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Comparison of Student Success by Course Delivery Methods at an Eastern Tennessee Community College

E. Ann Cunningham
East Tennessee State University

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by
E. Ann Cunningham
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Dr. Jasmine Renner, Chair

Dr. Ken Adcock

Dr. Bethany Flora

Dr. James Lampley

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ABSTRACT

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The purpose of this study was to compare academic success based on methods of course delivery for students in a computer applications course at an East Tennessee community college. Additionally, the researcher examined demographic relationships of age, gender, and race to student academic performance in the different delivery methods. The researcher used final course grades as a determinant of academic success. The study was focused on students who took the INFS 1010 Computer Applications course during the academic years, 2011-12, 2012-13, and 2013-14 at a southeast Tennessee community college. The population consisted of 1,177 students who took the INFS 1010 Computer Applications course over a 3-year period. The independent variable method of course delivery is generally defined as traditional, online, or blended. The dependent variable academic success is generally defined as final course grade. A student was considered an academically successful completer of the course by attaining a final course grade of A, B, C, or D. It should be noted that if a student is transferring to another institution, the receiving institution may or may not accept the course credit of a student who received a D grade in this course. However, at the studied institution students receiving final course grades of A, B, C, or D in INFS 1010 are considered successful course completers.

The research questions in this study were addressed through data analysis with Chi-Square 2-way contingency table analysis testing procedures. When areas of significance were identified,

follow-up pairwise comparisons were conducted to evaluate relationships between the proportions.

The quantitative findings revealed no significant overall relationships in final course grades among the 3 delivery methods. However, some relationships were noted within delivery methods by demographic characteristics. The findings of the online delivery method indicated significant relationships among all 3 demographic categories (gender, age, and race) studied. Significant grade relationships were identified in the gender and race categories within the blended delivery method. However, within the traditionally delivered sections of this course the only demographic area with significant findings was the age category.

DEDICATION

This body of work and entire endeavor is dedicated first and foremost to my Savior Jesus Christ without whom none of this would have been possible. He dreamed dreams for me that I never dared dream for myself and has guided me my whole life.

This dissertation is also dedicated to my family. My loving husband John Cunningham has supported me through every step of this journey. He has made sure I had time and space to do the work necessary and provided countless words of encouragement along the way. For most of the years of our marriage he has said that one day we would be Dr. and Mr. Cunningham. When he says something, he is usually right. My parents Millard and Dorothy Hooper have always believed in me and taught me by their lives as much as their words. My daughter Grayson brought much love to my life. Martha Cunningham has been a wonderful mother-in-law to me and great supporter of my continued education. I have been blessed with the best brothers, brother-in-law, sisters-in-law, nieces, and nephews possible. I love all of you and appreciate all the words of encouragement and joy you have given me through the years. Without a loving family I don't think I would have accomplished half of what I have been able to accomplish in my life. I thank you and dedicate this body of work to you.

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CHAPTER 1

INTRODUCTION

The higher education system consists of providing advanced educational opportunities to individuals who have already completed high school level course work. Typically, these higher educational experiences are delivered in institutions of higher learning called colleges, community colleges, and universities. For many years the higher education system has functioned with an instructor centered approach by delivering course educational information from experts/teachers to students who are at the same physical location (Herrington, Herrington, & Sparrow, 2000). This method of delivering educational information with teacher and student in the same location at the same time with content delivered orally or in writing is commonly referred to as traditional or face-to-face instruction (Allen & Seaman, 2014, p. 6).

Because the traditional method of instruction requires teacher and student to be in the same physical location, it excluded individuals from higher education opportunities who could not physically be present at an institution of higher learning. In general community colleges have been more proactive in efforts to provide flexible course instruction opportunities (Berg, 2005). This flexibility allowed students to receive instruction a distance away from the institution leading to the concept of distance education. The distance education concept was notably attractive to community colleges because these institutions served a diverse group of learners who often are older than the traditional college student and have family and/or work obligations. This diversity was highlighted by data gathered by the American Association of Community Colleges (AACC) that indicated the average age of community college students is 28, over half of community college students are women, and over half attend classes part time (American Association, 2014). As a result community colleges have embraced flexible learning

alternatives for their students. Consequently, according to the *Encyclopedia of Distance Learning*, "In America over the past 30 years, community colleges have clearly demonstrated the greatest commitment to the applications of distance education technologies" (Berg, 2005, p. 302).

Additionally, community colleges tend to be affordable and attract a large number of working adult students. These working adults often find courses that are offered in a distance education format helpful in their efforts to balance work, family, and school responsibilities. According to a 2012 survey by the American Association of Community Colleges (AACC) approximately three out of every five community college students work (American Association, 2014). Correspondingly, flexibility and convenience were identified as key reasons community college students chose online distance education courses in a 2012 qualitative study at two community colleges in Virginia (Jaggars, 2014).

Furthermore, the Community College Research Center conducted large, comprehensive studies of online learning in Virginia and Washington State Community College systems between 2004 and 2008 (Crawford & Persaud, 2013). These studies provided data to support some generally accepted characteristics of online learners in community colleges. These data indicated that online learners in these systems were more likely to be women, white, age 25 or older, and caregivers of children. In addition these online learners had a significantly lower competition rate than students in traditional courses in these same institutions (Crawford & Persaud, 2013).

In light of this portrait of the typical online student, recent statistics demonstrated decreases in community college enrollments especially among women and students over the age of 24 and suggested potential lower online student enrollments (Juszkiewicz, 2014). Conversely,

surveys gathered and analyzed by Noel-Levitz and Smarter Services indicated that traditional aged students are less satisfied and ready for online courses than their nontraditional aged counterparts (Bryant & Adkins, 2013). These findings lead to the belief that traditional students are less likely to enroll in and succeed in online or blended distance education courses (Bryant & Adkins, 2013). Although these trends indicate potential decreases in online enrollments, higher education administrators are considering increased use of technology through online and blended course delivery options as a means of controlling costs and increasing access (Bowen, Chingos, Lack, & Nygren, 2012, p. 7). At the same time E-learning (online, blended, etc.) has been described as reflecting how people learn by interacting directly with instructional materials in the 21st century (Keengwe & Onchwari, 2014, p. 888). Therefore, despite contradicting statistics and data, online and blended courses are expected to continue to increase. Thus, in spite of contradicting data on the merits and demerit of traditional versus online and blended courses, enrollment into online and blended courses continues to increase (Allen & Seaman, 2014, p. 4).

Background of the Problem

Because of the growth of online instruction there has been much concern in the educational community about student academic success in online delivered courses as compared to traditional delivery methods (Yang & Cornelius, 2005). Consequently, quality of online courses was the primary concern identified by both faculty who currently teach online and those who do not teach online at Armstrong University who participated in an institutional study designed to measure factors that inhibit faculty participation in online education (Betts & Heaston, 2014). Likewise, concerns related to the quality of learning were also highlighted in a similar study of factors influencing faculty willingness to teach online conducted with

educational technology doctoral students at universities in the Midwest and South in 2012 (Hung & Jeng, 2013).

As a result these concerns have led educators to consider options that provide students with the convenience of online and the benefit of regular physical contact with the instructor and other students. For this reason the blended course delivery method has emerged (Harmon, Alpert, & Lambrinos, 2014, p. 113). Blended courses are considered a combination method of instruction (Bonk & Graham, 2006). The Online Learning Consortium (formerly Sloan-C) definition of blended involves a blend of face-to-face instruction combined with 30%-79% internet delivered instruction (Allen & Seaman, 2014, p. 6). Therefore, it is believed that blended courses allow the student the benefits of both face-to-face contact and more flexible scheduling (Dziuban, Hartman, & Moske, 2004).

Potential benefits of blended course delivery method influenced differentiation between online and blended method in a report and meta-analysis conducted by Means, Bakia, and Jones (2010) for the United States Department of Education. While studies identified in this meta-analysis indicated blended instruction was more effective for achieving learning objectives, a lack of consistency among the studies in the definition of blended instruction limited the researchers' ability to make definitive conclusions about the course delivery method (Means et al., 2010, p. 18).

Correspondingly, Charles Graham (2013), a researcher from Brigham Young University, indicated similar concerns about blended learning definition variations in literature and research. In his section of a book regarding blended learning practice and research, he discussed issues with blended learning definitions that make it difficult to standardize and quantify thus creating gaps and questions in the research (Graham, 2013).

These gaps and questions in the research can be especially concerning for community colleges educators. Not only is there insufficient research providing a consistent definition of blended instruction but also insufficient research comparing community college students' success in traditional, online, and blended courses. Because community colleges are open access institutions, they attract many nontraditional students, as described previously who prefer the flexibility of nontraditional course delivery options (Oliver, 1995). For this reason a focused comparative study about academic achievement that is narrowed to community college students and differentiated among traditional, online, and blended would benefit community college educators in course delivery decision making.

Purpose Statement

The purpose of this study was to compare academic success based on methods of course delivery for students in a computer applications course at an East Tennessee Community College. Additionally, the researcher examined demographic relationships of age, gender, and race to student academic performance in the different delivery methods. The independent variable method of course delivery is generally defined as traditional, online, or blended. The dependent variable academic success is generally defined as final course grade. A student was considered an academically successful completer of the course by attaining a final course grade of A, B, C, or D.

The study was an analysis of academic and demographic data of students enrolled in traditional, online, and blended sections of the INFS 1010 Computer Applications course offered at an East Tennessee community college during a 3-year period. It should be noted that if a student is transferring to another institution, the receiving institution may or may not award course credit to a student who received a D grade in this course. However, at the studied

institution students receiving final course grades of A, B, C, or D in INFS 1010 are considered successful course completers.

Research Questions

This study was focused on research questions that were designed to identify relationships between methods of course delivery and student success as measured by final course grades as well as relationships between demographic factors and student success.

The study's research questions are as follows:

1. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course among the three delivery methods (traditional, online, and blended)?
2. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between males and females?
3. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between males and females?
4. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between males and females?
5. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between traditional aged (24 and under) and nontraditional aged (25 and older) students?

6. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between traditional aged (24 and under) and nontraditional aged (25 and older) students?
7. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between traditional aged (24 and under) and nontraditional aged (25 and older) students?
8. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional method among White, African American, and other race students?
9. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods among White, African American, and other race students?
10. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods among White, African American, and other race students?

Significance of the Study

In 2012 the 21st Century Commission on Community Colleges recommended changes to America's community colleges to meet the demands of the student success and completion initiatives sweeping the nation (American Association, 2012). These demands were largely in response to President Obama's goal "that by 2020, America would once again have the highest proportion of college graduates in the world" (The White House, Higher Education, 2014). The Complete College America organization formed in 2009 to promote systematic higher education reform believed necessary to "significantly increase the number of Americans with quality career

certificates or college degrees and to close attainment gaps for traditionally underrepresented populations" (Complete College America, Our Work, 2014). Subsequently in response to the President's goal and the Complete College America initiative many state legislatures and governors have initiated college success and completion agendas on the state level. For example, according to the National Conference of State Legislatures website many states are changing their funding models for higher education to reflect performance-based measures instead of enrollment models (National Conference, 2014). This legislative effort has guided education reform legislation in many states including Tennessee. The Tennessee legislature passed the Complete College Tennessee Act in 2010. Also, in support of Complete College Tennessee, Governor Bill Haslam challenged Tennesseans in 2013 with a new mission called Drive to 55. This initiative indicates a drive for 55% of Tennesseans to have a college degree or higher education credential by 2025 (Drive to 55, 2014). This study is significant because it provides academic comparison data to guide data driven decision making processes at community colleges.

Additionally, both regional and departmental accreditation agencies promote goals related to ensuring acceptable levels of academic quality. The Southern Association of Schools and Colleges Commission on Colleges (SACS COC) evaluates its member schools based on both achievement of learning outcomes and retention rates in addition to other criteria defined in the organization's Principles of Accreditation (Southern Association of Colleges and Schools Commission on Colleges, 2012). Furthermore, the Council of Regional Accrediting Commissions (C-RAC) developed the *Interregional Guidelines for the Evaluation of Distance Education Program (Online Learning)* in 2006 that focus on quality in online courses and programs (Middle States Commission on Higher Education, 2011). Similarly, learning outcomes

assessment is a threshold standard for accreditation of Business Programs by the Accreditation Council for Business Schools and Programs (ACBSP) as well as graduation rates, retention rates, and enrollment (Accreditation Council, 2014).

As a result of these external forces individual community colleges continue to investigate all aspects of student experience impacting student success and retention. Because approximately 35% of all students take at least one online course and 45% of Chief Academic Officers at public institutions view online retention as problematic (Allen & Seaman, 2013), examination of the impact of course delivery method on student academic success is critical to efforts to improve student success and retention. Therefore, this study provides an additional resource for community college educators in the ongoing process of making data driven decisions about course scheduling and delivery options.

Definitions of Terms

For the purpose of this study the following terms have been defined to provide clarity and ease of understanding.

1. *Blended course delivery*: Online and traditional methods are combined to create blended courses. In blended courses 30%-79% of the content is online and replaces a portion of the required time in a physical classroom (Allen & Seaman, 2014).
2. *Competency based instruction*: In competency based instruction college degrees are awarded based on competencies completed instead of credit hours completed (Klein-Collins & Baylor, 2013).
3. *Completion rate*: Percentage of students who officially withdraw from the course receiving a grade of W on their transcript as compared to the students who stay enrolled in the course to the end of the term. This is sometimes called *retention rate*.

4. *Course management system*: Computer program that allows students to engage online by providing various levels of student interaction with instructional material, their instructor, and classmates. This system is sometimes called a learning management system.
5. *Data Mining*: This is a process that involves finding specific hidden information in large amounts of data (Ahmed, Ahmed, & McKay, 2015).
6. *Flipped Learning*: In flipped learning teachers post their lectures and other resource material online and use class time to work collaboratively thorough applications of the concepts that have been presented. In a flipped classroom the time in the classroom is spent in more active learning processes and passive presentation of material is done online. It differs from blended learning in that it usually does not require the student to be physically present in the classroom fewer hours (Flipped Learning Network, 2014).
7. *Distance education*: Education using one or more technologies to deliver instruction to students who are not physically present with the instructor (National Center for Education Statistics, 2015).
8. *MOOCs*: This acronym stands for Massive Online Open Courses. These type courses are available online usually without any fees to a large number of people. They normally differ from typical online courses in that the participants do not have to be registered students, do not usually pay a fee, and do not normally receive credit. However, in some instances students can receive credit for the course by registering and paying fees. But the majority of MOOC participants are just participants not students receiving credit (Allen, Seaman, Hill, & Poulin, 2015).
9. *Online course delivery*: At least 80% of content is online and typically there are no face-to-face meetings in online courses (Allen & Seaman, 2014).

10. *Open access*: An open admission policy in which any student who applies is accepted (National Center for Education Statistics, 2015).
11. *Traditional course delivery*: In this type of course delivery little or no online components are used for instruction. The content instruction is presented orally or in writing (Allen & Seaman, 2014). Traditional course delivery is sometimes referred to as face-to-face or F2F.
12. *Web facilitated course delivery*: This is a form of traditional course delivery in which web-based technology is used to deliver between 1% and 29% of course content (Allen et al., 2015).

Delimitations, Limitations, and Assumptions

The fundamental limitation of this study is its narrow scope. The researcher compared student success and delivery method among students enrolled in a single course at a single community college over a 3-year period. Also, student academic success may have been impacted by other factors that were not involved in this study. It is assumed that the data collected from the institution's student database are valid and reliable. It is also assumed that the methodology addressed the research questions adequately. Furthermore, it is assumed that the statistical tests were appropriate and capable of detecting relationships between the variables if relationships were present. Finally, this study is limited by the usefulness of the results to community college faculty, administrators, and other stakeholders.

This study is delimited to courses developed and taught by faculty at a specific community college. Additionally, the study was delimited to students who took the INFS 1010 Computer Applications course. Further, summer school courses were excluded from the study because the computer applications course was only offered in the online format during summer terms. Therefore, the results may be generalized to computer applications courses taught at a community college

during the regular academic terms but may not be generalizable to other courses at other types of institutions.

Overview of the Study

Chapter 1 is a description of the foundation of this study through an introduction to the study topic and scope establishing a purpose statement and research questions. The first chapter also formulates the significance of the study and provides definition of terms as well as the limitations of the study. Continuing that foundational framework, Chapter 2 supplies a current review of the literature on this topic including a history of distance education, explanation of the growth of online and blended courses, comparison of course delivery methods, and projected future of distance education. Providing an explanation of the tools of the study, Chapter 3 is a description of the methodology used to conduct and analyze the student academic success research in this study. While applying the methodology in Chapter 3, Chapter 4 builds upon the foundation of Chapters 1 and 2 by presenting the findings and analysis of the study. Finally Chapter 5 provides the finishing touch of summary, findings of the research questions, conclusions, and suggestions for further research and practice.

CHAPTER 2

LITERATURE REVIEW

Introduction

The Southern Association of Schools and Colleges Commission on Colleges (SACS-COC) website describes distance education as an educational process that occurs with the majority of instruction happening when the teacher and student are not in the same physical location (Southern Association, 2012). According to the U. S. Department of Education it is the goal of accrediting agencies to ensure acceptable levels of academic quality in its member organizations (U. S. Department of Education, 2014). Accrediting agencies such as SACS-COC encourage campuses to provide objectives for academic success that lead to an effective institution. Those objectives for academic success must be reflected in all educational delivery methods including methods that are delivered all or in part at a distance such as online and blended courses. Thus, examination of impact of delivery method on academic success is a critical component of maintaining effective institutions.

This is especially true at community colleges because of the open enrollment access philosophy that encourages the academically underprepared to try college work (Oliver, 1995). Community colleges also tend to be affordable and attract a large number of working adult students. These working adults often find courses that are offered in a distance education format helpful in their efforts to balance work, family, and school responsibilities. According to 2011-2013 data analyzed by the American Association of Community Colleges (AACC) in a "Who Attends Community College" report, 46% of undergraduate students in the U.S. attend community colleges (AACC, 2015). Further, the report indicates that most community college students are nontraditional including more than half of the single parents attending college in this

country (American Association of Community Colleges, 2015). Consequently flexibility and convenience were identified as key reasons community college students chose online courses in a 2012 qualitative study at two community colleges in Virginia (Jaggars, 2014). In addition, E-learning (online, hybrid, etc.) has been described as reflecting how people learn by interacting directly with instructional materials in the 21st century (Keengwe & Onchwari, 2014, p. 888).

Furthermore, the Community College Research Center conducted large, comprehensive studies of online learning in Virginia and Washington State Community College systems between 2004 and 2008. These studies provided data to support some general accepted characteristics of online learners in community colleges. These data indicated that online learners in these systems were more likely to be women, white, age 25 or older, and caregivers of children. Also, these online learners had a significantly lower competition rate than students in traditionally delivered courses in these same institutions (Crawford & Persaud, 2013).

In light of this portrait of the typical online student, recent data revealing decreases in community college enrollments especially among women and students over the age of 24 suggest potential lower online student enrollments (Juszkiewicz, 2014). Conversely, surveys gathered and analyzed by Noel-Levitz and Smarter Services revealed that traditional aged students are less satisfied and ready for online courses than their nontraditional aged counterparts (Bryant & Adkins, 2013). This leads to the assumption that traditional students are less likely to enroll in and succeed in online or blended distance education courses. Therefore, concerns about retention and academic achievement of all types of online community college students are becoming more critical to community college educators.

Complete College Tennessee Act 2010

Another force impacting community colleges is the current drive for more Americans to earn higher education degrees or credentials. Complete College America, a national nonprofit organization organized in 2009, has led a college completion reform effort that has swept the nation. The primary focus of Complete College America is "to work with states to significantly increase the number of Americans with quality career certificates or college degrees and to close attainment gaps for traditionally underrepresented populations" (Complete College, Our Work, 2014). According to the National Conference of State Legislatures website many states are changing their funding models for higher education to reflect performance based measures instead of enrollment models (National Conference, 2014). Thus, this effort has guided education reform legislation in many states including Tennessee. The Tennessee legislature passed the Complete College Tennessee Act in 2010. This act is designed to provide:

> A comprehensive reform agenda that seeks to transform public higher education through changes in academic, fiscal and administrative policies at the state and institutional level. At the center of these reforms is the need for more Tennesseans to be better educated and trained, while also acknowledging the state's diminished fiscal capacity to support higher education.
>
> (Tennessee Higher Education Commission, Complete College TN Act of 2010, 2014)

In support of Complete College Tennessee, Governor Bill Haslam challenged Tennesseans in 2013 with a new mission called Drive to 55. This initiative indicates a drive for 55% of Tennesseans to have a college degree or higher education credential by 2025 (Drive to 55, 2014). In support of the Drive to 55 goals the Tennessee Legislature passed the Tennessee Promise Act in the spring of 2014. Tennessee Promise is a last dollar scholarship and mentoring program that offers 2 years of free tuition at Tennessee Community and Technical Colleges for Tennessee high school graduates beginning with the class of 2015. As a last dollar scholarship

this scholarship covers any tuition not paid for by federal and state financial aid (Drive to 55 Alliance, 2014). Another part of the Tennessee Promise Legislation provides funding for the Tennessee Reconnect program. Tennessee Reconnect provides last dollar scholarships to support any Tennessee adult desiring to attend a Tennessee College of Applied Technology. This scholarship is designed to assist the close to one million Tennessee adults without higher education credentials in completion of a degree or certificate (Tennessee Board of Regents, 2015).

Not only do these initiatives encourage institutions to reach out and draw in more students through a variety of course delivery methods but also to develop better methods to retain students. Thus, examination of the relationship of delivery method and retention is a critical component in developing practices to meet the demands of Complete College America and the Complete College Tennessee Act.

Further, based on data gathered by the American Association of Community Colleges fewer than half of students who enter community colleges achieve a degree within 6 years (American Association of Community Colleges, 2014). Similarly, the 6-year graduation rates in Tennessee mirror national rates at 47% across all Tennessee colleges and universities. However, those graduation rates drop dramatically to 29% at Tennessee's community colleges (Tennessee Higher Education Commission, 2014). Efforts to increase these statistics are being developed through both the American Association of Community Colleges, individual states, and individual institutions. Because virtually all public community colleges offer online and or blended courses (Allen & Seaman, 2014), a relationship between retention and course delivery method could impact Complete College American, Complete College Tennessee Act and Drive to 55 goals and objectives.

Consequently, community college administrators and faculty are being asked to make data driven decisions about all aspects of their educational programs. According to the NMC Horizon Report: 2014 Higher Education Edition, "Data driven learning and assessment, currently on the rise in universities in the developed world, will reach its maximum impact in higher education in about 2 to 3 years, but many leading institutions are moving considerably faster" (New Media Consortium; Educause, 2014, p. 6). Therefore, this review of literature was an examination of academic success compared by instructional delivery method. It also provided an exploration of relationships among demographic factors and academic success between students in traditional courses and courses that make up the current distance education—blended and online.

History of Distance Education

In the early days of distance education courses developed as distance education were often referred to as correspondence courses. Students received written instructional materials through the mail and then returned their assignments to the instructor through the mail. One of the first study-at-home correspondence education programs began in 1873 as a means of providing education for women (Nasseh, Senior Net, 1997). This process involved a written correspondence between the instructor and student for the purpose of instruction and learning. The first American university level correspondence education began in 1874 at Illinois Wesleyan University. This university offered both bachelor's and graduate level degrees by distance education (California Distance Learning Project, 2005-2011).

As new technologies were developed, distance education changed to include video and audio instructional delivery, which was considered the second generation or industrial mode of distance education (Aoki, 2012, p. 183). But the interaction with the student still primarily

involved written correspondence or telephone conversations. Although this provided instructional course delivery options, only a small percentage of educational programs and courses were offered through distance education. In 1996 an American Federation of Teachers task force report about distance education of the early 1990s stated, "too little is known about the effectiveness of distance learning" (Nasseh, A Brief History of Distance Education, 1997). Galusha (1998) described several barriers to distance learning at that time. The biggest barrier cited was the lack of faculty support due to the need for faculty to change their teaching style for distance learning. Galusha stated, "So long as college faculty feels there is a burden associated the distance education program currently in place, there will be little support for expanding distance education opportunities" (Galusha, 1998, p. 12).

Therefore, while distance education through correspondence and television and radio broadcasts met an educational need, it was not embraced by most educators and students. Also, Saba (2011) listed several issues that were cited with radio and television education such as:

- Listening to radio develops "intellectual passivity"
- Radio is a one-way means of communication
- It is hard to adjust instruction by radio to the capacity of the individual pupil
- Too many teachers have to work too many hours at too many chores. We cannot expect them to assume the labor of producing or using radio broadcasts without time allowance and without proper training
- TV seems to affect intelligence levels differently but exactly how has not been shown

(Saba, 2011, p. 12).

Also, in distance education delivered courses there was a lack of student interaction with other students through class discussion which caused a deficit in the learning experience. As a result, this lack of timely, two-way communication was considered a weakness of courses taught in a distance education format (Galusha, 1998).

Even though higher education researchers recognized the potential communications value of computing devices in the 1960s, the use of computers to solve communication issues in distance education was still decades away. Higher education researchers at the Massachusetts Institute of Technology (MIT) in collaboration with Department of Defense contractors developed the concept of computers connecting for communication through what would become known as computer networks. Researchers from the University of California in Los Angeles (UCLA) and MIT worked together on the computer networking concept. Consequently, the first experimental computer network connecting computers in Massachusetts and California became functional through the use of telephone lines in 1965. By 1969 the precursor to our current internet, Advanced Research Projects Agency Network (ARPANET) funded by the Defense Department's Advanced Research Projects agency, was operational (Gartner Inc., 2013). This network connected four host computers at higher education institutions across the United States (Internet Society, 2013).

In the mid-1980s the National Science Foundation (NSF) worked with the federal government to establish guidelines for its National Science Foundation computer network (NSFNET). NSFNET was similar to ARPANET but was created solely to support research and education. Eventually ARPANET reached the end of its usefulness and was decommissioned in 1991. In 1994 the National Research Council released a report called "Realizing the Information Future: The Internet and Beyond" (Internet Society, 2013). That report set the parameters for privatization of the internet that was accomplished with the dissolution of NSFNET in April of 1995 (Internet Society, 2013).

This development and proliferation of the internet breathed new life into distance education. Thereupon, a new distance education course delivery method was developed using

the internet to deliver course material and to provide interaction between students and more rapid feedback for distance education learners. Because many internet users referred to time spent using the internet as being "online," many community colleges and universities began using the internet to offer what was called online courses for distance education students. While interaction still primarily takes place through written expression, that interaction is facilitated within a course management system connected to the internet. Notably, the course management system is a computer program that allows students to engage online by providing various levels of student interaction with instructional material, their instructor, and classmates. For example, in an online class a student can view instructional videos, read course specific content, send and receive e-mails, participate in class discussions via an electronic discussion board, submit assignments through a dropbox procedure, read or listen to feedback from the instructor, and view grades.

Unlike its predecessor correspondence education, internet delivered course instruction, has become a popular instructional delivery method, leading to steady growth in online course enrollments. This has been particularly true at community colleges and public universities. A large part of this growth can be attributed to the Alfred P. Sloan Foundation's Anytime, Anyplace Learning program that was initiated in 1992 to provide millions of dollars in grant funds to higher education institutions, primarily community colleges and public universities. The purpose of this program was to encourage quality online learning in higher education. To begin with, public universities and community colleges received these funds because they demonstrated the most interest in offering online courses as a result of a commitment to providing access to education for any individual (Sloan Consortium, 2013).

Because of common access and quality goals, the original recipients of Sloan funding organized to share research results, institution data, and best practices resulting in the development of Sloan Consortium of Colleges and Universities (Sloan-C), a group of individual online educators and higher education institutional representatives. Early members of the informal group that became Sloan-C were University of Maryland University College and the Penn State World Campus that received some of the first Sloan grants for research and development of online learning programs. The informal organization of Sloan Foundation grantees incorporated into the formal Sloan-C nonprofit organization in 2008 (Sloan Consortium, 2013). In October of 2014 the Sloan-C organization name changed to Online Learning Consortium (OLC). According to the organization's website:

> The organization is now a non-profit, 501(c)(3) member-sustained organization. The organization's reach and impact has grown significantly since it was first conceived. We aim to extend our presence, mission, programs and service into new markets worldwide. Rebranding as the Online Learning Consortium (OLC) enables us to clearly represent and position the organization, and extend our presence, mission, programs and services into new markets worldwide" (Online Learning Consortium, Our Name Change, 2015).

OLC is considered the leading online education organization by many universities and colleges in the United States such as the University of Illinois which referred to OLC, formerly Sloan-C, on its website as "the premier association of American Colleges and Universities committed to quality in online teaching and learning" (University of Illinois Springfield, Sloan-C Resources, 2014).

As the leading online learning organization, OLC continues to support research and consistent data collection to facilitate continuous improvement and to document growth and trends in higher education online learning by partnering with Babson Survey Research Group (BSRG) to provide annual reports to track growth and changes in online education. As can be

seen in the past few years' reports, the online course delivery method is now often identified as a strategic component in higher education institutions' long-term goals. However, data from 2013 indicated that 66% (Allen & Seaman, 2014, p. 3) of higher education administrators consider online learning critical to long-term institution strategies as compared to 69% in 2012 (Allen, 2013, p. 4). This slight drop after years of steady growth in administrator's perceptions of the importance of online learning to long-term strategy initially raised some questions. However, the data reported from 2014 indicated 70.8% of academic leaders considered online learning critical (Allen et al., 2015). This percentage is similar to the 2012 report. This one year dip in administrator perceptions could have indicated administrators were evaluating new emerging methods of instruction and weighing the importance of traditional online learning practices in the long term against these new methods.

One new method of online education gaining attention is Massive Open Online Courses (MOOCs). MOOCs differ from traditional online courses in that they are large scale courses that often are more about lifelong learning than gaining a credential. These courses are open to anyone and are often offered free or at a low cost. While some are offered as credit courses, most are considered personal interest and the students or participants in the course may not be enrolled at the college or university delivering the course material. In 2013 only about 2% of higher education institutions had MOOCs and only about 9% were considering MOOCs (Allen & Seaman, 2014). These numbers increased only slightly in 2014 (Allen et al., 2015).

However, MOOCs are receiving much attention in both mainstream and educational media. MOOCs are often referred to as disruptive to the current educational systems and considered important to the future of online education. According to Yuan and Powell (2013) in a white paper for the Centre for Educational Technology and Interoperability Standards, "The

original aim of MOOCs was to open up education and provide free access to university level education for as many students as possible" (Yuan & Powell, 2013, p. 6). The two key features of MOOCs are identified as Open Access and Scalability (ability to involve large amounts of participants). These features support an open education model designed to foster life-long learning believed to be pioneered by MOOCs (Yuan & Powell, 2013).

A major educator concern about MOOCs is low completion rates. In a 2014 Columbia University report about MOOC expectations and reality, the completion rate of schools interviewed was between 3% and 15% (Hollands & Tirthali, 2014). Most community colleges are not currently developing and offering MOOCs. However, a small number of community colleges have developed developmental education MOOCs as a means of assisting students who are not college ready and who ordinarily would have to complete multiple semesters of developmental work before enrolling in credit bearing courses (Hollands & Tirthali, 2014). It remains to be seen just how disruptive this open education model will be to community college practices.

However, according to the 2014 Campus Computing Survey only 38% of respondents agreed that MOOCs were an effective online instructional delivery method. That percentage was quite a bit less than the 53% of the 2013 survey respondents who considered MOOCs an effective online instructional delivery method. Similarly, the percentage of respondents who considered MOOCs a viable method of increasing revenues declined by a third from the previous year to only 19% (Campus Computing, 2015). It is still too soon to determine the impact MOOCs will have on changing the way college credit-bearing courses will be delivered in the future.

Another method of instruction gaining popularity in the online arena is competency based instruction. In this method of instruction students advance according to their ability to demonstrate mastery of the course competencies (Educause, 2014). These courses allow students to progress according to their own time frame, and institutions award credentials based on completion of defined competencies as opposed to earning a passing grade. Degrees are awarded based on competencies completed instead of credit hours completed (Klein-Collins & Baylor, 2013, p. 1). These courses are attractive to many working people because it is possible to move to degree completion faster than in most traditional online programs.

The online competency based model has been made popular by Western Governors University (WGU). This institution was founded in 1997 by governors whose states contributed the initial funding for the university. It began as a public-private partnership for distance education students in certain Western states who had limited access to online instruction. Enrollment at WGU has mushroomed from 500 to 30,000 students since the school received regional accreditation in 2003. WGU students are predominantly nontraditional aged students with many representing underserved populations such as low income, minority, and first generation college students. Currently WGU is the only regionally and nationally accredited institution awarding competency based degrees in all states in this country (Oblinger, 2012).

Due to the attention gained by the growth of WGU, some state universities, such as Central Washington University, are implementing competency based programs (Krause Dias, & Schedler, 2015). These programs require existing course learning outcomes to be translated into competency measures that lend themselves to an online, self-paced, project-based courses (Krause et al., 2015). Competency based online learning adds a whole new dimension and subgroup of online course delivery. Questions about quality and college credit awards add a new

layer to the online delivery method quality versus traditional delivery method quality debate. (Krause et al., 2015).

At this time none of the newer online methods are prevalent in community colleges. So, while there are changes on the horizon, this study was focused on evaluation of student academic success in methods that are most commonly used in community colleges at this point in time.

While online instruction is still thought of as distance education, students in online classes are no longer necessarily only those who live a distance from the learning institution. As indicated in the 2013 book *Online Learner Competencies: Knowledge, Skills, and Attitudes for Successful Learning in Online Settings*, distance learning is no longer used only by those who cannot physically attend classes. Online learning is often a choice of students seeking an alternative to traditional classes for a variety of reasons beyond distance and time limitations (Beaudoin, Kurtz, Jung, Suzuki, & Grabowski, 2013).

Online courses, as well as blended courses, provide flexible scheduling options for students who are juggling various priorities in life, students who have time conflicts with other courses, and students who travel during the school term. This flexibility has been especially well received by community college students. In an effort to maintain data, ensure quality, and identify trends, OLC in cooperation with Babson Survey Research Group (BSRG) has sponsored an annual compilation of research and data comparing the different course delivery methods for more than 10 years. Beginning with the 2015 report of 2014 data, BSRG transitioned to joining its survey data with enrollment and other data collected from the Integrated Postsecondary Education Data System (IPEDS) (Allen et al., 2015).

Joining BSRG survey results with the data from IPEDS provided a single set of enrollment counts and lessened the institutional reporting. According to the report IPEDS

Commentary, "Two great advantages to including distance education categories in IPEDS are: census collection and data tied to the full set of institutional data already reported to the National Center for Education Statistics" (Allen et al., 2015, p. 42). This reporting will now allow the BSRG to provide analysis of online learning based on individual state and institutional information based on officially tracked data as opposed to individual institutions' self-reported information (Allen et al., 2015).

Throughout the years of BSRG reports some common definitions for the different course delivery methods have been identified. Online courses are defined as courses in which at least 80% of the course content is delivered online. Blended courses are defined as courses in which 30%-79% of course content is delivered online (Allen, 2013, p. 7). Blended courses are further defined in the *The Handbook of Blended Learning* (2006) as a combination of face-to-face instruction with computer-mediated instruction (Bonk & Graham, 2006, p. 5). Blended courses are not to be confused with web facilitated courses. In the 2014 BSRG report this new term was added to the course types section. A web facilitated course is a "course that uses web-based technology to facilitate what is essentially a face-to-face course" (Allen et al., 2015, p. 7). In web facilitated courses 1% to 29% of the content is delivered online. However, these courses are still traditionally scheduled without a reduction in the amount of time a student is required to be physically present in a classroom. In blended courses the amount of time a student is required to be physically present is reduced in some way. For the purpose of this study web facilitated courses will not be differentiated from traditionally delivered courses.

Growth of Online and Blended Courses

Academic achievement in online and blended distance education has been under scrutiny by many agencies, organizations, institutions, and instructors as it has increased in popularity

through the use of internet technology. According to data gathered annually by the BSRG at the request of OLC (2014), online enrollment as a percentage of total enrollments in American colleges has grown steadily from 9.6% in Fall 2002 to 33.5% in Fall 2012 (Allen & Seaman, 2014). That same data source indicated that most public institutions were offering online courses 10 years ago, but were not necessarily offering fully online programs. By 2012 most public institutions were offering fully online programs. This online programs statistic implies an increase in the number of online courses offered at public institutions over the past decade. Private nonprofit institutions were slower to offer online courses but have doubled their percentages of online offerings through the same time period (Allen & Seaman, 2014).

Statistics outlining the growth of online courses and programs abound. However, statistics for growth of blended courses are often lost somewhere among general online or distance education statistics. The Commission on Regulation of Post-Secondary Distance Education refers to blended learning as an experiment and innovation at many institutions. This report also recommends that regional accrediting agencies regularly revise distance learning standards based on innovations such as blended learning (Commission on Regulation, 2013, p. 23).

However a few institutions such as The University of Central Florida (UCF), have been offering courses in a blended format for many years. Researchers, Dziuban et al. (2004) from UCF defined blended learning as, "courses that combine face-to-face classroom instruction with online learning and reduced classroom contact hours (reduced seat time)" (Dziuban et al. 2004, p. 2). These researchers stated an important distinction between traditional web-enhanced courses and blended courses was the reduced time students are physically present. This reduced time in the physical classroom allows students, faculty, and administration the benefits of online

instruction while retaining some face-to-face interaction that can be difficult to emulate online (Dziuban et al., 2004).

Brigham Young researcher Charles Graham (2013) referred to blended learning as undeveloped in research as compared to other instructional delivery methods and contends that the differences and issues are still being defined (Graham, Emerging practice and research in blended learning, 2013, p. 11). A previous work by Graham and Bonk outlined the three primary reasons for the growth of blended instruction as improved pedagogy, increased access and flexibility, and increased cost-effectiveness (Bonk & Graham, 2006). Another researcher, Sarah Nielsen (2008) of Devry University, contented that blended learning courses are becoming more popular because of drawbacks of online courses. She cited high online dropout rates, concerns about online course credibility, and lack of class instructor and student interaction as problems in online courses that are solved by the blended method (Nielsen, 2008, p. 105).

A new form of blended learning called "flipped learning" is emerging. While flipped learning is a form of blended learning it involves specific practices that make it distinctive. The Flipped Learning Network official definition of Flipped Learning is as follows:

> Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter. (Flipped Learning Network, Definition of Flipped Learning, 2014)

Basically flipped learning involves teachers posting their lectures and other resource material online and using class time to work collaboratively thorough applications of the concepts that have been presented. In a flipped classroom the time in the classroom is spent in more active learning processes and passive presentation of material is done online. It is

considered a redistribution of learning time and is currently more prominent in K-12 classrooms than college courses. In the past the practical applications of concepts presented in the classroom was done at home in the form of homework. Now the presentation on concepts is done at home through the viewing of content materials so that the practical applications can be done in the classroom with teacher assistance (Horn, 2013).

So while flipped learning is definitely a form of blended learning it may or may not involve reduced time in the classroom indicated in the typical blended learning definition. For the purpose of this review of literature flipped course data were not included because this method is not used as often in college courses. Also, flipped courses generally are not a type of distance education because they seldom involve a reduction of time required physically present in the classroom. As Potts (2010) related in a discussion of blended engineering courses, a considerable amount of time and learning assessment must happen outside the classroom in exchange for classroom time for a course to be considered blended (Potts, 2010).

Historically distance educators have battled the difficulties of maintaining academic rigor and quality while providing students with the opportunity to achieve their educational dreams without the benefit of physical presence in classrooms. The growth of the internet provided the technological mechanism to improve many of the previous drawbacks of distance education. However, concerns about educational quality still exist. These concerns have led to the development of the blended method of instruction characterized as a variation of online distance learning bringing together the elements of traditional classroom environment and modern online course delivery to provide the potential best-of-both-worlds (Snart, 2010, p. xi).

Comparisons of Delivery Methods

As has been noted, growth of online and blended course instructional methods have brought many persistent questions about quality of instruction and student learning. In his book *The Theory and Practice of Online Learning* Anderson (2008) lists many concerns identified by educators relating to online learning. Those concerns include quality issues, technical issues, privacy policies, and cultural practices as well as educational philosophical impacts of online education (Anderson, 2008).

Online and Traditional Studies

OLC annual surveys have reported chief academic officers' perceptions of learning outcomes comparisons between traditional and online since 2003. The 2003 data indicated that 42.8% of chief academic officers considered outcomes in online to be inferior to their face-to-face counterparts. That percentage has had some fluctuation over the years but has maintained a downward trend. The 2013 data indicated that only 26% of chief academic officers now consider online inferior to face-to-face instruction (Allen & Seaman, 2014).

However, these data may not fully represent administrator attitudes in some regions of the country. North Carolina researcher Jorge Gartan (2009) found administrators in his state appear to support online learning primarily because of the benefits it provided to enrollments. In his qualitative study he interviewed one academic administrator and one online instruction administrator at eight institutions chosen randomly from a list of public higher education institutions in his state. The majority of the administrators (88%) indicated they were in favor of online instruction. However, all of the interviewed administrators indicated that they considered online quality to be inferior to face-to-face instruction (Gartan, 2009, p. 66).

Similarly, there are mixed reports of administrator perceptions of quality but also this survey of research literature yielded mixed results when comparing studies of student learning outcomes in online courses to traditional courses. Some large meta-analyses indicated no significant differences or slightly higher academic achievement in online courses (Means et al., 2010). But as researchers Xu and Jaggars (2013) indicated the overall research results are divided between studies showing positive results, indicating students in online courses are more likely to be academically successful than traditional courses, and negative results, indicating students are not as academically successful in online courses as traditional courses (Xu & Jaggars, 2013).

Positive online instruction results were presented in a report prepared for the United States Department of Education in 2010. This meta-analysis of data taken from studies conducted between 1996 and 2008 indicated slightly better academic performance of students in online courses. Analysis also included studies of courses taught in a blended method or with blended elements. However, this meta-analysis included online, blended, and a very limited number of K-12 studies analyzed together. So, it did not segregate or identify differences between the different types of studies (Means et al., 2010).

Likewise, researchers from two California universities examined 20 years of research studies in academic performance differences that compared students in traditional and distance education courses. These researchers Shachar and Neumann (2010) conducted a meta-analysis indicating academic performance of students in online courses was better than students in traditionally delivered courses. This meta-analysis compared 125 experimental and quasi-experimental studies conducted within a 20-year time frame. These studies included academic records for over 20,000 students. The analysis was broken down into four subperiods within the

20 years. The studies within the analysis compared the differences in academic performance between students enrolled in traditional and online courses as demonstrated by final course grades (Shachar & Neumann, 2010).

Results such as those previously cited most likely caused Carrol and Burke (2010), researchers at Dominican University, to hypothesize that students taught online had a higher level of achievement than students taught in a face-to-face setting. They conducted a study with a graduate organizational theory course to test their hypothesis. This course was offered in both online and face-to-face sections. However, the results of that study indicated no significant difference in achievement of student learning outcomes regardless of delivery method (Carrol & Burke, 2010, pp. 67-68). While their study cannot be viewed as supporting their hypothesis that online students have higher academic achievement, it does support alternate delivery methods in that it did not yield a negative result.

Correspondingly, researchers Ashby, Sadera, and McNary noted that results from many studies indicating no significant difference in student success based on learning environment led to their desire to examine student success at a community college (Ashby et al., 2011). Their research analyzed persistence and academic achievement in traditional, online, and blended sections of a community college developmental algebra course. Their findings indicated significant differences in both student achievement and persistence. Students in blended sections demonstrated the least overall academic success in this study. However, when data were adjusted for attrition face-to-face students demonstrated lowest academic achievement. With regard to completion the researchers stated, "The completion rates for this sample were significantly different, with 93% of the face-to-face students completing the course compared to 70% of the blended students and 76% of the online students" (Ashby et al., 2011, p. 138).

Likewise, student performance and retention were the focus of a study of a community college biology course taught both in online and traditional formats. While the researchers found no significant differences in final exam performance between students in the two delivery modes, the findings indicated that the online students were significantly less likely to complete their course. This study involved 105 community college students enrolled in either an online or traditional section of the same course at the same institution with the same instructor. The instructor used identical exams and assignments for each section of the course (Wolff, Wood-Kustanowitz, & Ashkenazi, 2014).

Coorespondingly, Fish and Kang (2014) found no significant differences in performance on learning outcomes between students in online and traditional sections of a general education stress management course at a large university on the West Coast. Just over a hundred students were enrolled in the two sections of this course. The students were almost evenly distributed between the two sections and were taught by the same instructor with same course requirements and exams. This study also examined demographic factors such as age and race and no effect was found based on demographics on any of the learning outcomes studied (Fish & Kang, 2014).

Similarly, a report from Lane Community College (2010) in Eugene, Oregon observed no major differences in completion and success rates among online, blended, and traditional courses. The officials at Lane defined completion rate as the rate at which students who were enrolled in the course on the second week and remained enrolled to the end of the term. Similarly, the definition for success rates were the rate at which students who were enrolled in the second week of the term attained a passing grade at the end of term. Completion rates for students in online and blended courses were consistently slightly less than those in traditional sections. The gap over the 4-year period studied was never more than 5% and only 1% in the

final year of the study. Success rates were virtually the same in all delivery methods during the four year period (Brau et al., 2010).

However, differences were found in student course success rates in community colleges in California according to a report published by the Public Policy Institute of California. The report presented research that examined data from all of California's community colleges from 2006 through 2012. The focus of the analysis was a cohort of students who enrolled in California Community Colleges in the fall of 2006 and were tracked through the next 6 years. This analysis of data indicated course success rates in online courses were lower than the traditional counterparts. The study defined the difference between success rates in online and traditional courses as the online performance gap. Further analysis of the data showed that gap to be larger for certain populations or subgroups. The largest gaps were found in Latino and African American populations (Johnson & Mejia, 2014).

Conversely, in spite of the negatives the study showed positive long-term outcomes. These positives were demonstrated in positive relationship between the number of online courses a student took and completion of an associate's degree or transfer to 4-year institution. So, basically the more online courses students took the greater the likelihood of completion of a degree or transfer for continued education (Johnson & Mejia, 2014).

In contrast, a study in at a Georgia University, found no significant differences in a number of precourse and postcourse variables among students in an online and traditional psychology course. However, online students in this study achieved significantly lower grade point averages, failed to turn in more assignments, and earned lower final course grades (Helms, 2014).

Similarly, overall student persistence and academic performance rates were higher in traditional face-to-face courses in comparison to online courses in a large study conducted in Washington State for the Community College Research Center by researchers Xu and Jaggars (2013). The dataset in this study included 40,000 first-time community and technical college students who were tracked through all the courses in their program of study. This study is unique in that it tracks students through all their courses as opposed to identifying student performance in specific courses (Xu & Jaggars, 2013, p. 20).

Another large archival study provided mixed conclusions regarding student persistence and academic performance. Texas researchers Atchley, Wingenbach, and Akers (2013) conducted this study at a small southwestern university using archival data from a 4-year period. The study examined completion and academic performance across disciplines and by course discipline between online and traditional courses. Results from this study indicated significant differences in both academic performance and completion. Students enrolled in online courses tended to earn higher grades than students enrolled in traditional classes. However, students enrolled in traditional classes tended to have higher completion rates than the online students. There were also significant differences in completion rates between online and traditional students among different course disciplines indicating that some disciplines may be more difficult to master online (Atchley et al., 2013, pp. 110-111).

As an illustration of difficult to master courses, a researcher at a community college in Tennessee, Garman (2010), conducted a comparison study of a course discipline that is often labeled as difficult for online delivery. Her study was completed using archival data from online and face-to-face sections of community college biology courses developed and taught by the same instructors over a 4-year period of time. The study measured success by average lecture

grade, average lab grade, and final course grade. It further analyzed success according to gender, age, and major. Overall findings indicated that students tended to be more successful in traditionally taught biology courses. However, the findings also indicated that traditional age students were more successful than nontraditional age in online courses (Garman, 2012, pp. 72-75).

In contrast, older students in a Creighton University qualitative study related a stronger preference for online learning asynchronous experiences than their younger classmates. The younger students preferred a more interactive synchronous experience while acknowledging that experience could be using online technology that would allow the students to interact live with other students and professor. The older students preferred the asynchronous lectures that allowed them to stop and take notes or replay to gain deeper comprehension (Simonds & Brock, 2014).

Additionally, Urtel (2008), a Purdue University researcher, found a relationship between demographics and student success. His study included 385 students in an undergraduate course divided between traditional and online sections. Analysis included the use of demographic data. Course evaluations and instructor evaluations were also used as measures in this study. There were significant differences in academic success between students in traditional and online sections. Students in traditionally delivered sections in this study tended to have higher grades. This was particularly true for freshmen students. Freshman final grades were equal to the overall final grades in traditional delivery but significantly lower than all other levels in online delivered sections (Urtel, 2008, pp. 322-330).

Also, researchers Wagoner, Garippo, and Lovaas (2011) determined demographics were a factor in student online success in a longitudinal study of a business applications (software)

course. This course was taught by the same professor using the same course materials and objectives over a 10 year period in online and traditional formats. While no significant difference was identified among delivery formats in general, a gender effect was observed. The data indicated that males in traditionally delivered sections were more successful than those enrolled in online sections (Wagner, Garippo, & Lovaas, 2011).

Further, gender differences were prevalent in a 3-year study at Open University, a distance learning and research university in England. During the years analyzed more women enrolled in online courses than men. No significant differences in completion rates were noted between students in online and traditional versions of the same course and no difference in completion rates between men and women in the traditional course. However, there were differences in completion rates and pass rates between men and women in online courses. According to the results in this study, women in online courses not only were more likely to complete than men in online courses but also were twice as likely to pass the course (Price, 2006).

Similarly, demographics were the focus of a study conducted by Emporia State University researchers Colorado and Eberle (2010). Their study examined the impact of demographic characteristics on graduate student success in online courses. Demographic characteristics considered were age, enrollment status, working status, GPA, number of past degrees, and time since completion of last degree. Students also completed a motivational orientation survey instrument. Those results were correlated with other data to form conclusions and suggest changes. The results of this study indicated no significant differences in academic performance based on the demographic characteristics studied. Findings indicated some relationships between demographic characteristics and self-regulated learning characteristics

(goal setting, time management, etc.) that were identified by the motivational survey instrument (Colorado & Eberle, 2010, pp. 7-9).

Conversely, researchers Castle and McGuire (2010) took a different approach in their study of impact of delivery method on undergraduate and graduate student learning at National University in San Diego, California. Most studies have examined grades, completion rates, and impact of demographic factors. The researchers at National University asked students to complete a self-assessment of learning. The results of the assessments indicated that most undergraduate and graduate students felt the traditional instructional delivery method was the most effective learning environment. However, when distinguishing preference between blended and online, undergraduate students tended to prefer the blended method of instruction. On the other hand, graduate students tended to prefer online delivery method over blended instruction (Castle & McGuire, 2010, pp. 37-38).

Similarly, student perceptions of instruction were also the basis for comparison of effectiveness of an online and traditionally delivered management course studied by Florida researchers Tesone and Ricci (2008). They conducted a 4-year study of senior-level hospitality management students at a large public university. The students surveyed were all enrolled in either a traditionally delivered or online management course taught by a single instructor. The data from the study indicated no significant differences in perception of quality of instruction between the online and traditional students (Tesone & Ricci, 2008, p. 321).

Online and Blended Studies

Canadian researcher Ibrahim Aly (2013) conducted a study to compare student performance in online and blended sections. Aly used a quasi-experimental design in his study

of student performance in an introductory management accounting class taught by the same instructor in both online and blended formats in the same semester. He found no significant difference in student academic performance for the two formats. While statistical analysis of student performance did not include data from traditional sections of the course taught in the previous semester, Aly did offer comparisons in completion rates among the three delivery methods. The blended section achieved a 90% retension rate which was 15% higher than the retention rate for the traditional section taught the previous semester. The retension rate for the online section was equal to the traditional section, thus also lower than the blended section. So while there were no statistical differences in student success as measured by course grades between the methods of course delivery their were differences in retention (Aly, 2013).

Comparison of academic peformance between online and blended course sections was the focus of a study by Chinese researcher Ge (2012). In this study Ge compared student final scores in a completely asychronous online English course at a University in Bejing with students taking the same course with blended delivery that included some synchronous video conference classes with the instructor. Both groups were provided the same online lectures, materials, and assignments. The only difference between the two groups was that one attended videoconference classes that provided real-time interaction with the instructor and other students. The students in the blended course scored significantly higher on the final course evaluations. This result supported Ge's statement that the blended appoach can bring a better outcome and his belief that the blended approach is the best approach for Chinese working adults to learn the English language (Ge, 2012).

Future of Distance Education

The International Association for Distance Learning has predicted several areas in which distance learning must evolve to meet the needs of students in a changing, more technical world. Among those areas are more time-flexible learning environments that are independent of geography such as asynchronous online learning. Also identified as future needs are more learner centered classes that incorporate new media and computer applications which deemphasize the lecture teaching style (International Association for Distance Learning, 2014).

Additionally, in a 2012 survey by Pew Research and Elon University 60% of respondents believed that higher education in 2020 will be vastly different. Among the differences cited were mass adoption of distance learning and teleconferencing as well as a transition to blended classes that require less time in-person on campus (Pew Research Center; Elon University, 2012).

Another factor in the growth of online and blended higher education courses is the expectations of younger students who have been using digital tools to learn throughout their K-12 educational experience. According to a 2014 report 75% of high school students surveyed already access class information through an online portal and more than 50% of high school students take tests online (Project Tomorrow, 2014). This comfort with using technology to learn will carry forward as this generation of students move into higher education thus creating a demand for more technology driven instruction.

In addition to comfort with using technology in general, the prolific use of mobile devices has led to an increasing emphasis on mobile learning or m-learning (Molina, Redondo, Lacave, & Ortega, 2014). M-learning can encompass more than just online and blended learning environments. Mobile technology is also being used in connection with the technology in Smart

classrooms to assist faculty members with student class interaction through online survey polls and other online applications. Mobile applications for students with physical and learning disabilities already abound and are used to assist those students with interaction in their learning environment in both traditional and online classrooms (Abachi & Muhammad, 2014). Despite rapid growth of the use of mobile devices, mobile learning adaptations have not kept pace (Alrasheedi & Capretz, 2015). While many students are already accessing online materials on their mobile devices, in the future educators will be giving more attention to the design of online learning environments in an effort to make them more accessible for the m-learner. A 2014 Campus Computing survey indicated that 70% of the surveyed institutions' CIOs and IT senior managers indicated that implementing and supporting mobile technology was a top institutional priority for the next 3 years (Campus Computing, 2015).

In the near future in addition to using new technologies to enhance the learning environment many faculty members will be learning to use technology tools to better analyze, document, and assess how students are learning. Data mining, which involves drawing out hidden information from large amounts of data, has been used in business and industry to make predictions about customer behavior for many years. Educational data mining is considered an emerging discipline that involves developing ways to analyze data from educational settings to better understand students and the way they learn (Ahmed et al., 2015). This analysis will guide faculty members in how to best build their curriculum in ways that will improve student learning. Tools are becoming available in many schools to allow faculty to analyze and adjust teaching methods in real time. Course management systems such as Brightspace by Desire2Learn (D2L) are now offering advanced analytical tools through the Insights add-in program to help faculty

better measure, guide, and evaluate student performance as well as predict student behavior (Desire2Learn, 2015).

Through the use of data mining tools faculty members can develop stronger learning assessments that better document student learning. According to a 2014 report by the National Institute for Learning Outcomes Assessment, student learning assessment has moved higher on institutional agendas in all accrediting regions (Gannon-Slater, Ikenberry, Jankowski, & Kuh, 2014). That same report included data from a 2013 survey of top administrators across all accrediting regions. From this survey a list of priorities for advancing institutional assessment work was gathered by region. Increased faculty and staff development for the purpose of furthering faculty use of assessment results was at the top of that list for every region. Other priorities included better technologies and analytics (Gannon-Slater et al., 2014).

Increased emphasis on assessment and documentation of student learning further challenges educators to continue to create online and blended learning environments that have the same rigor, educational quality, and learning outcomes of their traditional counterparts. At the same time attention must be given to the impact of the teaching method on student persistence and retention.

Conclusion

Finally, the conclusions surmised from this review of literature comparing student success among traditional and online delivery methods indicated mixed student success results in all types of measures. Equally important in review of the literature was the limited number of studies to evaluate the blended course delivery method. While several books have been written

about this method, specific study results are fewer than results comparing online and traditional methods of delivery.

Consequently, the literature revealed few major studies comparing blended with online or traditional learning in America. Blended learning appears to have gained popularity in some other countries because of expected cost reductions it could bring for government supported higher education (Liyanagunawardena, Adams, Rassool, & Williams, 2014). However, in this country reasons for growth of blended method seem to relate to quality concerns (Snart, 2010, p. xi), better use of learning tools (Ehrmann & Dinneen, 2012, p. 50), and learning style differences of Millennial students (Potts, 2010, p. 14).

Therefore, community colleges administrators and faculty in America are increasingly making the assumption that the blended method will provide the best blend of instructional course delivery. Likewise, blended courses at community colleges are now considered the answer to completion and academic success concerns related to courses that are taught completely online. More community college research comparing traditional, online, and blended course delivery is needed to guide community college educators in course delivery decisions.

In summary, this literature review provided no clear answers regarding method of course instruction at community colleges or even if the primary course delivery methods are equal in terms of providing students with an opportunity to be successful. This review raises concerns for community college educators in light of lingering questions about the ability of many community college students to be successful in alternate course delivery methods.

In addressing these type questions, Borden (2011) listed some key factors important to how higher education institutions should implement and improve on online learning. The factors presented were: accountability and transparency, course and content quality, role of instructor,

and collaboration and multi-modal content delivery (Borden, 2011). These same factors impact blended learning as well.

Therefore, further study that is more focused and narrowed to community college students would be beneficial in the community college decision-making processes. Thus, this researcher explored questions about student academic success in a computer applications course among three different instructional course delivery methods—traditional, online, and blended.

CHAPTER 3

RESEARCH METHOD

This study was a comparison of course grades of students in a computer applications course that was delivered in three different modalities. The purpose of this study was to compare academic success based on methods of course delivery for students in a computer applications course at an East Tennessee Community College. Additionally, the researcher examined demographic relationships of age, gender, and race to student academic performance in the different delivery methods. The independent variable, course delivery method, was generally defined as traditional, online, or blended. The dependent variable academic success is generally defined as final course grade. A student was considered an academically successful completer of the course by attaining a final course grade of A, B, C, or D. It should be noted that if a student is transferring to another institution, the receiving institution may or may not accept the course credit for a student who received a D grade in this course. However, at the studied institution students receiving final course grades of A, B, C, or D in INFS 1010 are considered successful course completers.

Research Questions

This study analyzed academic and demographic data of students enrolled in traditional sections, online sections, and blended sections of a computer applications course offered in an East Tennessee community college during a 3-year period. The study was focused on the following research questions and null hypotheses.

1. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course among the three delivery methods (traditional, online, and blended)?

   Ho1: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course among the three delivery methods (traditional, online, and blended).

2. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between males and females?

   Ho2: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between males and females.

3. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between males and females?

   Ho3: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between males and females.

4. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between males and females?

Ho4: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between males and females.

5. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between traditional aged (24 and under) and nontraditional aged (25 and older) students?

   Ho5: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between traditional aged (24 and under) and nontraditional aged (25 and older) students.

6. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between traditional aged (24 and under) and nontraditional aged (25 and older) students?

   Ho6: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between traditional aged (24 and under) and nontraditional aged (25 and older) students.

7. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between traditional aged (24 and under) and nontraditional aged (25 and older) students?

Ho7: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between traditional aged (24 and under) and nontraditional aged (25 and older) students.

8. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods among White, African American, and other race students?

   Ho8: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods among White, African American, other race students.

9. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods among White, African American, and other race students?

   Ho9: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods among White, African American, and other race students.

10. Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods among White, African American, and other race students?

Ho10: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods among White, African American, and other race students.

Instrumentation

The researcher applied comparative design to determine correlations between methods of course delivery and academic success. The comparative nonexperimental design had no intervention and was appropriate for investigating the differences identified in the research questions. In this study secondary data was employed to describe what had occurred and to compare achievement among the course delivery methods to examine relationships and trends (McMillan & Schumacher, 2010). Additionally, the researcher practiced a post positivist approach employing cause and effect thinking applied to statistically analyzed data (Creswell, 2003, p. 18).

According to Bernard (2004) "While, for example, qualitative research may serve to explore possible underlying mechanisms and serve to probe possible new distance education applications, comparative studies with quantifiable outcomes serve best to answer questions about what works, with whom, when, and in what contexts" (p.177). Further, as stated by Corner, "quantitative research design focuses on confirming hypotheses and thus make use of inferential statistics. Inferential statistics involves computing a statistic, such as a correlation coefficient, that is used to represent a hypothesized relationship between theoretical constructs." (2002, p. 676). Because the questions of this study focused on which instructional delivery methods lead to academic success as well as determining relationships between variables a quantitative method was appropriate.

Populations and Sampling Method

The population for this study was limited to students enrolled in computer applications courses at Cleveland State Community College (CSCC) during the 2011-12, 2012-13, and 2013-14 academic years. CSCC is located in Cleveland, Tennessee and serves five southeast Tennessee counties (Bradley, Meigs, McMinn, Monroe, and Polk). The CSCC student population is approximately 3,500 with a mix of full-time and part-time students (Cleveland State Community College, 2014). As one of 46 institutions that make up the Tennessee Board of Regents (TBR) system, CSCC offers a variety of transfer, career, and certificate programs designed to meet the needs of students within the five counties it serves (Tennessee Board of Regents, 2014).

While the majority of the students included in this study were enrolled in Associate of Applied Science, Associate of Science, and certificate programs, a small number of students enrolled in the examined course as nondegree seeking for personal interest. This course was chosen for analysis because it has been taught in all three delivery methods every fall and spring semester for the 3-year period.

Data Sources

The source of data for this study was student academic and demographic records from the CSCC Banner student information system. No individual identifying student information was accessed for this study. The Banner system was used by the college to process, archive, and analyze the official academic and demographic records of all current students and graduates during the years studied. This information system contained all the dependent and independent variables involved in this study. In addition to the Banner system, the conventions of the CSCC

2013-14 Fact Book provided classifications and parameters for the gender, age, and race categories identified in this study (Cleveland State Community College, 2014).

Two primary responsibilities of this researcher were student confidentiality and security of the data. According to McMillan and Schumacher, "Confidentiality is ensured by making certain that the data cannot be linked to individual subjects by name" (McMillan & Schumacher, 2010, p. 122). The data in this study were extracted from the Banner system without student names or any identification data. Confidentiality was also maintained by data analysis that provided group results instead of individual results. Data were saved on the researcher's CSCC institution issued password protected computer to provide security of the data.

Data Collection

Existing data gathered from the Cleveland State Community College Banner student information system were used to conduct this study. Permission to study the data was obtained from the East Tennessee State University Institutional Review Board and the president of Cleveland State Community College (CSCC). No identifying information for any student was included in the data for the analysis. The data included all students enrolled in the selected class in both fall and spring semesters during the years studied.

Data Analysis

The data were extracted from Cleveland State Community College Banner student information system by CSCC Information Technology Department personnel. They were then sent to the researcher in a text file with a computer generated file numbering system to avoid transmission of any personally identifiable data. The file was loaded to the researcher's institution issued computer, converted to an Excel file, then imported and analyzed using the Statistical Package for Social Sciences (SPSS). All reported findings were based on .05 level of

significance (alpha) to provide a significant level of reliability for the analysis. Pairwise comparisons significance levels were determined using the Bonferroni method. As stated by Teo, "The reliability of a test is an index of how consistently a test measures whatever it is supposed to measure (i.e., the construct). It is an integral part of the validity of the test" (2013, p. 22).

The research questions in this study were addressed through data analysis with Chi-Square testing procedures. Ho1 was analyzed using Chi-Square 2-way contingency table analysis and addressed the overall final course grade relationships among three course delivery methods.

Ho2-Ho10 targeted demographics and academic success as defined by final course grade. Hence, Chi-Square 2-way contingency table analysis testing was used to identify the proportion of individuals in each specified demographic category in comparison to the hypothesized values (Green & Salkind, 2011). Detailed description and results of each statistical procedure including cross tabulation tables are discussed in Chapter 4.

CHAPTER 4

FINDINGS

Introduction

The purpose of this study was to compare academic success based on methods of course delivery for students in a computer applications course at an East Tennessee Community College. Additionally, the researcher examined demographic relationships of age, gender, and race to student academic performance in the different delivery methods. The researcher used final course grades as a determinant of academic success. A demographic overview of both the institution and population studied as well as data analyses are presented in this chapter. The research questions presented in Chapter 3 were used to guide the study.

Demographics

Institution Demographic Profiles

The demographic profiles of the population studied are similar to the demographics of the institution. See Tables 1, 2, and 3 below for institution wide demographic student profiles for the years studied from the CSCC Fact Book (Cleveland State Community College, 2014, p. 3).

Table 1

Institution Student Race Profile Fall Terms 2011-2013

Race	Fall 2011	Fall 2012	Fall 2013
African American	241	230	244
White	3,297	3,068	3,191
Other Races	276	342	355

Table 2

Institution Student Age Profile Fall Terms 2011-2013

Age	Fall 2011	Fall 2012	Fall 2013
Under 18	470	498	729
18-24	1,853	1,837	1,864
25-29	458	379	347
30-34	319	289	235
35-39	253	225	212
40-44	182	169	157
45-49	141	126	126
50 & over	138	117	120
Average Age	25.8	25.2	23.6

Table 3

Institution Student Gender Profile Fall Terms 2011-2013

Gender	Fall 2011	Fall 2012	Fall 2013
Male	1,459	1,373	1,511
Female	2,355	2,267	2,279

Population Demographic Profiles

The demographics for the population of the students in this study were similar to the overall institution's demographics. For example, during the studied years the majority of the students (85%) at this institution were White and the majority of the students in this population were White as well (84%). The average student age over the studied years for the institution was

25.2 and the average student age in the study population was 26.1. Additionally, the majority of the participants in the study and the population studied were traditional aged. Sixty-three percent of the students in the study were considered traditional aged students (age 24 or younger). Thirty-seven percent were nontraditional aged students (age 25 and older). This compares closely with the institutional percentages during the studied years of 64% traditional aged and 36% nontraditional aged. Similarly, approximately 59% of the studied population was female compared to approximately 61% for the institution population during the studied years. Therefore the demographics of the studied group were reflective of the demographics of the institution as a whole.

Characteristics of the Data

This data set consisted of 1,177 student records. Of those students, the majority (626) were enrolled in blended sections of the course. These students were expected to spend at least 1 hour less per week physically in a classroom with an instructor than the 324 students enrolled in traditionally delivered sections. Therefore, a larger portion of the coursework was completed outside of the classroom. The remaining 227 were enrolled in a completely online format of the course in which all coursework was completed online without requirement of physical meetings with the instructor. See Figure 1 below for a visual representation of percentage of students by delivery method.

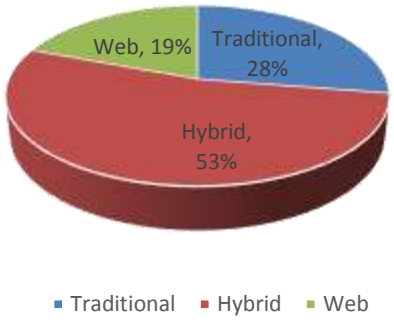

Figure 1. Percentage of Students by Delivery Method

Sixty-nine percent of the students in this study successfully completed the course based on final course grades of A, B, C, or D. Students receiving final course grades of F or W are required to repeat the course to receive credit at this institution. It should be noted that if a student is transferring to another institution, the receiving institution may or may not accept a course for a student who received a D grade in this course. However, at the studied institution students receiving final course grades of A, B, C, or D in INFS 1010 are considered successful course completers. See Figure 2 below for the distribution of final course grades for this population.

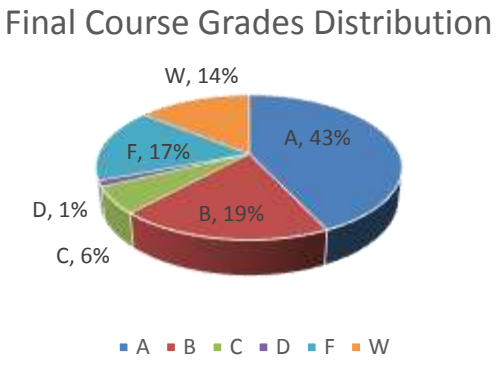

Figure 2. Final Course Grades Distribution

Analysis of Research Questions

Ten research questions and null hypotheses guided this study. The questions, hypotheses, and related findings are shown below.

Research Question #1

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course among the three delivery methods (traditional, online, and blended)?

Ho1: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course among the three delivery methods (traditional, online, and blended).

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, F or W in a computer applications course among the three delivery methods (traditional, online, and blended). The two variables were student final grade with six levels (A, B, C, D, F or W) and course delivery method with three levels (traditional, online, and blended). Student grade and course delivery method were not found to be significantly related, Pearson $\chi^2(10, N=1177) = 10.88$, $p = .375$. Therefore, Ho1 is retained.

Research Question #2

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between males and females?

Ho2: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between males and females.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional method between males and females. The two variables were final student grade with six levels (A, B, C, D, F or W) and gender with two levels (male, female). Student grade and gender in the traditional course delivery method were not found to be significantly related, Pearson $\chi^2(5, N=324) = 6.76, p = .239$. Therefore, Ho2 is retained.

Research Question #3

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between males and females?

Ho3: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between males and females.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between male and female students. The two variables were final student grade with six levels (A, B, C, D, F or W) and student gender with two levels (male and female). Student grade and gender in the online course

delivery method were found to be significantly related, Pearson $\chi^2(5, N=227) = 12.06$, $p = .034$. Therefore, Ho3 is rejected.

Follow-up pairwise comparisons were conducted to evaluate the difference among these proportions. Table 4 shows the results of this analysis. The Bonferroni method was used to control for Type 1 error at the .004 level across the six final course grade levels for comparisons. Significance was found in final grades of B vs. F. In general, the results suggest that females are more likely to achieve a final grade of B than a final grade of F in the online sections of Computer Applications than males. Therefore, the results suggest that females are generally somewhat more academically successful in the online delivery method than males.

Table 4

Results for Pairwise Grade Comparison for Gender in Online Using Bonferroni Method

Comparison	Pearson chi-square	*p* value (Alpha)	Cramer's V
A vs. B	1. 74	.187	.12
A vs. C	.16	.684	.04
A vs. D	.42	.516	.07
A vs. F	5.03	.025	.20
A vs. W	.74	.390	.07
B vs. C	.21	.647	.06
B vs. D	.02	.899	.02
B vs. F	8.96	.003*	.33
B vs. W	.15	.695	.04
C vs. D	.14	.709	.09
C vs. F	2.89	.089	.23
C vs. W	.03	.871	.02
D vs. F	2.16	.142	.21
D vs. W	.09	.761	.05

*significant at the .004 level.

The distribution of final course grades for males and females in the online delivery method of INFS 1010 Computer Applications is displayed in Figure 3.

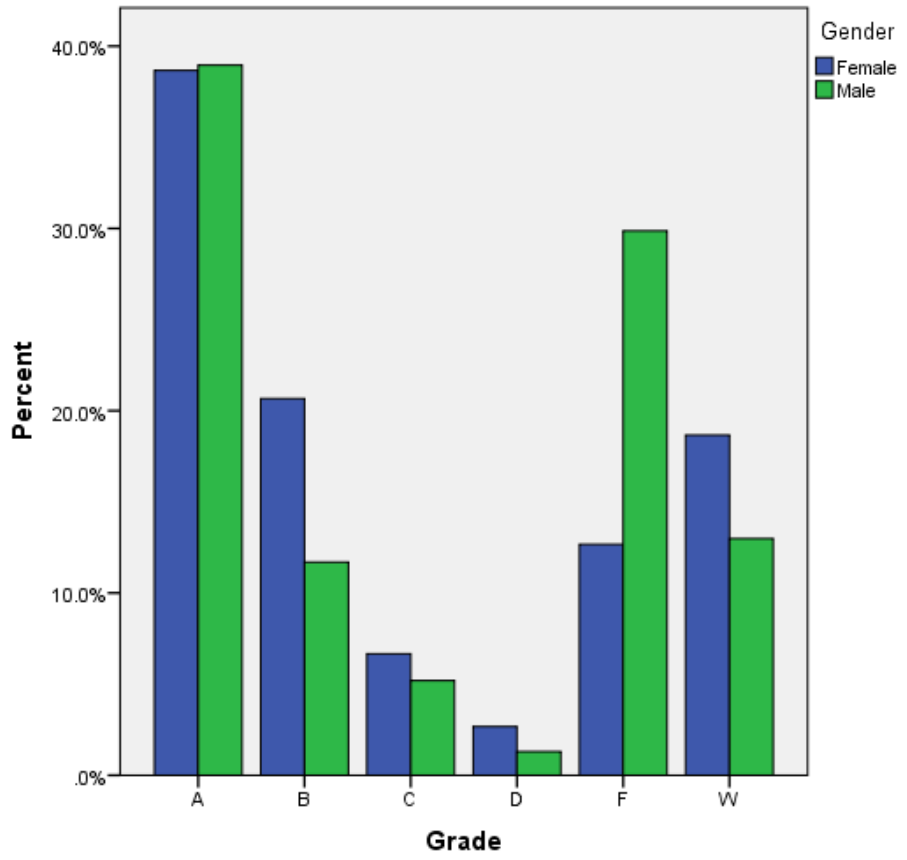

Figure 3. Male and Female Student Grades in Online INFS 1010 Computer Applications

Research Question #4

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between males and females?

Ho4: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between males and females.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, F, or W in a

computer applications course delivered using blended methods between male and female students. The two variables were final student grade with six levels (A, B, C, D, F or W) and student gender with two levels (male and female). Student grade and gender in the blended delivery method were found to be significantly related, Pearson $\chi^2(5, N=626) = 26.42$, $p > .001$. Therefore, Ho4 is rejected.

Follow-up pairwise comparisons were conducted to evaluate the relationships among these proportions. Table 5 shows the results of this analysis. The Bonferroni method was used to control for Type 1 error at the .004 level across the six final course grade levels for comparisons. Significance was found in final grades of A vs. F, and B vs. F. In general, the results suggest that females are more likely than males to achieve a final grade of A or B than a final grade of F in the blended sections of the Computer Applications course. Therefore, the results suggest that females are generally more academically successful in the blended delivery method than males.

Table 5

Results for Pairwise Grade Comparison for Gender in Blended Using Bonferroni Method

Comparison	Pearson chi-square	*p* value (Alpha)	Cramer's V
A vs. B	3.01	.083	.09
A vs. C	1.14	.285	.06
A vs. D	2.89	.089	.10
A vs. F	23.00	>.001*	.24
A vs. W	7.61	.006	.14
B vs. C	>.01	.952	>.01
B vs. D	1.19	.276	.10
B vs. F	7.10	.008*	.18
B vs. W	1.05	.305	.07
C vs. D	.93	.335	.16
C vs. F	2.88	.090	.15
C vs. W	.40	.529	.06
D vs. F	.01	.924	.01
D vs. W	.46	.499	.07

*significant at the .004 level.

The distribution of final course grades for males and females in the online delivery method of INFS 1010 Computer Applications is displayed in Figure 4.

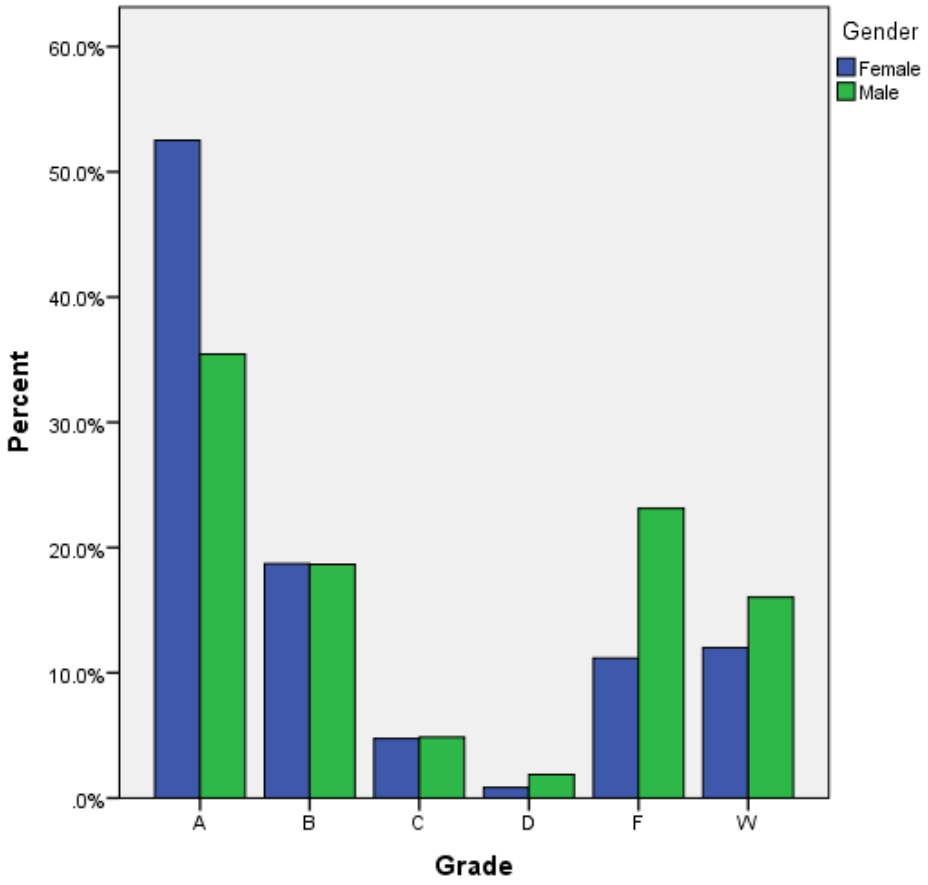

Figure 4. Male and Female Student Grades in Blended INFS 1010 Computer Applications

Research Question #5

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between traditional aged (24 and under) and nontraditional aged (25 and older) students?

Ho5: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between traditional aged (24 and under) and nontraditional aged (25 and older) students.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods between traditional aged (24 and under) and nontraditional aged (25 and above) students. The two variables were final student grade with six levels (A, B, C, D, F or W) and student age group with two levels (traditional, and nontraditional). Student grade and student age group in the traditional course delivery method were found to be significantly related, Pearson $\chi^2(5, N=324) = 19.21$, $p = .002$. Therefore, Ho5 is rejected.

Follow-up pairwise comparisons were conducted to evaluate the relationships among these proportions. Table 6 shows the results of this analysis. The Bonferroni method was used to control for Type 1 error at the .004 level across the six final course grade levels for comparisons. Significance was found in final grades of C vs. W. In general, the results suggest that students in the nontraditional age group are somewhat more likely to withdraw from the course than students in the traditional age group in the traditionally delivered Computer Applications course.

Table 6

Results for Pairwise Grade Comparison for Age in Traditional Using Bonferroni Method

Comparison	Pearson chi-square	*p* value (Alpha)	Cramer's V
A vs. B	.26	.613	.04
A vs. C	4.98	.026	.18
A vs. D	1.47	.226	.10
A vs. F	1.30	.254	.08
A vs. W	7.25	.007	.20
B vs. C	3.23	.072	.19
B vs. D	1.25	.264	.13
B vs. F	.37	.541	.06
B vs. W	7.80	.005	.27
C vs. D	.47	.494	.13
C vs. F	1.68	.195	.15
C vs. W	14.26	>.001*	.45
D vs. F	.98	.322	.14
D vs. W	3.57	.059	.28

*significant at the .004 level.

The distribution of grades for traditional and nontraditional aged students in the traditional delivery method of INFS 1010 Computer Applications is displayed in Figure 5.

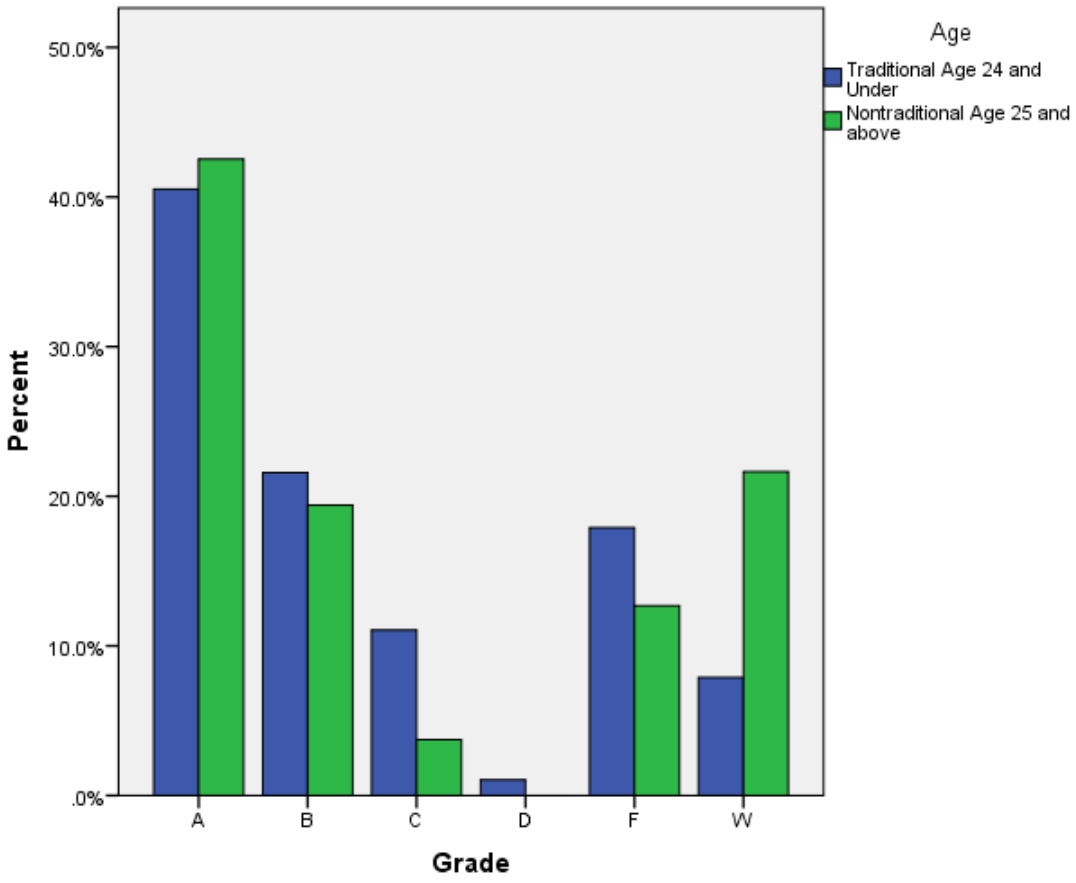

Figure 5. Student Grades by Age Group in Traditional INFS 1010 Computer Applications

Research Question #6

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between traditional-aged (24 and under) and non-traditional-aged (25 and older) students?

Ho6: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between traditional aged (24 and under) and nontraditional aged (25 and older) students.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods between students in the traditional age group and students in the nontraditional age group. The two variables were final student grade with six levels (A, B, C, D, F or W) and student age with two levels (traditional and nontraditional). Student grade and student age in the online delivery method were found to be significantly related, Pearson $\chi^2(5, N=227) = 17.81, p = .003$. Therefore, Ho6 is rejected.

Follow-up pairwise comparisons were conducted to evaluate the relationships among these proportions. Table 7 shows the results of this analysis. The Bonferroni method was used to control for Type 1 error at the .004 level across the six final course grade levels for comparisons. Significance was found in final grades of A vs. B. In general, the results suggest that students in the nontraditional age group are somewhat more likely than students in the traditional age group to achieve final course grades of A than B in the online delivered Computer Applications course.

Table 7

Results for Pairwise Grade Comparison for Age in Online Using Bonferroni Method

Comparison	Pearson chi-square	*p* value (Alpha)	Cramer's V
A vs. B	8.77	.003*	.26
A vs. C	3.56	.059	.19
A vs. D	5.80	.015	.25
A vs. F	.01	.921	.01
A vs. W	.05	.818	.02
B vs. C	.01	.939	.01
B vs. D	1.82	.177	.20
B vs. F	6.27	.012	.28
B vs. W	7.38	.007	.31
C vs. D	1.81	.179	.31
C vs. F	2,89	.089	.23
C vs. W	3.52	.061	.26
D vs. F	5.36	.021	.34
D vs. W	5.93	.015	.37

*significant at the .004 level.

The distribution of final course grades for traditional and nontraditional aged students in the online delivery method of INFS 1010 Computer Applications is displayed in Figure 6.

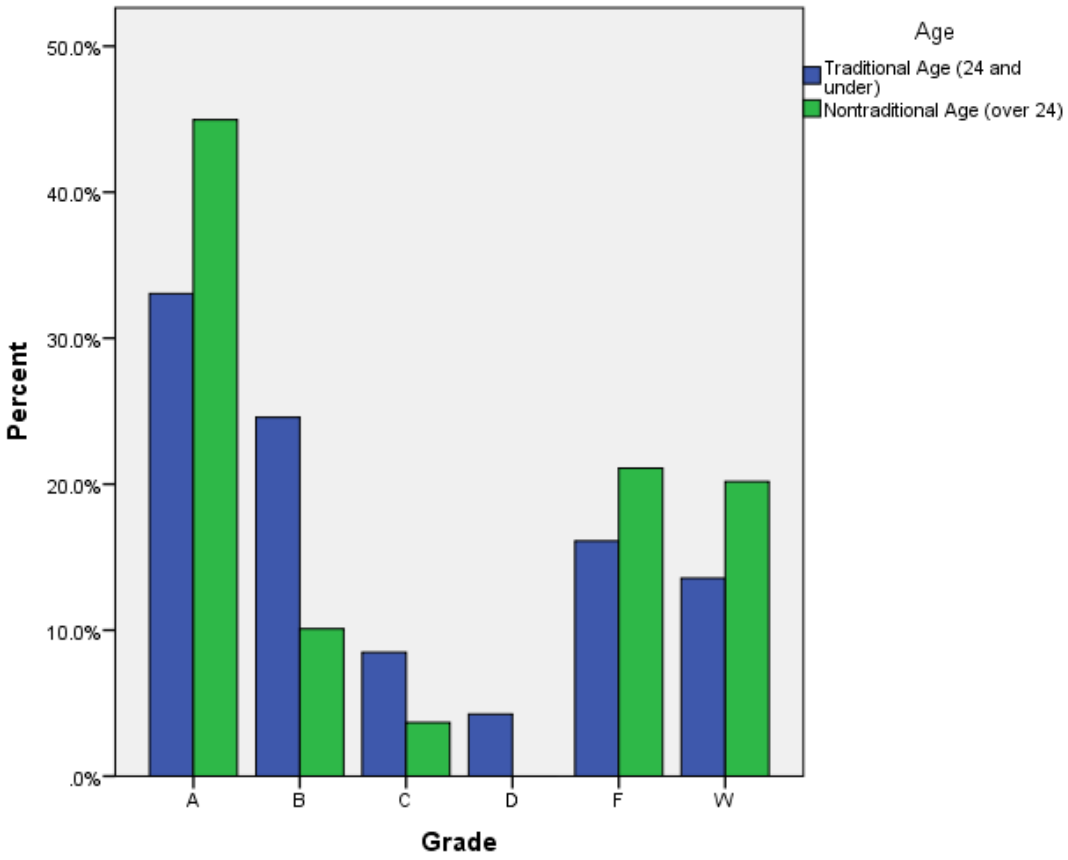

Figure 6. Student Grades by Age Group in Online INFS 1010 Computer Applications

Research Question #7

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between traditional aged (24 and under) and nontraditional aged (25 and older) students?

Ho7: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between traditional aged (24 and under) and nontraditional aged (25 and older) students.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods between students in the traditional age group and students in the nontraditional age group. The two variables were final student grade with six levels (A, B, C, D, F or W) and student age with two levels (traditional and nontraditional). Student grade and age in the blended course delivery method were not found to be significantly related, Pearson $\chi^2(5, N=626) = 8.96$, $p = .111$. Therefore, Ho7 is retained.

Research Question #8

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods among White, African American, and other race students?

> Ho8: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods among White, African American, and other race students.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using traditional methods among White, African American, and other race students. The two variables were final student grade with six levels (A, B, C, D, F or W) and student race with three levels (White, African American, other races). Student grade and student race in the traditional course delivery method were not found to be significantly related, Pearson $\chi^2(10, N=324) = 15.54$, $p = .114$. Therefore, Ho8 is retained.

Research Question #9

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods among White, African American, and other race students?

Ho9: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using online methods among White, African American, and other race students.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, or F in a computer applications course delivered using online methods between student grade and student race. The two variables were final student grade with six levels (A, B, C, D, F or W) and student race with three levels (White, African American, and other races). Student grade and student race in the online course delivery method were found to be significantly related, Pearson $\chi^2(10, N=227) = 23.96$, $p = .008$. Therefore, Ho9 is rejected.

Follow-up pairwise comparisons were conducted to evaluate the relationships among these proportions. Table 8 shows the results of these analysis. The Bonferroni method was used to control for Type 1 error at the .016 level across all three race comparisons. The only pairwise comparison that was significant was between White and African American races. In general, these results suggest that African American students are not as successful as White students in this course in the online delivery method.

Table 8

Results for Pairwise Grade Comparison for Race in Online Using Bonferroni Method

Comparison	Pearson chi-square	*p* value (Alpha)	Cramer's V
White vs. African American	18.97	.002*	.30
White vs. Other Races	5.37	.373	.16
African American vs. Other Races	8.53	.129	.49

*significant at the .016 level.

The distribution of final student grades for White and African American students in the online delivery method of INFS 1010 Computer Applications is displayed in Figure 7.

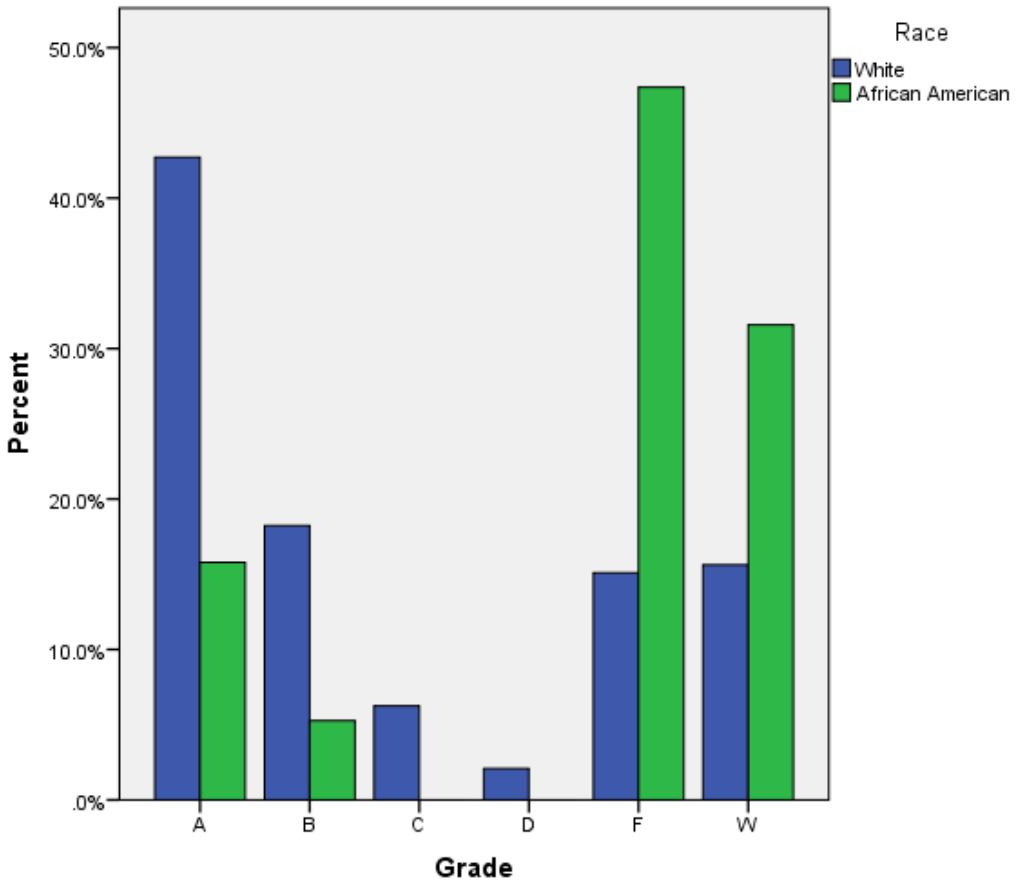

Figure 7. White and African American Student Grades in Online INFS 1010 Computer Applications

Research Question #10

Is there a significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods among White, African American, and other race students?

Ho10: There is no significant difference in the proportion of students receiving final grades of A, B, C, D, F, or W in a computer applications course delivered using blended methods among White, African American, and other race students.

A 2-way contingency table analysis was conducted to evaluate whether there were relationships in the proportion of students receiving final grades of A, B, C, D, or F in a computer applications course delivered using blended methods between male and female students. The two variables were final student grade with six levels (A, B, C, D, F or W) and student race with three levels (White, African American, and other races). Student grade and student race in the blended course delivery method were found to be significantly related, Pearson $\chi^2(10, N=626) = 33.16, p =>.001$. Therefore, Ho10 is rejected.

Follow-up pairwise comparisons were conducted to evaluate the relationships among these proportions. Table 9 shows the results of these analysis. The Bonferroni method was used to control for Type 1 error at the .016 level across all three race comparisons. There were pairwise comparisons that were significant between White and African American races. Figure 8 displays the proportion of final course grades between the races. In general, these results suggest that African American students are not as successful as White students in this course in the blended delivery method.

Table 9

Results for Pairwise Grade Comparison for Race in Blended Using Bonferroni Method

Comparison	Pearson chi-square	*p* value (Alpha)	Cramer's V
White vs. African American	31.73	>.001*	.23
White vs. Other Races	2.55	.769	.77
African American vs. Other Races	11.59	.041	.34

*significant at the .016 level.

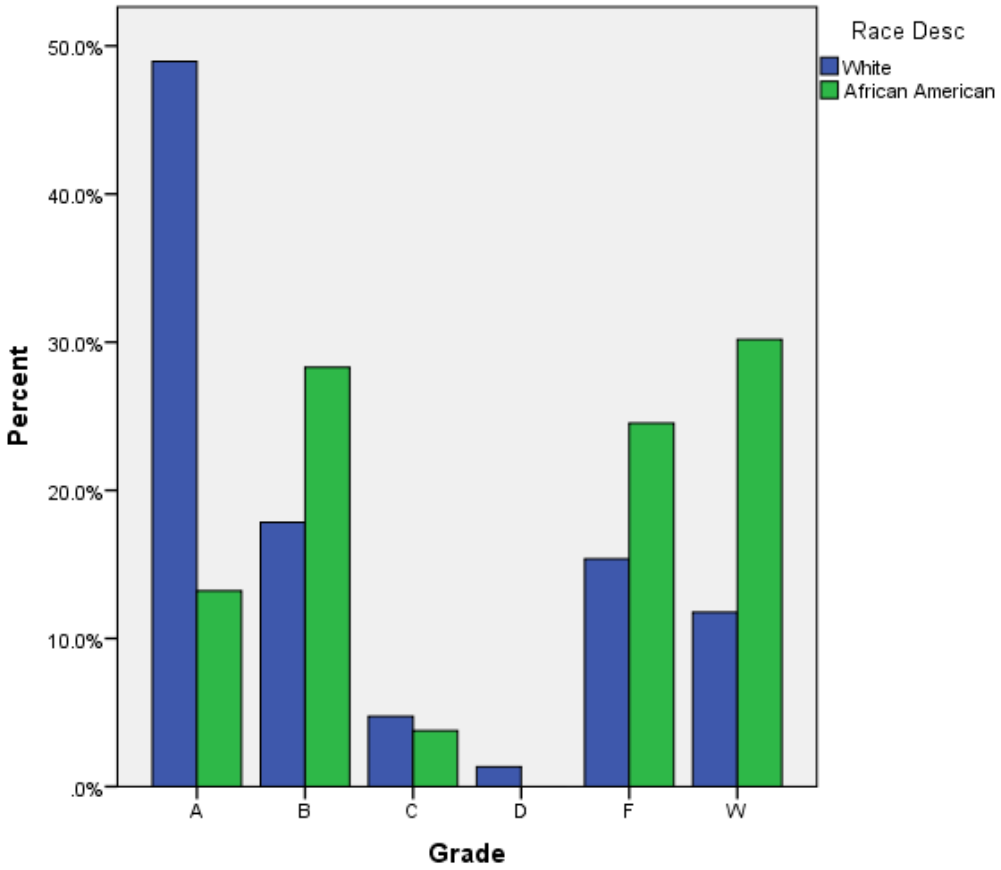

Figure 8. White and African American Student Grades in Blended INFS 1010 Computer Applications

Chapter 5 contains the summary of the findings and conclusions for this research. The recommendations for practice and further research are also included in Chapter 5.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR PRACTICE AND FURTHER RESEARCH

The purpose of this study was to compare academic success based on methods of course delivery for students in a computer applications course at an East Tennessee Community College. Additionally, the researcher examined demographic relationships of age, gender, and race to student academic performance in the different delivery methods. The researcher used final course grades as a determinant of academic success. The analysis focused on the variations in student academic success defined by final course grades. Successful completion of the course was defined as achievement of a final course grade of A, B, C, or D. Summary, conclusions, and recommendations are outlined in the following sections.

Summary

Studies have indicated mixed reports of administrator perceptions of academic quality of online and blended delivery methods (Allen & Seaman, 2014; Gartan, 2009) as well as mixed results when comparing studies of student academic success among the delivery methods (Means et al., 2010; Xu & Jaggars, 2013). Other studies indicate demographics, gender, age, and race can be a factor in student success in online and blended delivered courses (Colorado & Eberle, 2010; Price, 2006; Simonds & Brock, 2014; Urtel, 2008; Wagner et al., 2011). Therefore, further study that was focused on community college students was important for continuing the data driven community college decision making and student advising processes.

The findings of this study indicated no overall significant relationships between final course grades and delivery methods. However, among the delivery methods there were some significant relationships based on student demographics. For example, in the online delivery

method significant grade relationships were found in all three demographic characteristics identified (gender, age, and race). In the blended delivery method significant grade relationships were found in both gender and race. In the traditional delivery method significant grade relationships were found only in the age demographic. The following sections outline the overall characteristics of the data sets and the results of each of the study's research questions.

Conclusions

For this study final course grades for students in all sections of INFS 1010 Computer Applications during 3 academic years were retrieved not including summer terms. The population consisted of 1,177 student grade records that were analyzed to identify overall grade relationships among the three course delivery methods (traditional, online, and blended). Those records were then sorted by course delivery method and divided into three separate data sets. The resulting datasets included traditional delivery method with 324 student records, online delivery method with 227 student records, and blended delivery method with 626 student records.

The research questions in this study were addressed through data analysis with Chi-Square 2-way contingency table analysis testing procedures. Cramer's V and pairwise comparisons were used to determine association strengths for the Chi-Square 2-way contingency table analysis tests that were significant. Follow-up tests were based on the Bonferroni method to provide a significant level of reliability for the analysis.

Research Question 1

Research Question 1 focused on overall final course grade relationships among the three different delivery methods (traditional, online, and blended). No overall relationship between

grades and delivery method was identified, Pearson $\chi^2(10, N=1177) = 10.88, p = .375$. Therefore, the null hypothesis was retained.

Research Questions 2, 3, and 4

Research Questions 2, 3, and 4 were focused on final course grade relationships between males and females among the three different delivery methods (traditional, online, and blended). No relationships were identified between males and females in the traditional method, Pearson $\chi^2(5, N=324) = 6.76, p = .239$. Therefore, the null hypothesis for Research Question 2 was retained.

However, relationships between final course grades were identified between males and females in both the online and blended delivery methods, Pearson $\chi^2(5, N=227) = 12.06, p = .034$ and Pearson $\chi^2(5, N=626) = 26.42, p > .001$. Therefore, the null hypotheses for Research Questions 3 and 4 were rejected. Follow-up pairwise comparisons were conducted to evaluate the relationships among these proportions. According to the findings females are generally more likely to be academically successful in online and blended course delivery methods than males. This was consistent with the literature. A similar study was conducted in which females were more likely to pass in online classes but there were no significant differences in pass rates in the traditional classes studied (Price, 2006). A gender relationship was also observed in another study. The data in that study indicated that males in traditionally delivered sections were more successful than those enrolled in online sections (Wagner et al., 2011).

Research Questions 5, 6, and 7

Research Questions 5, 6, and 7 were focused on final course grade relationships between traditional aged students (age 24 and under) and nontraditional aged students (age 25 and above) among the three different delivery methods (traditional, online, and blended). Significant

relationships were identified between final course grades and student age in both the traditional and online course delivery methods Pearson $\chi^2(5, N=324) = 19.21, p = .002$ and Pearson $\chi^2(5, N=324) = 19.21, p = .003$. Follow-up pairwise comparisons were conducted to evaluate the relationships among these proportions.

No significant relationships were identified between final course grades and student age in the blended delivery method, Pearson $\chi^2(5, N=626) = 8.96, p = .111$. Therefore, the null hypotheses for Research Questions 5 and 6 were rejected but the null hypothesis was retained for Research Question 7. These findings indicated that students in the nontraditional age group are somewhat more likely to withdraw from the course than students in the traditional age group in the traditionally delivered Computer Applications course. In the online delivery method students in the nontraditional age group were more likely than students in the traditional age group to achieve a final course grade of A than B.

Research Questions 8, 9, and 10

Research Questions 8, 9, and 10 were focused on final course grade relationships among the three primary race categories and the three different delivery methods (traditional, online, and blended). No significant relationships were identified among the races in the traditional method, Pearson $\chi^2(10, N=324) = 15.54, p = .114$. Therefore, the null hypothesis was retained for Research Question 8. However, relationships were identified among the races in both the online and blended delivery methods, Pearson $\chi^2(10, N=227) = 23.96, p = .008$ and Pearson $\chi^2(10, N=626) = 33.16, p = .001$. Follow-up pairwise comparisons were conducted to evaluate the relationships among these proportions. Therefore, the null hypotheses were rejected for Research Questions 9 and 10. White students were generally more successful than African American students in both the online and blended delivery methods of this course.

Recommendations for Practice

The findings and conclusions of this research have led to the following recommendations for practice.

1. Provide more organized and structured adviser training about the different delivery methods. Because this particular institution already has a structured adviser training program, that program could be strengthened to include specific and detailed training and resources for advisors about possible demographic relationships with delivery methods and how to communicate these to students.
2. Educate students, parents, and advisors that all course sections are not alike. Often students choose course sections strictly based on personal schedules. An online class might fit the student's schedule better but may or may not be the best learning environment for that student. This can be accomplished through readily available resources for guiding students in making section choices.
3. If an institution requires a First Year Seminar or College Success course, those courses should include substantial components related to the different course delivery methods. This would be an excellent place to teach students learning styles, and that gender, age, and background can impact the student's ability to succeed at different levels based on learning environment. It is also an excellent opportunity for providing students with information about how to use different learning tools based on the way the course is delivered.
4. Encourage or require students to take some of the many available online inventories to determine if the online learning environment is a good fit before enrolling in an online or blended course.

5. Institutions should offer student choice of learning environment whenever possible or alternate delivery methods in different semesters. Faculty and administrators may choose to offer low enrollment courses in only the online delivery method as a means of maximizing the number of students enrolled in that course. The findings of this study have indicated that the online delivery method can be problematic for some groups of people. To offer a course only in the online method can make it difficult for those students to be successful.
6. Provide resources to guide students in how to be successful in online and blended delivery methods even if that particular method of delivery does not match their learning characteristics. This is particularly true when institutions choose to only offer certain courses in the blended and online delivery formats. At small institutions students do not always have a choice of delivery method. Often smaller academic programs have only enough students to fill one section per semester and sometimes per year.
7. Students enrolling in online courses could be required to complete an online orientation that would go beyond the basics of how the course works to include tips for success in the online learning environment and frequently asked questions about online courses.
8. Seek input from students who have been both successful and unsuccessful in all three delivery methods. Prepare a video of some of these students' comments about what worked or did not work for them and how they studied differently for courses based on how courses were delivered (traditional, online, or blended). Then share these videos over the school intranet for all students. In preparing the videos choose students who are representative of the demographics of the institution.

9. Develop strong male minority student organizations to provide a peer led support system to encourage these men when they are in courses involving minimal face-to-face instruction.

Recommendations for Future Research

The findings and conclusions of this research have led to the following recommendations for future research.

1. After the studied years, the instruction for all sections of this particular course at this particular institution was changed to use training and assessment software as the primary method of content instruction and evaluation. In this new design the instructors in all sections of the course do not personally deliver the content but facilitate the student interaction with the training and assessment software, evaluate some of the student work, provide tutoring, and offer feedback. It would be beneficial to conduct similar research of INFS 1010 Computer Applications among the delivery methods after the switch to the use of training and assessment software. This type study would allow for comparison of student final grades before and after the change to the software. Comparing the two studies would provide necessary data to support either staying with the standardized training and assessment software method or returning to methods of content instruction that vary according to course teacher.
2. Qualitative study to identify student and faculty perceptions about the reasons for relationships among the demographic categories could be beneficial in closing those learning gaps.
3. This study was focused on one particular high enrollment course that is known to not contain particularly difficult content for most students. It could be beneficial to compare

this study to a similar study of a course at this institution that is known to contain particularly difficult content to determine if relationships among demographics in the course deliveries are consistent.

4. As learning environments or course delivery methods are constantly changing with new technology, it is important to continue the process of studying the impact of course delivery method on student success. This will assist educators in the effort to maintain academic quality while meeting student scheduling needs.

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APPENDICES

APPENDIX A
Letter from President of Cleveland State Community College

Cleveland State
COMMUNITY COLLEGE

OFFICE OF THE PRESIDENT

June 30, 2015

Ann Cunningham
Associate Professor, Computer Information Systems
Cleveland State Community College
P.O. Box 3570
Cleveland, TN 37320

Dear Ann,

I am pleased to provide you this letter indicating my support and approval to conduct your research on the Cleveland State Community College campus for your dissertation titled: *Comparison of Student Success by Course Delivery Methods at an East Tennessee Community College.*

I am excited you have reached this stage in your doctoral study and we look forward to your successful conclusion. If I can be of any assistance please do not hesitate to call upon me.

Best wishes,

Dr. William A. Seymour
President

3535 Adkisson Drive • P.O. Box 3570 • Cleveland, TN 37320-3570
(423) 478-6200 • (800) 604-2722
Fax (423) 614-8752 • E-mail: wseymour@clevelandstatecc.edu

APPENDIX B
IRB Letter

EAST TENNESSEE STATE UNIVERSITY

Office for the Protection of Human Research Subjects • Box 70565 • Johnson City, Tennessee 37614-1707
Phone: (423) 439-6053 Fax: (423) 439-6060

July 14, 2015

E. Ann Cunningham
3580 Crown Colony Drive, NW
Cleveland, TN 37312

Dear Ann,

Thank you for recently submitting information regarding your proposed project "Comparison of Student Success by Course Delivery methods at an East TN Community College."

I have reviewed the information, which includes a completed Form 129.

The determination is that this proposed activity as described meets neither the FDA nor the DHHS definition of research involving human subjects. Therefore, it does not fall under the purview of the ETSU IRB.

IRB review and approval by East Tennessee State University is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are human subject research in which the organization is engaged, please submit a new request to the IRB for a determination.

Thank you for your commitment to excellence.

Sincerely,
Stacey L. Williams, Ph.D.
Chair, ETSUIRB

Full AAHRPP Accreditation

Accredited Since December 2005

VITA

ELIZABETH ANN HOOPER CUNNINGHAM

Education:

East Tennessee State University, Johnson City, Tennessee,
Doctor of Education in Educational Leadership; 2015

Tennessee Technological University, Cookeville, TN
Master of Arts in Education: Instructional Leadership; 2003

University of Tennessee, Chattanooga, TN
Bachelor of Science in Secondary Education: Business; 1985

Professional Experience:

Associate Professor of Computer Information Systems
Cleveland State Community College, Cleveland, TN
2001-Present

Adjunct Professor
Cleveland State Community College, Cleveland, TN
1996-2001

Chattanooga State Community College, Chattanooga, TN
1993-1995

Instructor
Branell Institute, Chattanooga, TN
1992-1993

Chattanooga State Community College, Chattanooga, TN
1988-1991

McKenzie College, Chattanooga, TN
1986-1988

Honors and Awards:

2011 NISOD Excellence Award from National Institute for Staff and Organizational Development

Cleveland State Community College 2010 Distinguished Faculty Award

Cleveland State Community College 2009 Service-Learning Champion

Cleveland State Community College 2007 Faculty Star Award for Providing Service to Institution

Tennessee Board of Regents Innovation Award 2004 Distance Learning Conference