually. A second way to reduce costs is through curriculum outsourcing. Outsourcing means the institution contracts outside specialists for curriculum development instead of using internal employees. Furthermore, online enrollment may boost overall enrollment; thus, the budget shortfalls may decrease through increased tuition revenues (Ives, 2019). Outside of budgetary constraints, meeting student needs is a primary mission of community colleges; providing distance learning opportunities fills that need.

Online instruction provides many challenges for community colleges. All students may not be equipped for online learning due to lack of self-motivation and inadequate technological skills (Ives, 2019). These deficiencies may prevent students from achieving success in the course. Retention is another challenge because students may become overwhelmed due to their lack of being fully equipped for online instruction or other life circumstances. If students become frustrated while taking online courses, they may not continue taking courses at all. At the same time, faculty may be resistant to online instruction and have concerns over technology use, the quality of the instructional method itself, and of change itself. Then again, if faculty are not adequately trained to provide these courses, the courses may lack the high-quality to provide good experiences for students (Ives, 2019). Addressing all of these challenges is essential in order for community colleges to realize student success goals.

Online instruction has several forms. These include classes that are fully online, hybridized, or may be a traditional on-ground class that utilizes a learning management system to supplement the in-class instruction. Fully online courses are taught exclusively online without any on-ground meeting requirement (Sener, 2015). Hybrid courses blend online instruction with

traditional class meetings. Traditional on-ground classes follow the typical "seat time" rules to meet the course requirements; the designated number of minutes students spend in their seat is carefully calculated to satisfy the prescribed standards (Sener, 2015). Many of these traditional on-ground classes enhance the in-class instruction with online components using the online learning management system to provide supplementary materials, give tests, and to post feedback and grades on assignments (Coble, 2020). In addition to traditional online courses that are basically the same as the on-ground courses delivered through a different delivery method, other forms of online instruction have emerged as competitors to traditional online learning. Massive Open Online Courses (MOOCs) and competency-based instruction are two such examples (Lazarewicz, 2017).

Massive Open Online Courses (MOOCs) debuted in 2008 (Mallon, 2018). Deng et al. (2019) described them as a momentous technical advancement of the last decade. As the name implies, these are completely open access courses that allow users to enroll at any time and complete at their own pace. Presently, many higher education institutions and private-sector companies offer courses. For example, Coursera has reached over one million users through the 200 course offerings (Mallon, 2018). OpenCourseWare, a product of the Massachusetts Institute of Technology (MIT), has been operational since 2002 and contains over 2,000 courses (Schejbal, 2012). Udacity provides varying levels of courses in a few selected subject areas (Mallon, 2018). Additionally, Apple created iTunes University which provides a myriad of educational resources (Schejbal, 2012). While the future of MOOCs is unknown, data show that more than 700 universities offer MOOCs with over 6,800 courses presently available (Deng et al., 2019).

Another type of online delivery is competency-based instruction. Competency-based instruction differs from traditional course instruction in that students move forward in a course after verifying proficiency. One example of an institution using competency-based instruction is Western Governors University (WGU) which was established in 1997 to eliminate a student access barrier (Education Without Boundaries, 2020). This university operates without a physical campus (Caruth & Caruth, 2013). With this model, tuition is charged annually (Schejbal, 2012). Students work on classes at their own pace; assessments are taken when students are ready to take them. During this timeframe, students complete as much or as little as they choose; graduation occurs when the required number of credits is completed (Schejbal, 2012). As opposed to traditional online classes, time does not pose a barrier to successful completion. Evaluations for moving ahead are assessed through competencies as opposed to traditional testing methods. The significance of this popular online instructional method is evidenced by the data; as of 2018, Western Governors University's annual growth rate was 20% (McKenzie, 2018).

As with all other programs and services offered, institutions must ensure accreditation compliance with online instruction. Termed distance education in the Southern Association of Schools and Colleges Commission on Colleges (SACSCOC) Distance and Correspondence Education (2018) policy, distance education includes the instructor and student residing at separate locations during a significant portion of the course. Instruction may occur simultaneously with student learning or at different times. Documentation required from SACSCOC by the institution includes several items. Among these are that student transcripts reflect course credit earned by distance education after identifying verification of the student through a combination of the following measures: password secure logins, proctored

assessments, and other student identification technologies. Student privacy procedures must be published. Any additional student online fees assessed for student verification must be publicly displayed. Annual Institutional Profile reports must reflect precise distance education student headcount. Finally, all programs and/or courses offered by this method must comply with the accreditation requirements (Distance and Correspondence Education, 2018). Distance education will also be applicable to most units of the institution in their respective sections of the accreditation standards' narratives. For example, standards regarding library and learning resources will also need to include information pertaining to the library resources and access specifically for distance education students.

Student success is paramount to the mission of community colleges. Regardless of delivery method, institutions should strive to offer the highest quality courses from the best trained and credentialed instructors possible. All courses should be routinely reviewed for continuous quality improvement actions to build on previous success and meet accreditation requirements. To successfully fulfill these obligations, institutions should investigate and assess online course and program outcomes based on comparable on-ground courses, student characteristics, optimal class sizes, and faculty characteristics to supply the best quality courses regardless of the delivery method.

Online Compared to On-Ground Student Success

Online instruction has both commonalities and differences with on-ground instruction. Students enroll in the course and have a defined start and end date. Assessments are given in both online and on-ground classes resulting in a final course grade. Most courses follow the same course outline, guidelines, textbooks, and credit hour requirements. Most on-ground students and faculty agree on preferred teaching methods, faculty involvement, and pedagogy. However,

student perceptions of online classes and content delivery differ in some ways from that of faculty teaching online classes.

One study showed students in online courses felt that it was not necessary to have a course instructor in stark contrast to faculty's perception that an instructor was always vital (Otter et al., 2013). Students also perceived online classes as easier than on-ground, whereas faculty did not share this view. In this same study, students believed faculty did not spend as much time teaching and preparing for an online class as opposed to faculty believing they spend more time preparing for online classes (Otter et al., 2013). These unique sets of perceptions about online courses supply insight into each group's view about the online course environment. In a separate study, Herman (2012) agreed with faculty and suggested online class preparation takes more time to design. Citing the added difficulties from online delivery, faculty conceded these difficulties were the greatest roadblocks to online instruction (Herman, 2012).

Adding to this roadblock are the student perceptions and how these perceptions lead to a different environment in an online class. Bawa (2016) strongly suggested that students feel the flexibility of the online environment will mean the class will be easier; subsequently, when students are enrolled and discover that the lack of a formal time requirement for instruction does not translate into an easier course, many students do not perform well. Bawa further posited that the lack of faculty online course design training and the ability to encourage the necessary student interactions contributed to the higher attrition rate. Together, the student and faculty disconnect concerning online classes may signify reasons why on-ground classes typically end with higher grades than online classes.

Faidley's (2018) research of two principles of accounting introductory courses at a university highlighted the significant difference in final online and on-ground course grades.

Equally, Gregory's community college research (2016) acknowledged that online students did produce a lower percentage (78.5% compared to 80.5%) of C or higher grades than on-ground students. Both of the aforementioned studies are particularly striking because the studies used the same instructors teaching in both delivery methods for the research. Bloemer et al. (2018) concurred in their findings that online course sections resulted in higher numbers of D, F, and W grades than the equivalent on-ground course sections in their small Midwestern public university research of undergraduate courses. Lower division courses accounted for 27% of the courses in the study (Bloemer et al., 2018). In the aforementioned examples, the student success was not dependent upon whether the student was a community college or university student; the on-ground success rate was higher.

Some research showed that online and on-ground did not yield significant differences in student success. Huh et al. (2009) found that online and on-ground comparisons showed no significant difference when studying accounting courses at a university taught with both delivery methods, the same textbook, and the same lecture materials by the same instructor over a three-year period. Cunningham (2015) contended that none of the three delivery methods studied exhibited a major difference with respect to the final student grade when researching an introductory computer course at a community college. In a much larger study encompassing public community colleges from five states using data from the Predictive Analytics Reporting (PAR) Framework, James et al. (2016) asserted that while fully online students might not do quite as well as on-ground students, the difference was small. In addition, the difference disappeared when students registered for a mixture of on-ground and online courses. Consisting of multiple member institutions who agree to share redacted data, the PAR framework is a non-

profit organization whose goal is to support member institutions in analyzing data to support student success (James et al., 2016).

Lewis and Harrison (2012) focused on determining whether or not using online delivery to enhance traditional in-class instruction provided greater benefits for students and their subsequent success. The results confirmed no significant difference in the pre-test and post-test results (Lewis & Harrison, 2012). Although this is only one small study with a small sample, this is another focus area for further study to learn of the potential influences on student success.

Synthesizing all of the aforementioned research, students in online courses sometimes concluded with lower course grades than students in on-ground classes. Taking online classes did not guarantee a lower grade in every instance regardless of whether the courses were taken at a community college or university (Cunningham, 2015; Huh et al., 2009; James et al., 2016; Lewis & Harrison, 2012). Further research is warranted to determine how to duplicate the successes that some institutions enjoyed with online students and determine best practices that can be used to eliminate the gap.

Student Characteristics' Influence on Student Success in Online Classes

After comparing the outcomes of on-ground and online instruction, student characteristics leading to online success or those leading to attrition should be identified. Institutions need data to sufficiently support students. Armed with proper knowledge based on substantial research, institutions can invest in student supports that will encourage student success in online classes.

Student GPA

Student GPA was a strong predictor of online student success in many studies. Huh et al. (2009) found that previous higher GPAs not only train online learners for success but also confirmed that higher GPAs also establish success for on-ground learners. For example, the researchers' three-year studies compared on-ground and online accounting classes taught by the same instructor using the same textbook and same lectures; these same instructors also proctored and scored all assessments. Huh et al.'s results indicated prior GPA had a larger bearing on success for on-ground students than for online students, although the prior GPA did serve as a predictor for the outcomes of online students also. Wojciechowski and Palmer (2005) pointed out similar results with community college business courses. Results confirmed that a student's overall GPA had a strong relationship to the online class grade. Wojciechowski and Palmer's study revealed that GPA had the highest relationship among all of the factors reviewed in their study. Vella et al. (2016) reiterate that higher GPAs have a relationship with student online success. Consequently, students with higher GPAs were the students who earned higher grades in fully online and hybrid courses at Vella et al.'s mid-sized public university study. Comparatively, in a public university, Faidley (2018) found that prior GPA did emerge as having a significant relationship to the final online course grade. On-ground students had higher prior GPAs than online students (Faidley, 2018).

Some other studies produced similar yet moderately different results. For example, a study by Aragon and Johnson (2008) at a rural community college presented similar results with a small differentiation. Tracing the students' beginning GPAs to their final online course grades, Aragon and Johnson's final data demonstrated that higher GPAs made a slight difference for the success of online students; however, this was not a significant difference as it was in the

previously reviewed research. A similar study by Harrell (2006) of five Florida community colleges observed a significant relationship between GPA and the withdrawal rate. Specifically, students with higher GPAs generally did not drop the course (Harrell, 2006).

Institutions have internal data systems that contain valuable information for institutional representatives to study. Hachey et al. (2013) found that community colleges have a large number of areas to contemplate when striving to maximize online student success. Among these are that students with a GPA between 2.0 and 3.5 have the highest probability of being unsuccessful in online classes. Additionally, students taking an online class for the first time have a higher probability of not being successful. Also, students taking required classes in their major field of study tend to have a higher success rate. Finally, white students tend to perform better online than other ethnic groups, and science, technology, engineering, and math (STEM) courses typically yield higher grades on-ground than online (Hachey et al., 2013). These institutional data can also be used to study faculty characteristics to identify traits that may provide further contributions to decreasing online attrition.

When combining the results of the previous student GPA studies, consensus exists. Researchers consistently found that GPA is a predictor of student success in online classes. In many of the aforementioned cases, the GPA was also a predictor of success in on-ground classes. Success tends to lead to more success; assisting students with early wins appears to be something institutions should seek ways to ignite (Rijt et al., 2014).

Student Gender

Gender studies netted a wide variety of results. Some on-ground studies had different results than the online studies, and the same gender did not show significantly different in all

studies. For on-ground studies, Huh et al. (2009) revealed that males tended to do better than females. In contrast, Gregory (2016) documented significant differences in final grades based on gender for on-ground classes; however, females proved statistically more likely than males to earn A or B grades in this research. Wladis et al. (2015) further insists that females outperformed males on-ground in a community college STEM study.

While several research studies showed gender as an indicator of online student success, this was not the case in all studies. Huh et al. (2009) indicated gender did not account for a significant difference in online and on-ground learners. Similarly, Yukselturk and Bulut (2007) observed that gender did not have an effect in online class success in their single-year study of 80 student volunteers who were enrolled in an online computer science course. Krajewski (2015) reiterated that gender showed no significance in online class success in the study of a single biology course from a community college. Gregory's (2016) research at a single community college did not show any gender significance in online classes. Additionally, while Wladis et al. (2015) found that females performed better on-ground than males, this difference was not present when courses were taken online.

Despite some studies that did not find a significant difference in gender, other studies did find females were significantly more likely to achieve online student success. Aragon and Johnson's (2008) research is an example of one such study which involved approximately 300 students from a single community college. Findings indicated significance in gender with females completing at a higher percentage than males; however, the results showed a low inverse correlation (Aragon & Johnson, 2008). James et al. (2016) repeated Aragon and Johnson's findings of slight gender significance in their study in which women were retained marginally more than men. Also interesting to note, James et al.'s study concluded that women registered

for online classes at a higher percentage rate than men. Comparatively, Vella et al.'s (2016) research findings attest to gender significance in online class final grades. In this study, females showed both better final course grades and an increased likelihood of finishing the course. However, Vella et al.'s study was not only researching fully online classes, but also used data from blended classes. Cunningham (2015) discovered that female students generally exhibited greater course success than males in online courses; specifically, females showed a predictor of making a B rather than an F final grade. While this was a small case study using only a single class, the results substantiate several other findings (Cunningham, 2015). Similarly, Faidley (2018) also documented a gender difference in the public university study of two accounting courses. In this research, online outcomes resulted in a significant difference, with females ranking higher in this study with over 500 participating students (Faidley, 2018).

Analyzing the results from several studies, gender revealed a wide range of results. While many studies showed no significance in gender influence on online course success, several studies disputed those findings. When gender results did expose a slight difference, females were the higher performers in most studies. Interestingly, females did not perform higher in all studies. More research is needed in this area to clarify if gender is truly a factor in online student success and to determine if additional student supports are needed to eliminate gender gaps.

Student Full-Time or Part-Time Status

Interaction of student course load with GPA is another critical area that needs further research (Shea & Bidjerano, 2019). Research, using data from 30 community colleges in New York, did not yield the typical expectations. Incorporating a sample of over 45,000 students, Shea and Bidjerano's (2019) data showed that part-time students with lower GPAs had an increased likelihood of completing degree requirements over corresponding full-time students

with lower GPAs. An important fact to note is that this study examined the student's total online course load (Shea & Bidjerano, 2019). Vella et al. (2016) corroborated these findings in their one-semester study which included hybrid courses. Part-time students in this university study of over 2,000 students proved to do better than their full-time student counterparts (Vella et al., 2016). In Gregory's (2016) study, full-time students showed significantly more C and F grades.

Colorado and Eberle's (2010) research contradicted the previous findings in their study of university online graduate students. Researchers concluded full-time or part-time status did not influence academic performance (Colorado & Eberle, 2010). Wojciechowski and Palmer (2005) also affirmed this conclusion in their research of community college business students. Reviewing almost 200 students over three years, the researchers detected no significant difference in full-time or part-time status (Wojciechowski & Palmer, 2005).

Some studies had different results than any of the aforementioned conclusions. Krajewski's (2015) study of approximately 700 students' data from a single community college biology course discovered that full-time students were much more likely to complete the course than part-time students. In fact, the data indicated that part-time students were 2.1 times less likely to complete (Krajewski, 2015).

In summary, the final impact of the academic load for full-time or part-time students deserves more study. With results portraying such a wide variety of ranges, determining the influence of load is not currently feasible. Additional research is needed for more solid findings that institutions could use to construct student supports.

Student Age (Traditional or Non-Traditional) Status

Most research studies reviewed indicated that a student's age did project a clear indication of online course success. Furthermore, the more advanced aged students typically had higher online course outcomes. However, Yukselturk and Bulut (2007) noted that age did not factor into student success in their study of online computer programming students from a university in Turkey. Some interesting facts about this study were that it involved 80 student volunteers from a single semester (Yukselturk & Bulut, 2007). More longitudinal data with a larger sample size may be needed to support this thesis. This is in contrast to several other studies notably Cunningham (2015), Faidley (2018), Gregory (2016), Vella et al. (2016), James et al. (2016), and Wojciechowski and Palmer (2005).

Disputing these studies, online business students in Wojciechowski and Palmer's (2005) research reflected that students generally received higher grades by age. Put another way, the older students, typically called non-traditional, generally received the higher grades. Approximately 200 students at a community college participated in this study (Wojciechowski & Palmer, 2005). Although this research only included a small sample from a single course at one institution, findings exhibited corresponded to several other studies. Likewise, Faidley (2018) concluded significant differences in traditional and non-traditional students. In fact, non-traditional students proved to have higher rates of student success (Faidley, 2018). Using over 500 students, Faidley's research was conducted over a three-year period but only used data from two introductory university accounting courses.

Vella et al. (2016) maintained that age did affect grades and success in the online course. In this research, older students (non-traditional) displayed better grades than the younger students. This one-semester study included over 2,000 university students taking both fully

online and hybrid courses (Vella et al., 2016). Likewise, Gregory's (2016) research identified non-traditional students as being less likely to fail a class than their traditional student counterparts. Subsequently, non-traditional students generally made more A grades (Gregory, 2016). Parallel to Gregory's study, Cunningham (2015) contended that online non-traditional students were slightly more prone to receive a course grade of A or B than traditional students. Research initiated from one community college using a single course with over 1,100 students participating in the study (Cunningham, 2015).

Wladis et al. (2015) observed similar findings in a study of 3,600 community college students from science, technology, engineering, and math (STEM) majors. Grades of C- and higher labeled the students as successfully completing the course. Corresponding courses, instructors, and semesters were compared to determine online and on-ground outcomes. According to Wladis et al.'s research, non-traditional aged students did better online than on-ground. Comparably, James et al. (2016) declared non-traditional aged students were more likely to be retained than traditional students in their five-state community college study with over 9,000 participants. Similarly, Krajewski (2015) concurred with the aforementioned findings. Processing six semesters of community college data from a single biology course, Krajewski found significance for age. This researcher, with almost 700 participants, postulated every year of age produces a 1.1 times larger chance of online course completion (Krajewski, 2015).

To summarize, most studies concur in their findings that non-traditional aged students have a greater likelihood of being successful in an online course. While these studies typically showed a consensus, all studies did not agree. A possibly important factor in the difference might lie in the fact that the only study with alternate findings was a small university study in Turkey. All other studies were in the United States, and most had larger sample sizes.

Class Size

In addition to student factors, class size is another important factor for institutions to consider for online or on-ground classes. Various instructional delivery methods may require different class sizes to achieve the highest student success rates. A review of the literature reveals many different models of how class sizes should be determined and what the optimal number should be. Class sizes hold vast institutional significance because of the student learning implications, educational tactics, budgets, and faculty workload (Taft et al., 2019). According to Taft et al. (2019), class size should be determined by the educational tactics required for the class. Learning theories provide further insight into the educational tactics and linkage to class size. Objectivist, constructivist, and community of inquiry are some examples of learning theories that can relate to class size (Taft et al. 2019).

Objectivist theory assumes students are passive learners who obtain knowledge through the instructor (Taft et al., 2019). An example of objectivist theory in education is seen where an instructor teaches data, principles, and philosophies that are not disputed (Bates, 2019). In these types of classes, students learn the material and basically repeat it back to the instructor.

By contrast, constructivist theory advances the idea that learning occurs as students connect previous knowledge to new knowledge through highly intensive exchange of ideas (Taft et al., 2019). Group work and writing reflections are some examples of constructivism in education (Constructivism in the classroom, n.d.). Comparatively, applying the constructivist theory is more time intensive for instructors (Taft et al.). Bloom's taxonomy is another example of constructivist theory. Bloom's taxonomy theorizes that learning is structural as illustrated in a seven-level pyramid. The base is necessary before the next layer can be built. Taft et al. (2019)

explained that as a student moves to a higher level, instructors must spend more time working with students because learning is scaffolded throughout the learning process.

The Community of Inquiry (CoI) theory contends online learning requires instructor-driven methodology along with intellectual and group components (Taft et al., 2019). Understandably, faculty workload is greatly increased when using the Community of Inquiry theory. These three theories form the basis leading to the class size framework used in this research study. Following extensive research on learning theories and reviewing the literature, Taft et al. (2019) proposed an online class size framework. This framework suggested small online classes be defined as those having 15 or fewer students (Taft et al., 2019). From the arguments presented, the mixture of small, medium, and large class sizes seemed adequately grounded in data.

Tomei (2006) constructed an optimal class size framework based on estimated time spent on online courses and faculty load. With this framework, the recommended size for an online class was 12 students (Tomei, 2006). Instructors could give students ample time with a class of this size; however, budget considerations must also be considered.

Parks-Stamm et al. (2017) studied data from university online classes to determine optimal online class sizes from student engagement in discussion posts. Reviewing approximately 500 courses, the results were somewhat surprising. Contrary to what some might believe, classes considered small consisting of fewer than 15 students had the largest effect on the number of discussion posts from each student stemming from the number of instructor interactions in the course (Parks-Stamm et al., 2017).

In stark contrast to the previously mentioned studies, Bettinger et al. (2017) undertook a large study of online class sizes at a proprietary university. Using over 100,000 student registrations in almost 4,000 classes, this research included many different classes. Results indicated that online classes averaging 30 students did not show an effect on student course success; additionally, a 10% student increase did not show an effect on student course success (Bettinger et al., 2017).

In line with Bettinger et al.'s (2017) study, Roby et al. (2013) administered a survey to collect information from both students and faculty to learn what techniques would improve online and hybrid courses. Students expressed no concerns about being enrolled in online classes that had as many as 50 students; instructors, however, emphasized that 30 students should be a maximum number for an online class size. Although students did not mind being in larger classes, they did expect instructors to provide frequent and timely feedback (Roby et al., 2013).

Influence of Faculty Characteristics on Student Success in Online Classes

In addition to comparing on-ground and online course outcomes, student characteristics, and the effects of class size, faculty characteristics should be researched. Because faculty are the core of the educational process, institutions need the best quality instructors available (Umbach & Wawrzynski, 2005). Faculty status such as full-time or part-time, non-tenured or tenured, and years of teaching experience all deserve research to further enhance student success at the institution. Compiling all of the research findings may provide better direction for institutions desiring to increase student support systems, maintain optimal class sizes, and expand faculty supports to achieve the highest overall success rates that allow students to meet their goals.

Faculty Full-Time or Part-Time Status

Full-time faculty normally develop and maintain an institution's online course offerings. Akroyd et al. (2013) researched the likelihood of community college full-time faculty to choose to teach online courses. Akroyd et al.'s (2013) research, based on over 26,000 faculty from 980 institutions across the country, showed a noteworthy difference in the likelihood of full-time faculty holding a higher degree level to teach online classes. Their findings could affect the number and expansion of course offerings for some institutions.

With the popularity of online courses, part-time faculty, frequently called adjuncts, now teach some online course sections due to the increased demands unable to be met by full-time faculty. The National Center for Education Statistics (2018) report "The Condition of Education: Characteristics of Postsecondary Faculty" 2016 data showed adjuncts teach an average of 47% of the higher education institutions' courses. Administrators may need to look at a variety of ways to aid adjunct faculty members as institutions seek to minimize online course attrition rates (Magda et al., 2015).

Ran and Xu (2019) agreed that researching the effects of adjuncts and non-tenure-track community college faculty is critical for several reasons. First, adjuncts teach increasingly larger percentages of courses at community colleges. Second, because community colleges have open access, they serve more underrepresented groups of students who need additional student support systems. By serving more underrepresented groups, community colleges have a greater opportunity to narrow the achievement gap within these underrepresented groups (Ran & Xu, 2019).

Comparison of Adjunct and Full-Time Faculty Online Outcomes

Magda et al. (2015) reported fall 2013 data from the U.S. Department of Education showing adjunct faculty taught approximately 31% of online courses at both two-year and four-year institutions. Subsequently in 2015, 56% of institutions disclosed growth in the percentages of adjuncts teaching online with 25% reporting a growth rate of at least 5%. Adjuncts are teaching in many different disciplines; however, business boasts the largest overall percentage of online adjunct instructors. Combined with the increase in online instruction demand, institutions must find and use best practices for aiding adjunct faculty in successful online instruction (Magda et al., 2015).

In reviewing adjunct faculty online instruction in regard to attrition rates, several studies compared adjunct and full-time faculty course results. Fewer studies specifically examine the difference in adjunct and full-time faculty for only online classes. As a result, some of the research mentioned below are not specifically studies of adjuncts teaching online courses; some are the results of studies that compared on-ground instruction outcomes between adjuncts and full-time instructors. These studies from a different delivery method are included to demonstrate the impact adjunct teaching in general has on student attrition rates. While the delivery method does account for some differences in attrition rates, the same is true for the student attrition rates when the course is taught using a different delivery method by full-time faculty.

Several studies have provided historical data on the difference in student outcomes based on the course being taught by an adjunct faculty or a full-time faculty member. Hutto (2017) addressed the connection between course retention and faculty status for general education classes at a Florida community college during a single semester. According to this study, one of the reasons for increased student retention rates has been linked to adjunct faculty (Hutto, 2017).

Hutto's short-term study results confirmed the researcher's hypothesis of a correlation between full-time and adjunct faculty on student attrition; however, this study actually revealed that adjunct faculty showed a slight increase in course retention over full-time faculty. Additionally, Hutto's study compared on-ground course results.

Interestingly, some other studies did not find significant differences in student success. Flaherty (2013) compared adjunct and full-time instruction's influence on student success. Findings chronicle no significant differences in adjunct and full-time instruction at community colleges. Institutional data were derived from the Integrated Postsecondary Education Data System (IPEDS), making this research a national-level study as opposed to others which are generally only done at a local or regional level. Xu concedes that a weakness in this study is that students were not matched to full-time or part-time instructors to consider the percentage of time spent with each group (as cited in Flaherty). Furthermore, this study was not limited to any particular delivery method (Flaherty, 2013). Landrum (2009) addressed the increased use of adjunct faculty by studying full-time and part-time university faculty to determine if significant variances in demographics, student evaluations, and grade distributions were found. According to the research, significant variances did not exist. An important note on this study is that it reviewed overall instruction; this study was not confined to reviewing exclusively online classes (Landrum, 2009). Salley and Shaw's (2015) findings expressed interchangeable results. Data from a Midwest community college from one semester advanced the idea that full-time and adjunct faculty do not have significant differences in final online student course grades or attrition. These data were taken from 189 full-time and adjunct faculty members (Salley & Shaw, 2015). One weakness of this study was the lack of more specific student data.

Additionally, other studies also revealed full-time faculty yielding greater student success than adjuncts. Mueller et al. (2013) studied adjunct and full-time faculty online student success rates. Results showed higher course grades from the online course sections taught by the full-time faculty members. It is important to note this was not a longitudinal study at multiple institutions in a variety of courses; this study only used a single course with all sections being taught online from a single institution. Mueller et al. suggested the need to look further into the impact of adjunct instruction on students. Ran and Xu (2019) verified the findings of Mueller et al. (2013) that students taking introductory courses in their chosen discipline from non-tenure track faculty were both unlikely to enroll in a subsequent course in that discipline and reduced the subsequent grade earned. This was in spite that the initial introductory student course grade was generally higher with a non-tenure track faculty member. Again, Ran and Xu's study was not confined to online only classes; however, the research did span five years, include both two- and four-year institutions, and assessed over 155,000 students.

Whether or not adjuncts teach online, they must feel engaged and as if they are an integral part of the institution. This connection helps improve the fulfilment of their job duties. Most administrators seem to ensure adjuncts have the information needed to do their jobs, but they do not always ensure the appropriate institutional networks actually welcome and foster adjuncts (Dolan, 2011). Dolan's qualitative research examined online adjuncts' views on the communication and collaboration received from the institution, and the results of the study suggested that colleges providing the right communication and support systems can positively motivate adjuncts and result in subsequent increased student retention and completion in online classes. This research further supported Green et al.'s (2009) study that reported a continuous sense of community was vital to all online instructors.

Adjunct, non-tenured, tenure track, and tenured faculty had some differing reasons for participating in online teaching according to one study (Green et al., 2009). This study showed that most motivating factors to teach online were similar among the various faculty ranks; some of the reasons they choose to teach online result from their core satisfaction of teaching, challenge, job progression, and flexible work times (Green et al.).

Based on the aforementioned research studies, results are inconclusive on the comparison of adjunct and full-time faculty performance. Because student outcomes are so critical, more research is needed in this area. Specifically, more research is needed comparing the online differences, or lack thereof, in adjunct and full-time faculty. This research study will add to the literature and provide some additional insight to help answer this important question.

Faculty Non-Tenure or Tenure Status

In addition to the faculty member's adjunct (part-time) or full-time status, faculty non-tenure and tenure status and years of teaching experience should be considered. Faculty move through faculty ranks as they become more seasoned; examining the progression along with how the number of years of experience affects performance can help to determine what faculty supports are needed and when are the best times to provide these supports throughout their careers. Continuous professional development is always needed for all professionals; the unique delivery method of online courses demands special attention for professional development needs.

According to Herman (2012), faculty ranks did show differences in the total number of hours of online teaching. Non-tenured faculty comprised 36.1%; faculty not on tenure track comprised 35.7%; and tenured faculty comprised 32.6%. Herman further reported that approximately one third of faculty are confident that online courses match the quality of

traditional on-ground courses. Herman (2012) suggested all faculty need adequate professional development for achievement of continuous quality improvement in online courses.

McDaniel (2003) researched the effects of non-tenured and tenured faculty on course quality in the online environment. Results indicated that no significant difference existed between course quality based on the course being taught by a non-tenured or tenured faculty member. McDaniel conducted this study at a university with over 80 online courses from 14 different departments; furthermore, surveys from the faculty generated these results.

Ehrenberg and Zhang (2005) maintained their study was the first to determine the influence of non-tenure track faculty on subsequent student success. From College Board and other data, the researchers discovered that non-tenure track faculty could potentially reduce students' future likelihood of success. Class data were from all courses offered at the institutions studied over a period of fifteen years (Ehrenberg & Zhang, 2005).

Figlio et al. (2013) extrapolated data from Northwestern University regarding whether non-tenure track or tenure track faculty stimulated students to register for additional classes in a particular discipline and whether or not students performed well in the ensuing courses. In both of these instances, non-tenure track faculty showed considerably higher results than tenure track faculty. Data were from freshmen at Northwestern University over a seven-year period from all types of classes; over 15,500 students were part of this study. Also, not all of the courses in this study were online courses; the study only referred to the courses in total (Figlio et al., 2013).

This category of research was limited in both the number of studies and in research that specifically studied online courses. One longitudinal study produced some potentially unsettling results such as non-tenure track faculty having a negative influence on the students' future

success. However, Figlio et al.'s (2013) study did not generate the same disturbing evaluation. Institutional administrators may need more data to understand these contradictory findings. Years of teaching experience provides similar data to aid in student success through the faculty lens.

Years of Online and On-Ground Teaching Experience

In some studies, years of teaching experience generated higher student success rates. Kane et al. (2015) studied the impact of faculty degree and online professional development on student satisfaction. Faculty's degree level did matter in the research; those holding a master's degree scored higher than those with a doctorate degree. A weakness of this study was that no explanation for this discrepancy was given. Online professional development did not show a significant gain for faculty; however, the professional development results did show promise for reducing faculty attrition. The researchers also studied whether online faculty provide better student satisfaction after they have spent more time teaching online. Results showed that the length of time teaching online yielded slightly higher student evaluations (Kane et al., 2015). McDaniel (2003) concurred with results showing a significant difference in the online course quality based on the instructors' number of years of online teaching experience. In general, the results indicated that instructors with more online teaching experience generated more successful online courses. McDaniel's university study contained data from 80 online courses; data were derived only from a survey of the instructors. Johnson et al. (2013) extracted data that produced further support for previous length of time teaching leading to greater student success. In their university study, almost 4,000 courses were examined over seven semesters. Outcomes did not depict the number of online courses. Non-tenure track faculty generally had lower mean GPAs

for their courses; however, the number of years of teaching resulted in lower student satisfaction scores (Johnson et al., 2013).

One study showed that the years of teaching experience did not impact student success. Casablanca-Torres' (1987) research findings showed that no significant differences exist in full-time and part-time faculty based on the number of years of teaching experience. This study contained over 10,000 records of student who had taken courses from approximately 81 faculty members teaching in a variety of subject areas. Taken from two comprehensive accredited colleges and universities in Puerto Rico, this study reviewed only on-ground courses (Casablanca-Torres, 1987).

Not very study found in the literature produced support for the assumption that the number of years of teaching experience led to greater student success. For example, Potter's (1978) study reported different results. From multiple community and junior colleges in Arkansas, Mississippi, and Tennessee, 48 faculty members participated (Potter, 1978). These faculty were instructors in humanities, mathematics, natural sciences, and social sciences. Potter found that the number of years of teaching experience unveiled a significant difference; paradoxically, the outcomes showed that student success diminished with faculty who had more years of teaching experience. Because Potter's study was in 1978, only on-ground courses were included in this research.

Literature was again limited on research regarding years of teaching experience as depicted in the non-tenured and tenured faculty studies. Moreover, literature was also sparse on comparisons of the number of years teaching experience and its effect on students for either online or on-ground studies. Some on-ground only studies contributed to this deficit. These limitations represent additional areas ripe for more research. Based on the very limited data,

results are inconclusive. Answering these questions will provide institutions with knowledge that can be used to deliver appropriate faculty professional development for online instructors.

Other Factors Suggesting the Need for this Research

Student data can be used to determine appropriate student supports. Likewise, faculty data can be used to determine appropriate faculty supports. Research in all of the aforementioned faculty categories confirmed the need for additional professional development. For context, some research on online professional development and similar supports is presented below.

Several studies such as Portugal (2015), Lesht and Windes (2011), Brown (2017), Johnson and Berge (2012), and Tirrell and Quick (2012) highlighted support tools administrators could provide for faculty to help them be more successful teaching online. Portugal (2015) focused on how graduate faculty attributes contribute to online success and determined if online instruction were a good match for the individual. Rather than relying solely on credentials to determine online instructors, Portugal suggested basing the teaching assignment on other factors that would determine if online instruction was a good match for that individual. These factors included adaptability, ability to maintain a good work/life balance, deriving satisfaction from teaching online, and belief in the viability of online courses for students. Determining these attributes would be the challenge for the institution. The researcher further noted the types of supports needed to ensure quality instruction and proposed concentrating on factors faculty should possess in order to be successful online instructors. This study also suggested these same factors might also help prevent burnout in online instruction (Portugal, 2015). Lesht and Windes (2011) studied the perceptions of administrators regarding online instruction and its impact on the institution. This research provided some interesting points to consider such as the effect of online faculty not being as physically engaged as on-ground faculty in institutional committee

work and other expected activities requiring a physical presence. The researchers noted the need for administration and faculty collaboration to develop and offer the best support mechanisms for faculty who are teaching online. They assert that the plans must include ways to achieve the needed faculty connection with the higher education institution (Lesht & Windes, 2011). Online course quality is extremely important to student success. Brown (2017) addressed the importance of not sacrificing the quality of online courses while trying to meet the increased demand for course offerings. Furthermore, Johnson and Berge (2012) agreed with this sentiment in studying community college online course delivery and the need to ensure quality instruction. The researchers identified several factors that contribute to student success such as hiring faculty who strongly support online course instruction and then providing satisfactory support for them. Additionally, training for online course development and teaching must be available to ensure program success (Johnson & Berge, 2012). Tirrell and Quick (2012) focused on lower student retention rates in online classes and the possible causes based on faculty using Chickering's seven principles of good practice in online courses, differences in full-time and part-time faculty, and the relationship of using the seven principles with student attrition rates. Again, professional development needs surfaced as being vital to faculty teaching online (Tirrell & Quick, 2012).

Several studies such as Baker and Griffin (2010), Kaymak and Horzum (2013), Boton and Gregory (2015), and Abell et al. (2016) listed those practices faculty directly control that lead to greater student success in online classes. These practices include the layout of the course and the faculty member's actions during the course. Baker and Griffin (2010) concluded that prompt communication from the faculty significantly increased student success. Further studies by Kaymak and Horzum (2013) showed collaboration enhanced a student's learning and satisfaction. Boton and Gregory (2015) used qualitative case studies from 18 online instructors in

six countries to determine strategies for improving student online attrition rates. Findings included using cooperative and thought-provoking activities in the online course but also emphasized the need for the institution to conduct faculty online course training sessions (Boton & Gregory, 2015). Abell et al. (2016) conducted both student and faculty surveys to determine online student learning preferences and faculty teaching techniques, with online graduate students and College of Education faculty participating in the surveys. The faculty survey was used to determine the faculty teaching styles, and the researchers followed up with individual faculty meetings to discuss the survey findings. Subsequent post-survey discussions with faculty resulted in providing possible teaching aids for improvement in online instruction (Abell et al., 2016). These studies all highlight faculty teaching strategies that should be emphasized for and utilized by faculty who teach online.

Summary

Distance education in higher education had its beginnings with correspondence courses, radio courses, and television courses. Today's distance education delivery system is primarily online instruction. Although online instruction started with proprietary schools, this platform is now heavily grounded in public state higher education institutions. In contrast to the previous distance education formats, online instruction continues to grow and thrive. With this continued growth, attrition rates are of major concern to higher education administrators as online classes generally experience higher attrition rates than on-ground classes. Student success is paramount for both students and institutions. Research regarding on-ground and online delivery methods showed a plethora of results based on the literature reviewed for this study.

Class sizes extensively control institutional budgets. Moreover, tuition is one of the major sources of revenue for institutions. As such, tuition revenues are critical for institutions to thrive.

At the same time, finding the optimal class size for all delivery methods to enhance student success is difficult to determine. Research in this area is yet another critical focal point for institutions that want to maximize revenues while maximizing student success. Numerous research studies have been conducted on optimal class sizes yielding a myriad of contradictory results; institutions using this research must decide what works best for instructor load and budgetary constraints.

Research studies regarding student characteristics and their relationship to attrition abound. Student GPA and non-traditional aged student status emerged as predictors of success through most of the research. Nonetheless, some of these studies have offered a wide variety of results. Gender and full-time or part-time status are examples. Further study is needed by institutions to navigate the journey to achieve greater student success; this research showed that institutions should continually study these data and adjust as needed. Students are the reasons institutions exist, and institutions have an obligation to commit time and energy into reaching for the elusive brass ring that will allow all students to be fruitful in college and realize a brighter future.

As depicted, many research studies have focused on the student characteristics that potentially affect attrition. However, fewer studies have focused on faculty characteristics that potentially affect attrition. It is equally important to study faculty characteristics because faculty spend so much time with the student and have such a tremendous impact on the student's educational experience. Faculty factors such as full-time or part-time status, non-tenure or tenure status along with years of teaching experience are just a few aspects to consider in determining where additional professional development is needed.

Research comparing full-time or part-time (adjunct) status was indeterminate. Results were split in this category in reviewing the literature. Based on few studies, non-tenured and tenured faculty as well as the number of years of teaching experience led to discrepancies that still need additional study. Results were not corroborated from the other similar literature cited in this literature review.

Based on this literature review, needs persist for further study at the specific institution regarding ways to reduce online attrition. While data exist for comparison of online full-time or part-time faculty status in multiple research studies, data are scarce in comparing non-tenured and tenured faculty, the number of years of teaching experience, and the effect on attrition. Administrators need these data to help in daily decision-making regarding online instruction.

After the faculty characteristics that show a significant impact on student success are identified, more research is notably needed to learn how to replicate these traits and training with other faculty not experiencing that same level of success. Faculty impact on online attrition can also be studied further with a longitudinal study on a variety of courses at multiple institutions. Determining all of the multiple factors needed to lower attrition in online classes is essential to addressing and overcoming this deficit. Institutions already possess much of these data needed to perform the studies; the information simply needs to be compiled, delivered, and implemented.

Chapter 3. Research Method

Introduction

Institutions have missions that lead them to seek student success; one of the ways student success can potentially be improved is by researching specialized delivery methods such as online to ensure appropriate support methods are being implemented (Galvis, 2018). The purpose of this non-experimental quantitative case study was to compare student academic success over three academic years before the onset of COVID-19 based on final grades and the influence from student factors, class size, and faculty characteristics using archival data from selected online and on-ground classes at a Middle Tennessee community college. Student factors reviewed include gender, full-time or part-time status, and age (traditional or non-traditional status). Instructor characteristics reviewed included full-time or part-time (adjunct) teaching status and tenure or non-tenure status of faculty.

The predictor variables were either a delivery method (online or on-ground), student factor, class size, faculty characteristic, or some combination of these descriptors. The criterion variable was student academic success or student final course grade, depending on the research question; furthermore, student academic success was generally defined as a final course grade of A, B, or C. A grade of D was considered to be unsuccessful in this study. Where individual letter grades were reviewed, F, FA, and W grades were combined. At the participating institution, the difference in an F and an FA grade is attendance; students who fail due to not attending after two-thirds of the course is completed are automatically assigned an FA grade instead of an F. However, either grade signifies the student failed the course; the difference lies in the reason for the failure. The selected classes were English, history, and the natural sciences; these disciplines were chosen because they are required by most degree-seeking students at the college, have been

developed for online delivery by a full-time faculty member, and are then cloned to others teaching the class, and have the same student learning outcomes (SLOs) as the corresponding on-ground classes. This chapter contains information regarding the research questions and null hypotheses, instrumentation, population, data collection, data analysis, and a chapter summary.

Research Questions and Null Hypotheses

The non-experimental quantitative research questions and corresponding null hypotheses that guided this case study are as follows:

Research Question 1: Is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between online and on-ground in corresponding classes at the participating community college?

H_o1: There is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between online and on-ground in corresponding classes at the participating community college.

Research Question 2: Is there a significant difference in the proportion of students receiving unsatisfactory or failing grades (D, F/FA/W) between online and on-ground in corresponding classes at the participating community college?

H_o2: There is no significant difference in the proportion of students receiving unsatisfactory or failing grades (D, or F/FA/W) between online and on-ground in corresponding classes at the participating community college.

Research Question 3: For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between female and male students at the participating community college?

H_o3: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between female and male students in online classes at the participating community college.

Research Question 4: For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between full-time students (taking 12 or more credit hours) and part-time students (taking fewer than 12 credit hours) at the participating community college?

H_o4: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between full-time students (taking 12 or more credit hours) and part-time students (taking fewer than 12 credit hours) in online classes at the participating community college.

Research Question 5: For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between traditional aged students (age under 24) and non-traditional aged students (age 24 and over) at the participating community college?

H_o5: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between traditional aged students (age under 24) and non-traditional aged students (age 24 and over) at the participating community college.

Research Question 6: For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) among the three class sizes (fewer than 11, 11-18, 19 or more) at the participating community college?

H_o6: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) among the three class sizes (fewer than 11, 11-18, 19 or more) at the participating community college.

Research Question 7: For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between the courses taught by tenured or non-tenured full-time instructors at the participating community college?

H_o7: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between the courses taught by tenured or non-tenured full-time instructors at the participating community college.

Research Question 8: For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between the courses taught by full-time and part-time (adjunct) instructors at the participating community college?

H_o8: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between the courses taught by full-time and part-time (adjunct) instructors at the participating community college.

Instrumentation

Secondary data analyses were used for this study. Specifically, Banner and ARGOS, archived and secured databases used by the college, provided the data for this study. These historical, reliable databases ensured the data being used were both valid and reliable. Validity means the data in a study measure the intended measures (Yilmaz, 2013). Because these data

were from official records maintained by the college, these results are believed to be accurate and reliable. Reliability refers to the ability to replicate a study given similar situations and participants (Yilmaz, 2013). Because secondary data were used from a secure, archived database, replication can be accomplished. Furthermore, reliability refers to both the stability of the measure and the precision of the tool (Heale & Twycross, 2015). In quantitative research, commonly used software packages and statistical analyses will achieve this goal (Coughlan et al., 2007). Specifically, for the statistical analysis, IBM-SPSS was used along with Microsoft Excel. SPSS is a widely accepted statistical analysis software package for the social sciences (Miller, 2017).

Because archival data were used for this study, neither the students nor the faculty who were included in this research were aware of this study while the courses were being taught. Because the courses had already concluded prior to this study, no opportunity existed for any potential behavior modification by either students or instructors that would manipulate the study results. Additionally, no surveys or interviews were used. Data presented to me had been redacted; identifying information regarding participants was not provided. Finally, data files were maintained on a password-protected computer to ensure proper confidentiality and security of the data received.

Population

An accredited Middle Tennessee community college with both urban and rural campuses supplied data for this study. According to the Carnegie classification, this two-year public institution had a total enrollment of 6,594 students in fall 2017 (The Carnegie classification of institutions of higher education, 2017). Additionally, the institution's basic Carnegie classification category is Associate's Colleges: High Transfer-High Traditional, and the

institution is further classified as medium-sized. Sixty-one percent of the students were female and 39% were male; approximately 50% were full-time students, and 50% were part-time students; 79% were traditional students, and 21% were non-traditional students; the mean student age was 22, and the mean student GPA was 2.83 (Motlow State Fact Book, 2018-19).

The population for this study included all online and on-ground English, history, and natural science faculty and students enrolled at the census date from three consecutive academic years (fall 2016-summer 2019) at a Middle Tennessee community college. Students who dropped the course before the census date were deleted from the roster. Because the institution offers Associate of Arts, Associate of Science, Associate of Fine Arts, Associate of Science in Teaching, and Associate of Applied Science degrees along with certificates, students in this study were likely pursuing a wide variety of degrees; few students would likely be seeking a certificate because most certificates do not require these particular courses. However, these courses were selected because of their high number of student enrollments each semester and because they were required in most degree programs offered at the institution.

Data Collection

I successfully completed the Institutional Research Board (IRB) training and received certification before seeking the permission of the IRB for this study. After the IRB approval was received, I sought permission from the participating institution for this study. Following this subsequent approval, data were emailed to me. This file did not contain identifying student information such as the college numerical identifier for student names or faculty names; additionally, the file contained data extracted from Banner and ARGOS official student records and faculty records from the Academic Affairs unit. Originating from the office of Organizational Development Leadership and the Academic Affairs unit, these data were pre-

checked for validity. Data collected for the study included all English, history, and natural science on-ground and online courses from fall 2016 to summer 2019. Furthermore, these data originated from all faculty who taught and all students who registered for English, history, and natural science online and on-ground courses during the specified three-year timeframe. These data included the student code assigned only for this study, course sections, final course grade, gender, registered number of semester credit hours for that term, and age. Additionally, for the faculty, these data included the identifying code assigned to faculty only for this study, instructor teaching status (full-time or part-time), and the full-time instructor tenure status (tenured or non-tenured). Class sizes were also included in these data.

Data Analysis

A non-parametric quantitative methodology was used to analyze data. Quantitative analysis was appropriate for this research because of the need to use both descriptive and inferential statistics. Descriptive statistics furnish instruments to outline data through such mechanisms as charts and tables (Witte & Witte, 2010). In contrast, inferential statistics enable researchers to form predictions regarding hypotheses and relationships (Witte & Witte, 2010). Descriptive and inferential statistics were used in this study.

Data delivered to me were in a password-protected Excel spreadsheet; I then coded the data appropriately before I analyzed the data in SPSS. A chi-square statistical test was used for all of the research questions. A chi-square statistical test is fitting for analyzing these data because this statistical test assesses if a statistical relationship is found among variables (Green & Salkind, 2011). Additionally, this study used an alpha level of .05 to establish significance; this level of significance is common for social science research indicating an acceptance of a 5% chance of inferring a significant difference exists when one does not (Creswell & Creswell,

2018). Furthermore, the presence or absence of statistical significance in each research question aided in making the generalization statements about online student success.

Effect size, calculated as Cramer's V, was also given in the SPSS results. Effect size is listed in the results to demonstrate the intensity of the association between or among the groupings (Creswell & Creswell, 2018). When follow-up testing was required because more than two means had significant differences, the Holm's sequential Bonferroni method was used (Green & Salkind, 2011). This additional testing helps researchers control for Type I errors. (Witte & Witte, 2010).

For all research questions, the dependent variable was student success with two grouping levels. The grouping levels included the students determined to be successful and the students determined to be unsuccessful. For this research study, students deemed successful had final grades of A, B, or C, and the students deemed unsuccessful had final grades of D, F, FA, or W. Research Question 6 required follow-up testing.

I compared online student academic success over three academic years based on final course grades and the influence from student factors, class size, and faculty characteristics using archival data from selected online classes at a Middle Tennessee community college. I learned the significance and the effect size for each area studied from this analysis. Additionally, where significant differences were found, the Holm's sequential Bonferroni method was used for follow-up testing.

Summary

Topics included in this methodology chapter were research questions and null hypotheses, instrumentation, population, data collection, data analysis, and a chapter summary.

Archival, secondary data were generated by the institution's Office of Organizational Development and Leadership and the Academic Affairs office which included redacted data with differing identifiers where appropriate to maintain anonymity. These data were collected from all students taking online and on-ground courses at the selected community college studied from fall 2016 through summer 2019. I was then able to run chi-square statistical tests on these data using SPSS to determine if any of the factors being researched showed significance to online student success. Chapter 4 provides the results of the analyzed data, while Chapter 5 presents a summary of the results, conclusion, and recommendations.

Chapter 4. Results

Introduction

The purpose of this non-experimental, quantitative case study was to compare the academic success of community college students over three academic years (2016-17 through 2018-19) before the onset of COVID-19 based on final grades and the influence of student factors, class size, and faculty characteristics using archival data from selected online and on-ground classes at a Middle Tennessee community college. Student factors reviewed include gender, full-time or part-time enrollment, and age (traditional or non-traditional status). Instructor characteristics reviewed included full-time or part-time (adjunct) teaching status and tenure or non-tenure status of faculty.

Student academic success was generally defined as achieving a final course grade of A, B, or C. Grades of D, F, FA, and W were considered to be unsuccessful in this study. At the participating institution, the difference in an F and an FA grade is attendance; students who fail due to not attending after two-thirds of the course is completed are automatically assigned an FA grade instead of an F. However, either grade signifies the student failed the course; the difference lies in the reason for the failure. The selected courses were English, history, and the natural sciences.

Descriptive Data

Institutional data for this study consisted of 44,568 student records comprising 34,006 on-ground classes and 10,562 online classes. For the percentages provided, audit and incomplete or missing data were excluded. The mean grade point average (GPA) of all students with prior GPAs was 2.7 in this study. Unique student registrations totaled 13,400 students and unique

instructors totaled 198. Further descriptive data from the institution and data used in this study for the academic years 2016-2018 are shown in Figure 1 and Table 1.

Figure 1

Percentages of Courses by Delivery Method

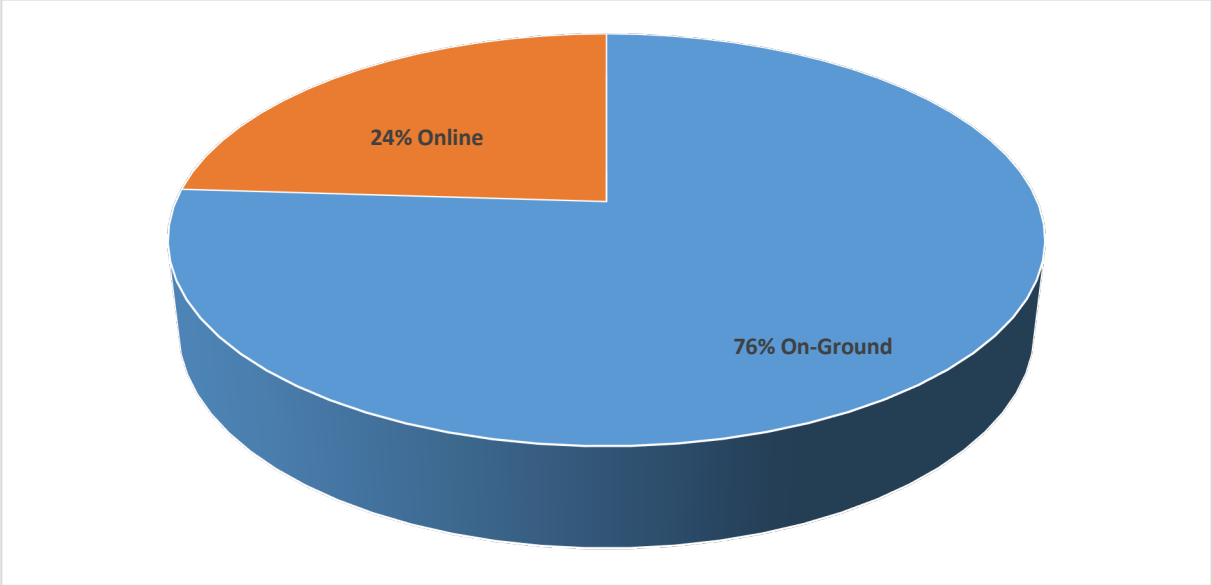


Table 1

Demographic Online Course Data and Fall 2017 Institutional Data

	Online Courses - This Study	Fall 2017 Institutional Data
Female	72%	61%
Male	28%	39%
Full-Time	52%	50%
Part-Time	48%	50%
Traditional	68%	79%
Non-Traditional	32%	21%

Research Question Analysis

An analysis of the eight research questions guiding this study is presented below. Each research question is presented along with its corresponding analysis.

Research Question 1

Is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between online and on-ground in corresponding classes at the participating community college?

H_o1: There is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between online and on-ground in corresponding classes at the participating community college.

A two-way contingency table analysis was conducted to evaluate whether the proportion of online and on-ground college students successfully completing the course at the participating community college are significantly different. The two variables were course delivery method with two levels (on-ground, online) and student course success with two levels (pass, fail). Student success was found to have a significant difference based on the two delivery method levels, Pearson $\chi^2(1, N = 44{,}568) = 9.449$, $p = .002$, Cramer's V = .015. Therefore, the null hypothesis is rejected. In general students taking online classes are significantly more likely to be successful in classes than students taking on-ground classes. Figure 2 displays the successful students by delivery method. Table 2 presents the student success percentages overall and grades A, B, and C by delivery method.

Figure 2

Successful Students by Delivery Method

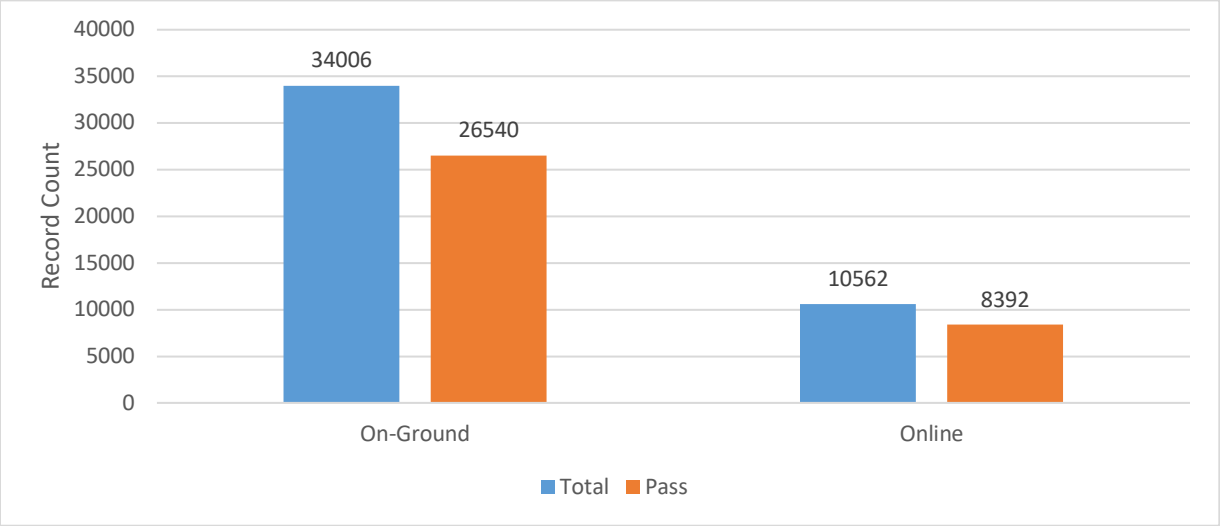


Table 2

Student Success Percentages Overall and A, B, and C Grades by Delivery Method

Grade	On-Ground	Online
Pass	78%	79%
A	37%	40%
B	26%	24%
C	15%	13%

Note: Audit students and rounding effect percentage totals.

Research Question 2

Is there a significant difference in the proportion of students receiving an unsuccessful or failing grade (D, or F/FA/W) between online and on-ground in corresponding classes at the participating community college?

H_o2: There is no significant difference in the proportion of students receiving an unsuccessful or failing grade (D, or F/FA/W) between online and on-ground in corresponding classes at the participating community college.

A two-way contingency table analysis was conducted to evaluate whether the proportion of online and on-ground college students who are not successful in the course at the participating community college are significantly different. The two variables were course delivery method with two levels (on-ground, online) and unsuccessful course completion with two levels (pass, fail). Student success was found to have a significant difference based on the two delivery method levels, Pearson $\chi^2(1, N = 44{,}568) = 9.449$, $p = .002$, Cramer's V = .015. Therefore, the null hypothesis is rejected. In general on-ground college students are significantly more likely to fail courses than online college students. Figure 3 displays the unsuccessful students by delivery method. Table 3 presents student failure percentages and grades D, F, FA, and W by delivery method.

Figure 3

Unsuccessful Students by Delivery Method

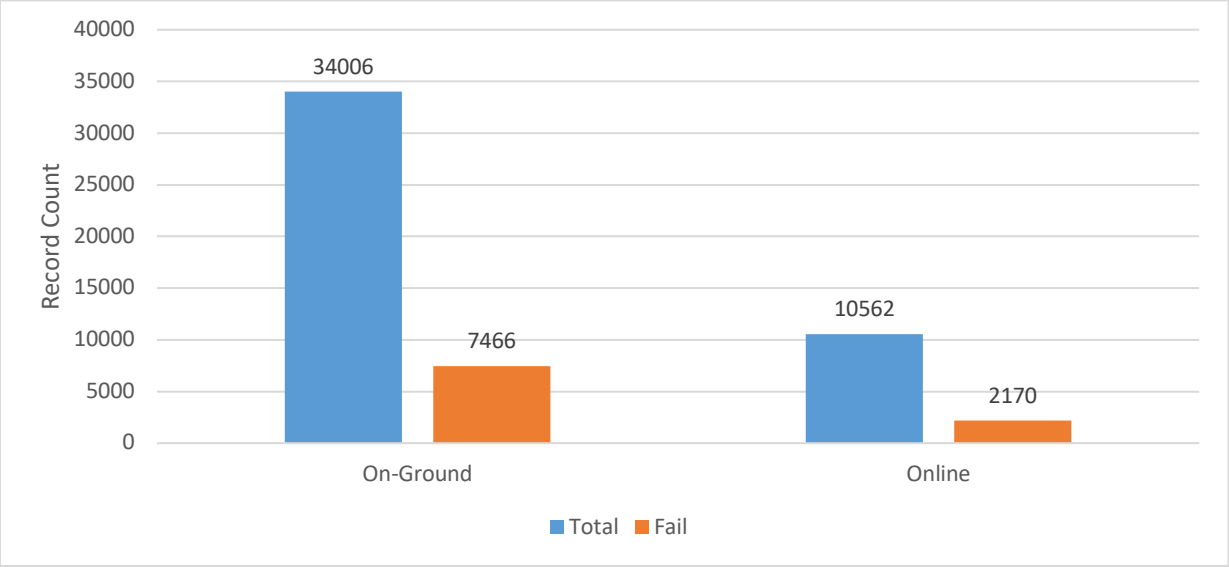


Table 3

Student Failure Percentages and Grades D, F/FA/W by Delivery Method

	On-Ground	Online
Fail	22%	21%
D	6%	5%
F/FA/W	16%	17%

Note: Audit students and rounding effect percentage totals.

Research Question 3

For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between female and male students at the participating community college?

H_o3: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between female and male students in online classes at the participating community college.

A two-way contingency table analysis was conducted to evaluate whether the proportion of male and female college students successfully completing the course at the participating community college are significantly different. The two variables were gender with two levels (male, female) and successful course completion with two levels (pass, fail). Pass rates were found to have a significant difference based on the two gender levels, Pearson $\chi^2(1, N = 10{,}562) = 7.788$, $p = .005$, Cramer's V = .027. Therefore, the null hypothesis is rejected. In general female college students are significantly more likely to be successful than male college students in online courses. Figure 4 displays the proportion of successful and unsuccessful online college students by gender. Table 4 presents the online student success percentages by student gender.

Figure 4

Online Student Success by Gender

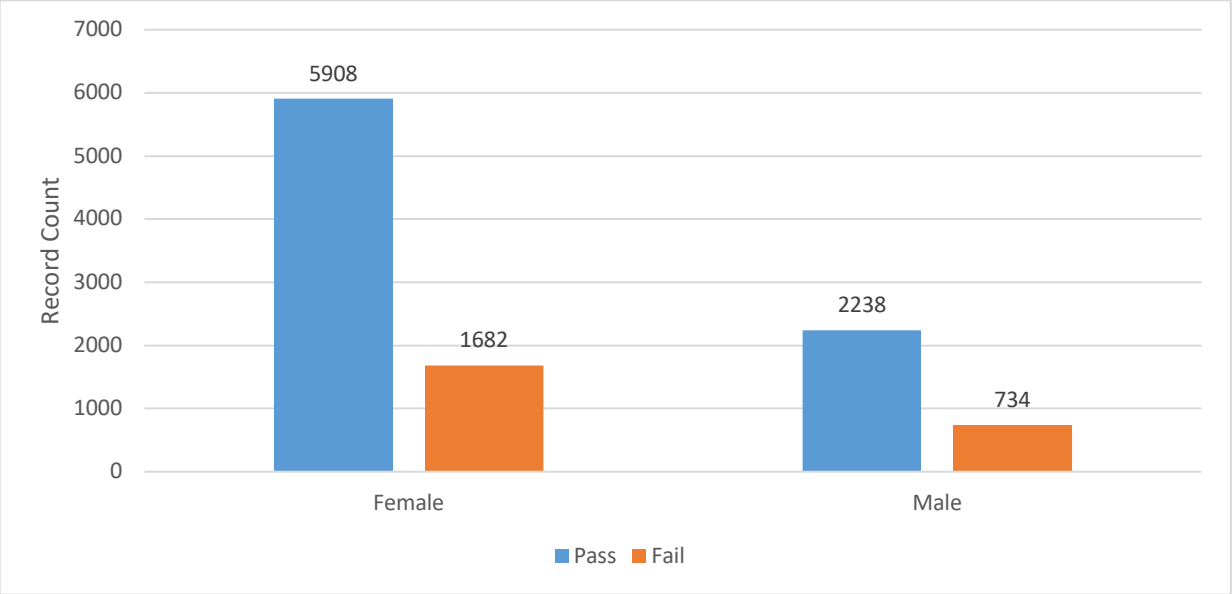


Table 4

Online Student Success Percentages by Student Gender

	Male	Female
Pass	75%	78%
Fail	25%	22%

Research Question 4

For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between full-time students (taking 12 or

more credit hours) and part-time students (taking fewer than 12 credit hours) at the participating community college?

H_o4: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between full-time students (taking 12 or more credit hours) and part-time students (taking fewer than 12 credit hours) in online classes at the participating community college.

A two-way contingency table analysis was conducted to evaluate whether a significant difference exists in the proportion of online full-time and part-time college students and successful course completion. The two variables were enrollment status with two levels (full-time, part-time) and students successfully completing the course (pass, fail). Enrollment status of college students was found to have a significant difference based on the two levels, Pearson $\chi^2(3, N = 10{,}562) = 218.589$, $p < .001$, Cramer's V = .144. Therefore, the null hypothesis is rejected. In general part-time college students are significantly more likely to be successful than full-time college students in online courses. Figure 5 displays the proportion of online college students who are successful based on student enrollment status. Table 4 presents online student success percentages by student enrollment status.

Figure 5

Online Student Success by Student Enrollment Status

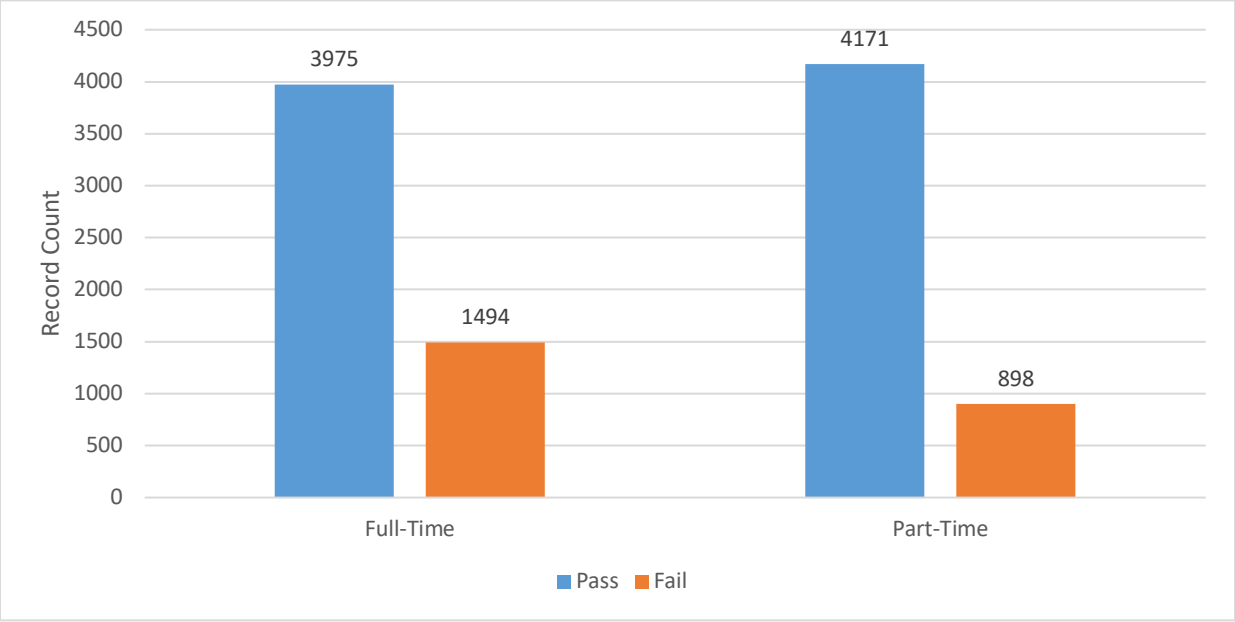


Table 5

Online Student Success Percentages by Student Enrollment Status

	Full-Time	Part-Time
Pass	73%	82%
Fail	27%	18%

Research Question 5

For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between traditional aged students (age

under 24) and non-traditional aged students (age 24 and over) at the participating community college?

H_o5: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between traditional aged students (age under 24) and non-traditional aged students (age 24 and over) at the participating community college.

A two-way contingency table analysis was conducted to evaluate whether the proportion of traditional and non-traditional college students who successfully complete the course at the participating community college are the same. The two variables were age with two levels (traditional and non-traditional) and student success with two levels (pass, fail). Age was found to have a significant difference based on the two age levels, Pearson $\chi^2(2, N = 10{,}562) = 181.331$, $p < .001$, Cramer's V = .131. Therefore, the null hypothesis is rejected. In general non-traditional college students are significantly more likely to be successful in online courses than traditional students. Figure 6 displays the proportion of successful and unsuccessful traditional and non-traditional students in online courses. Table 6 presents the online student success percentages by student age.

Figure 6

Online Student Success by Age

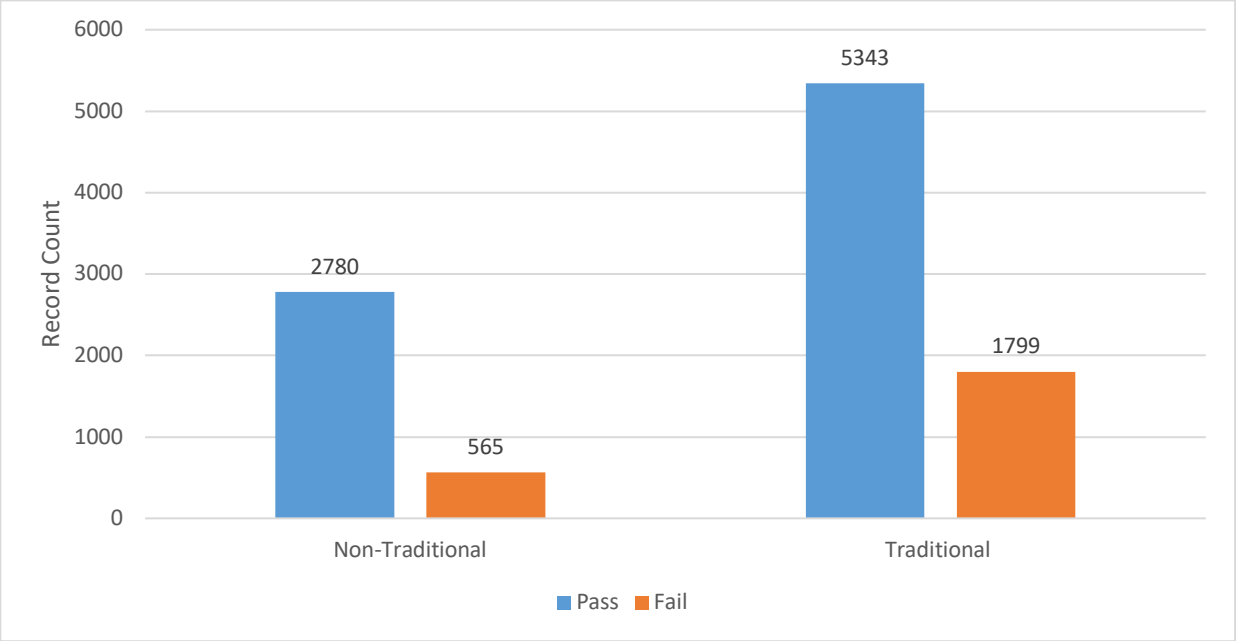


Table 6

Online Student Success Percentages by Student Age

	Non-Traditional	Traditional
Pass	83%	75%
Fail	17%	25%

Research Question 6

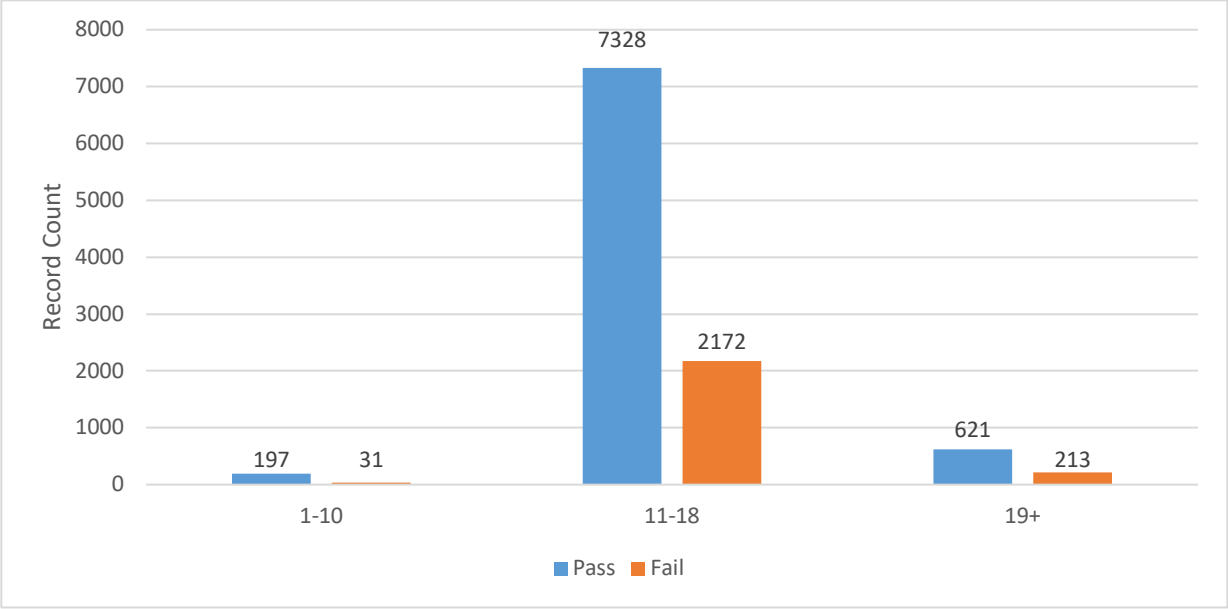
For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) among the three class sizes (fewer than 11, 11-18, 19 or more) at the participating community college?

H_o6: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) among the three class sizes (fewer than 11, 11-18, 19 or more) at the participating community college.

A two-way contingency table analysis was conducted to evaluate whether the proportion of students in the three class sizes successfully completing the course at the participating community college are the same. The two variables were class size with three levels (fewer than 11, 11-18, 19 or more) and student success with two levels (pass, fail). Student success was found to have a significant difference based on the three class size levels, Pearson $\chi^2(2, N = 10{,}562) = 14.483$, $p = .001$, Cramer's V = .037. Therefore, the null hypothesis is rejected. Figure 7 displays the proportion of successful and unsuccessful online college students based on the three class sizes of fewer than 11, 11-18, 19 or more.

Figure 7

Online Student Success by Class Size



Follow-up pairwise comparisons were conducted to evaluate the difference among those proportions. Table 7 shows the results of these analyses. The Holm's sequential Bonferroni method was used to control for Type I error at the .05 level across all comparisons. The pairwise differences that exhibited significance were in the fewer than 11 and the 11-18 class sizes as well as the fewer than 11 and 19 or more class sizes. In general, college students in class sizes fewer than 11 are significantly more likely to be successful in online classes. Table 8 presents the percentage of each grade by class size.

Table 7

Results from the Pairwise Comparisons Using the Holm's Sequential Bonferroni Method

Comparison	Pearson Chi-Square	p value (alpha)	Cramer's V
<11, 11-18	10.915	.001	.033
11-18, 19+	3.094	.079	.017
<11, 19+	14.432	<.001	.117

Table 8

Percentages of Grades by Class Size

Grade	Fewer than 11	11-18	19 or more
A	64%	40%	35%
B	17%	24%	26%
C	7%	13%	13%
D	1%	5%	6%
F	5%	8%	9%
FA	4%	4%	5%
W	2%	5%	6%

Research Question 7

For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between the courses taught by tenured or non-tenured full-time instructors at the participating community college?

H_o7: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between the courses taught by tenured or non-tenured full-time instructors at the participating community college.

A two-way contingency table analysis was conducted to evaluate whether the proportion of college students taught by tenured and non-tenured instructors are significantly different. The two variables were faculty tenure status with two levels (tenured, non-tenured) and student success with two levels (pass, fail). Student success was found to have a significant difference based on the two faculty employment status levels, Pearson $\chi^2(1, N = 10{,}562) = 172.570$, $p < .001$, Cramer's V = .128. Therefore, the null hypothesis is rejected. In general online college students taught by tenured instructors are significantly more likely to be successful than online college students taught by non-tenured instructors. Figure 8 displays the proportion of successful and unsuccessful online college students by tenure status of instructors. Table 9 presents online student success percentages by faculty tenure status.

Figure 8

Online Student Success by Faculty Tenure Status

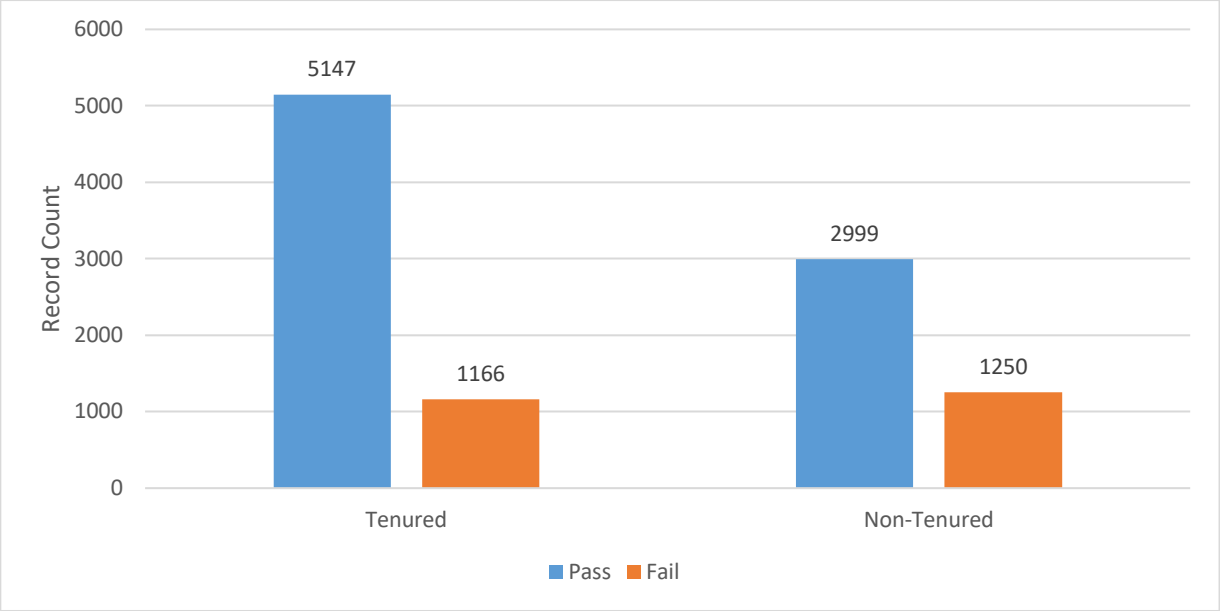


Table 9

Online Student Success Percentages by Faculty Tenure Status

	Tenured	Non-Tenured
Pass	82%	71%
Fail	18%	29%

Research Question 8

For online students, is there a significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between the courses taught by full-time and part-time (adjunct) instructors at the participating community college?

H_o8: For online students, there is no significant difference in the proportion of students successfully completing the course (grade of A, B, or C) between the courses taught by full-time and part-time (adjunct) instructors at the participating community college.

A two-way contingency table analysis was conducted to evaluate whether the proportion of successful college students taught by full-time and adjunct instructors in courses at the participating community college are significantly different. The two variables were faculty employment status with two levels (full-time, adjunct) and student success with two levels (pass, fail). Online college student success was found to have a significant difference based on the two faculty employment levels, Pearson $\chi^2(1, N = 10{,}562) = 19.737$, $p < .001$, Cramer's V = .043. Therefore, the null hypothesis is rejected. In general online college students are significantly more likely to be successful in classes taught by full-time instructors than part-time instructors. Figure 9 displays the proportion of successful and unsuccessful online college students by the faculty employment status. Table 10 presents online student success percentages by faculty employment status.

Figure 9

Online Student Success by Faculty Employment Status

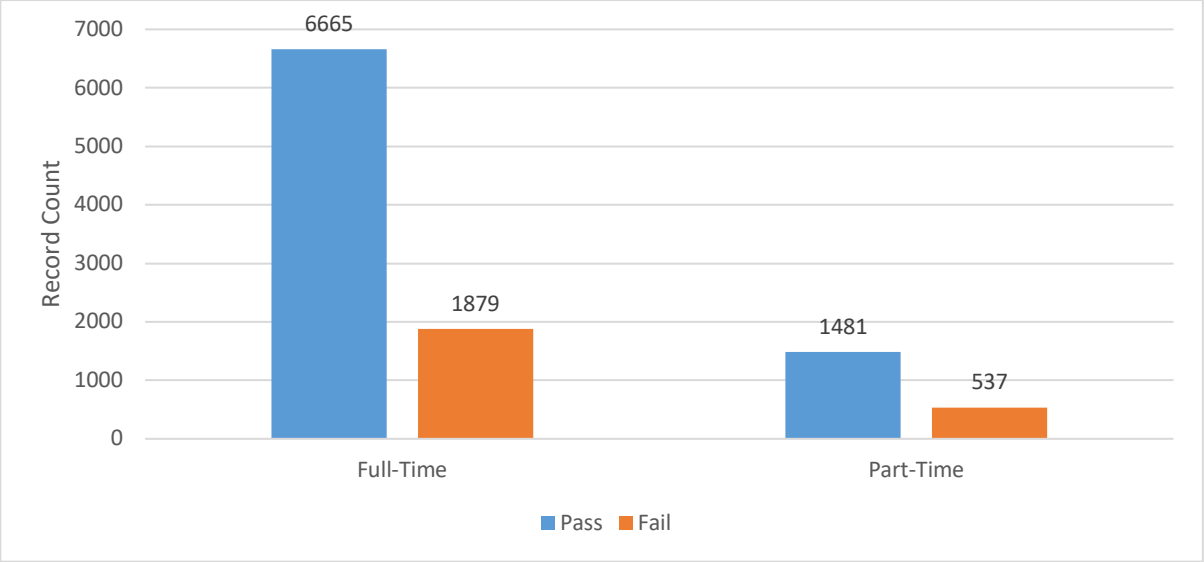


Table 10

Online Student Success Percentages by Faculty Employment Status

	Full-Time	Part-Time
Pass	78%	73%
Fail	22%	27%

Chapter 5. Summary, Conclusions, and Recommendations

The purpose of this non-experimental quantitative case study was to compare the academic success of community college students over three academic years (2016-17 through 2018-19) before the onset of COVID-19 based on final grades and the influence of student factors, class size, and faculty characteristics using archival data from selected online and on-ground classes at a Middle Tennessee community college. Student factors reviewed include gender, full-time or part-time status, and age (traditional or non-traditional status). Instructor characteristics reviewed included full-time or part-time (adjunct) teaching status and tenure or non-tenure status of faculty.

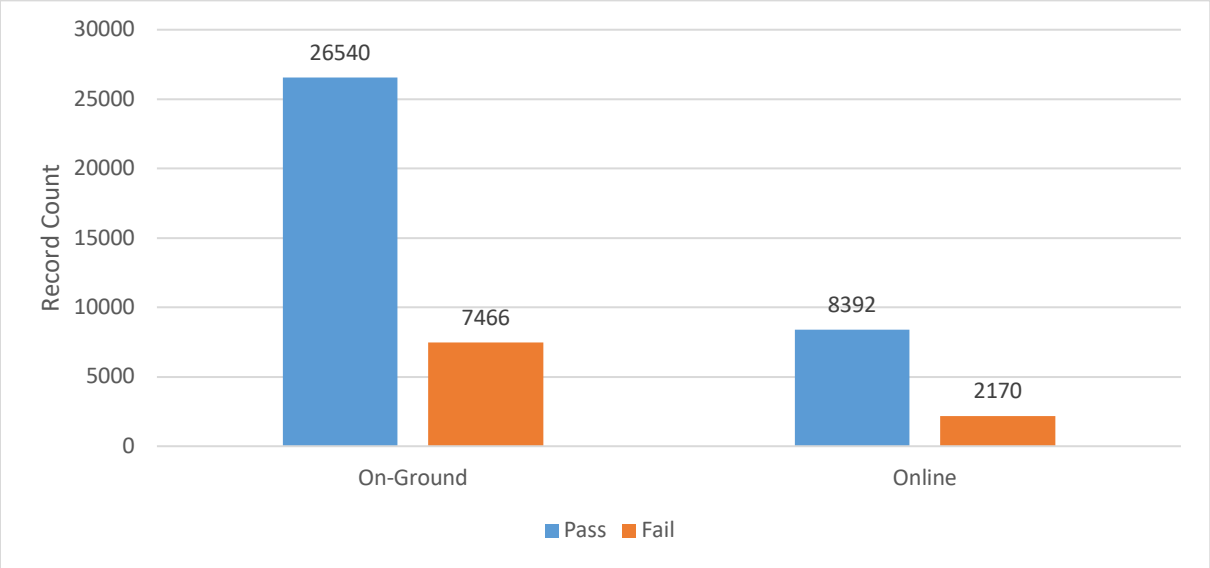
My study adds to the literature by bridging deficiencies in online community college research. Specifically, faculty and class size studies were few, and student characteristic studies netted a wide variety of results. The 44,568 records in this population of 13,400 students with 198 instructors help to build on the previous community college research.

Discussion and Conclusions

The results of my study were both consistent and inconsistent with the literature. Each research question yielded a somewhat different result. Figure 10 shows the total number of students who passed and failed by each delivery method studied.

Figure 10

Successful and Unsuccessful Students by Delivery Method



For Research Question 1, I examined the proportion of successful online and on-ground students. Results showed students were generally more likely to be successful in online classes as compared to on-ground classes. Over the three academic years, students had a 79% success rate in both on-ground and online courses. My study yielded results in alignment with other studies including Huh et al. (2009), Cunningham (2015), James et al. (2016), and Lewis and Harrison (2012). Although these studies did not show significant differences in online class performance over on-ground class performance, these studies and mine did not necessarily result in a lower grade online. My results contradicted the findings of Faidley (2018), Gregory (2016) and Bloemer (2018). Review of the literature resulted in no clear indicator of a more successful course delivery method; findings from this study add to the wide-ranging variety of results.

For Research Question 2, I assessed the proportion of successful online and on-ground students. Results showed students were generally more likely to be unsuccessful in on-ground classes than online classes. Over the three academic years, students had a 21% failure rate in on-

ground classes and 23% failure rate in online courses. Again, my study yielded results in alignment with other studies including Huh et al. (2009), Cunningham (2015), James et al. (2016), and Lewis and Harrison (2012) because online classes did not necessarily mean a student would be unsuccessful. My study did differ somewhat in the significant difference found. Results contradicted the findings of Faidley (2018), Gregory (2016) and Bloemer (2018). Review of the literature resulted in no distinct gauge of a more likely course delivery method for failure, and my study contributes to the range of results.

For Research Question 3, I analyzed the proportion of students being successful in online courses by gender. Females were found more likely in general to be successful in online courses than males. This aligned with the studies of Aragon and Johnson (2008), James et al. (2016), Vella et al. (2016), Cunningham (2015), and Faidley (2018). While all of the literature did not agree, females did have more consensus than males. My study adds to this growing body of consensus.

For Research Question 4, I evaluated the proportion of students being successful in online courses by student enrollment status. Part-time students were generally more likely to be successful in online classes. Part-time students showed a higher likelihood of success as indicated by Shea and Bidjerano (2019), Vella et al. (2016), and Gregory's (2016) studies. From the literature review, other studies such as Colorado and Eberle (2010), Wojciechowski and Palmer (2005), and Krajewski (2015) had alternate results. More research is needed in this area.

For Research Question 5, I assessed the proportion of students being successful in online courses by student age. Most studies reviewed had the same result. Non-traditional students were more likely in general to be successful than traditional students. With the exception of Yukselturk and Bulut (2007), this result agrees with the studies reviewed in the literature. More

consensus is found in this area; however, one study reviewed did produce alternate results, leaving this area open for further research.

For Research Question 6, I examined the proportion of students being successful in online courses by class size. Classes with fewer than 11 generally produced more successful students than both class sizes of 11-18 and 19 and above. Parks-Stamm (2017) affirmed that online classes with fewer than 15 students resulted in more discussion posts which in turn showed greater student success. Tomei's (2006) research recommended 12 students. While smaller classes may lead to better results, budgetary constraints of institutions may not allow for these class sizes. Institutions must make decisions based on the entirety of the institutional resources. Further internal research could help find the optimal class size for the individual institution. For example, at the participating institution, honors and other specialized courses have smaller class sizes. Further investigation is before results can be determined.

For Research Question 7, I analyzed the proportion of students being successful in online courses by faculty tenure status. In my study, students generally had more success in online courses when taught by tenured faculty. This finding contradicted most other studies such as McDaniel (2003) and Figlio (2015). Ehrenberg and Zhang (2005) published the only other study reviewed in the literature that produced similar results. With these findings, more research should be performed in this area.

For Research Question 8, I evaluated the proportion of students being successful in online courses by faculty employment status. Full-time instructors generally showed higher results than part-time instructors. Ran and Xu (2019) and Mueller et al.'s (2013) studies agreed. However, several other studies such as Hutto (2017), Flaherty (2013), Landrum (2009), and Salley and Shaw (2015) contradicted these results. Faculty online studies in the literature are few; therefore,

this is a result that needs further study. A variety of results were found in the literature on the differences in adjunct and full-time faculty instruction and which is best for student success.

When comparing student success for online and on-ground, online students were generally more likely to be successful while on-ground students were generally more likely to be unsuccessful. In online courses, female students, part-time students, and non-traditional students were more likely to be successful. Class sizes fewer than 11 were generally more likely to produce successful students. Successful students were generally more likely to be taught by full-time faculty and tenured faculty. My results contribute to the growing body of community college online class studies. Both similarities and differences were found to the existing literature. This case study reviewed a single institution. Each institution should review its own data regularly for decision-making purposes.

Recommendations for Practice

Results of my study led to several recommendations for practice. These recommendations would be the most valuable to other community colleges of similar size and student characteristics. After analyzing data from my study, I make the following suggested recommendations for practice:

1. Assume that online classes will allow for equal student achievement in relation to other delivery methods; disregarding the potential of online classes will reduce the subsequent student success that can be gained through the access afforded from this delivery method.
2. Study data frequently to ensure all delivery methods are producing acceptable levels of student success while continuously making improvements.

3. Disaggregate student data to ensure equity success gaps are being addressed.
4. Assess outcomes regularly for various class sizes. While budgetary constraints may require some larger class sizes, additional student success could outweigh the cost savings of the larger classes in some cases.
5. Examine broad faculty outcomes to determine professional development needs. For example, success gaps in faculty employment or tenure status should not be overlooked.
6. Focus on building relationships with adjuncts and faculty with less experience through mentorship programs. Dolan (2011) and Green et al. (2009) indicated that developing a cohesive network among faculty and the institution is important to faculty, and subsequently student, success.
7. Provide instruction for students regarding online course expectations and how to navigate online courses before students enroll in online courses.
8. Extend support services for all delivery methods offered.
9. Hold focus groups of students and faculty periodically to determine additional needs.
10. Establish timelines for faculty feedback to students and amount of engagement required for the course.

Recommendations for Further Research

After completing my study, I recommend the following mixed methods, qualitative, and quantitative areas for further research:

1. Survey students to find out the reasons they enroll in online courses, and evaluate the relationship between the reason for enrollment and student success.

2. Evaluate the performance of students in subsequent courses when the pre-requisite courses were taken online.
3. Study how institutions can best support part-time and non-tenured faculty in the process of their online teaching professional development.
4. Research the student success measures that need to be offered to students taking online courses.
5. Establish ways to apply diversity, equity, and inclusion principles to online classes.
6. Determine the reasons students drop online courses and what measures can be taken to further support them.
7. Assess the relationship of the amount of engagement in online classes between the instructor and student to the final course grade.
8. Examine the relationship between faculty satisfaction surveys and student satisfaction surveys to online student success.
9. Conduct a qualitative study focusing on male online students in order to learn and examine possible reasons for their decreased levels of student success.

Students deserve the best support systems an institution can provide. To meet the goals of Complete College America and other initiatives for raising the level of postsecondary credential achievement, institutions must champion both students and faculty in all course delivery methods. Continuous assessment improvements and review of data are vital because results may change over time. Ongoing research will provide additional understanding to aid in the quest for online student success.

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VITA

MELODY EDMONDS

Education:	Doctor of Education in Educational Leadership, concentration in Higher Education Leadership, East Tennessee State University, Johnson City, TN, 2021
	Certificate in Community College Leadership, East Tennessee State University, Johnson City, TN, 2018
	Master of Business Administration, Tennessee Technological University, Cookeville, TN, 1995
	Bachelor of Science. Accounting, Middle Tennessee State University, Murfreesboro, TN, 1990
	Associate of Science, Motlow State Community College, Lynchburg, TN, 1989
Professional Experience:	Assistant Vice President for Academic Affairs, Motlow State Community College, 2019 - present
	Interim Vice President for Academic Affairs, Motlow State Community College, 2016-2019 and SACSCOC Liaison 2018-2019
	Director/Dean, McMinnville Campus, Motlow State Community College, 2000-2019
	Business Information Technology Instructor/Assistant Professor, Motlow State Community College 1995 - 2000
Honors and Awards:	SACSCOC Academic Peer Evaluator Training Workshop Certification, 2019 Phi Theta Kappa Distinguished Advisor, 2016 Faculty Excellence Award, 1999
Affiliations:	National Business Educator Association (NBEA) Member White County Advisory Board Warren County Pre-K and CTE Advisory Boards Foundation for Warren County Educational Progress Secretary TN Promise Advisory Council – Warren County