INTERACTIVE TEXTBOOKS: A STUDY ON THE EFFECTS ON LEARNING GAINS AND COURSE GRADES AMONG COMMUNITY COLLEGE MINORITY STUDENTS

by

Victoria C. Brower

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

The purpose of this quantitative quasi-experimental study is to examine whether the use of interactive e-textbooks by community college minority students makes a difference in academic outcomes (as measured by final course test grades) and if the use of interactive textbooks could lead to course completion and terminal degrees. This study adds to the existing literature insight into alternative methods of increasing learning and developing positive attitudes among minorities in the community college setting. The sample population included minority students enrolled in a government class attending a community college in an urban area in South Florida. There were $N = 118$ students enrolled in the government class in which 55 (47%) used an interactive textbook, and 63 (53%) did not. The final grades of the students were collected at the end of the semester. The SALG instrument was administered at the beginning of the semester and the end. Final course test grades and student learning outcomes, as measured by the Student Assessment of Learning Gains Survey, were compared between students enrolled in a section that utilizes an interactive e-text book and those students enrolled in a section that does not. More research is needed concerning the use of digital textbooks to bridge the gap in educational outcomes between White and African American students. Although this study established that the use of interactive books does not result in improved performances, e-textbooks have enhanced access to education among minority students, and multi-media learning can effectively enhance students' educational achievements.

Keywords: community college, technology, interactive textbooks, minorities

Dedication

This work is dedicated first to my God; I will love you O Lord, my strength. You carried me through and have been the rock of my continual salvation. I also dedicate this work to my mom and dad. Mami and Papi- you are such wonderful parents; you instilled so many values, the greatest to be committed and a deep impression to persevere even in the most challenging times. Your support and love have been a constant throughout my life. My boys -you three are my forever heartbeat: Christian- I so deeply love you, and you are still the best! Josiah, you are my heart. My courageous son-you have taught me how to be fearless and strong! And Shawn Nathaniel 2-You are my great gift from God; my life is so full because of you-you inspired me to become the absolute best I could be in every area of my life; you are my love! To my A1 support team for these past five years: Pamela Garner, my sister and my friend ...no words to thank you for every prayer, words of encouragement and all the laughs, you are my forever hero! I so respect, and admire you. Phillipa Vassal, this work would not have been possible without you, I totally depend on you for everything research, you are the best and such a great friend-ready to be there for your next great work! Rose Squad, you are my forever cheerleader, your beautiful positive, uplifting presence was my go-to in so many difficult times, thank you for your selflessness, and Joy Luke you are still in my heart my friend. To my colleagues, you are the best to work with, it has been a source of strength all of your support throughout the years. You all have a part in this work, thank you, I love you all- we did it!

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List of Abbreviations

Interactive Textbooks	(ITB)
Non-Interactive Textbooks	(NITB)
Minority Community College Students	(MCCS)
African American (Black is used interchangeably)	(AA)
Student Assessment for Learning Gains	(SALG)
Face to Face	(FTF)
Institutional Review Board	(IRB)
Final Course Grades	(FCG)

CHAPTER ONE: INTRODUCTION

Overview

"Above all things, I hope the education of the common people will be attended to: convinced that on their good sense we may rely with most security for the preservation of due degree of liberty" (Jefferson, 2003, p.7). The United States, built on the creativity and innovations of immigrants, is ahead of other nations in its educational opportunities. As an introductory chapter, discussion will begin with a background, (with both a theoretical and historical overview), presenting the repercussion of an uneducated society, a comparative view with other countries educational status, and the current status of U.S. citizenry. This section will be followed by the problem in the lack of research and will delineate the purpose and significance of the study of minorities, and the effects of interactive textbooks on government course final grades and student learning outcomes. The final section of this chapter will state the research questions, and definitions of key terms will be explained.

Background

There has never been a time in the U.S. history of such diverse populations living and working side by side. Congruently, the United States faces the challenge of keeping its citizenry educated and knowledgeable to participate in political and economic freedom (Jefferson, 1965). For this to continue to occur in a progressive and positive forum, a study of what it takes to manifest an educated citizenry is of most benefit (Ponnuswamy & Manohar, 2016). Two trends will be presented through an international lens. The first trend will discuss the consequences of governance and domestic stability within a country when citizens of a country are not educated. The second trend is the dynamics present for second world countries' mobility to newly industrialized world status and using that as a model to be used toward closing educational gaps

(Pevehouse & Goldstein, 2017). The final part of the background describes the current environment in which minorities find themselves within the higher educational system.

Consequences of an Uneducated Society

In most recent decades, governments around the globe have watched how corruption has brought about the demise of the country's economy and freedom (Art & Jervis, 2017; Lamy et al., 2015). This situation has been largely due to ignorance and the demise of an educated citizenry. In the case of Africa, for example, Konte (2018) conducted a research with surveys from Afrobarometer. This nonpartisan network covers the continent of Africa and measures societal trends. Thirty-three countries were surveyed on their "public attitudes on economic, political, and social matters" (p. 2). Interviews conducted involved more than 50,000 Africans, and it drew a "strong link between quality of local governance and the quality to the educational resources in Africa's public schools" (Konte, 2018, p. 2). Between 2011 and 2013, Konte (2018) found that corruption increased the likelihood of poor-quality conditions for schools. This condition is a perpetual cycle whereby one causes the other in a downward spiral. In these schools, where corruption was pervasive, there was absenteeism by instructors, classrooms with students sitting on floors, or wherever there was space perpetuated (Konte, 2018). These conditions were regardless of the financial investment of education a country acquired. This cycle has been replicated in other regions, and this repeated downward spiral would create a never-ending cycle with less education, giving rise to more corruption (Konte, 2018). This situation is where the populace faced the knowledge to foresee corrupt politicians, but citizens were either unwilling or ignorant of their laws nor their rights to make changes and confront corrupt leaders; however, an educated citizenry matters.

Venezuela is another example where the process from a free, prosperous republic, to the weakening of a complete society, can cripple an economy and political structure (Ausman, 2019). These movements come in part, due to a citizenry that has no knowledge or are poorly educated. “The Venezuelan crisis is filling the headlines and truly deserves the world’s attention. It is a wake-up call to all, as it holds relevant lessons for both developing and developed countries” (Ausman, 2019, p. 1). An educated citizenry is essential to continued freedom (Rice & Alexakis, 2015; Soloway, Guzdial, & Hay, 1994). Considering such dangers coming to the United States, the educational system and educating all citizens should be at the forefront of every elected official’s agenda from the White House to the schoolhouse. Educated citizens are a stabilizing force in a divisive society. If there is a disparity between groups on educational levels, this could lead to disruption in society’s governmental structures. All citizens find it in their best interest to assure the furtherance of all its citizens to be educated regardless of their background or status so that all can contribute to their society.

Newly Industrialized Countries

In contrast to these crumbling environments, there is a new sector of societies in the international sphere that has attained upward mobility. These countries have created open markets, established updated educational systems, and introduced technology to their citizenry (Pevehouse & Goldstein, 2020). These countries are now engaging in the world markets and creating business opportunities for their people. Among the top four successful are the “four tigers of East Asia: South Korea, Taiwan, Hong Kong, and Singapore” (Pevehouse & Goldstein, 2020, p. 397-398). India has also taken off financially by growing its economy by 5% between 1996-2013 (Pevehouse & Goldstein, 2020). This growth came from a two-prong approach to development. The first is its newly educated young people who dominate their society, and the

second approach is its people's recent access to technology, previously not available to the common person living in India (Pevehouse & Goldstein, 2020).

Current Status on Education in the United States

In the United States, both federal and state governments subsidize most public colleges and universities from U.S. revenue collected from taxpayers. This money is spent on various programs and aid within both K-12 and higher educational institutions. Students within this system are also receiving a tremendous amount of financial aid (Hung et al., 2020). Thus, the taxpayer and all citizens have an inherent interest both economically and educationally in students' success and failure rates within these institutions (Bensimon, 2005; Post et al., 2016). Of particular focus lately are the graduation and completion rates of minorities who have fallen behind in academics and completion rates. There is a significant gap between Whites and Asian graduation rates, compared to those of African Americans and Hispanics graduation rates (Bensimon, 2005). A closer focus should be on higher learning institutions that provide access to minorities that could be the conduit to closing these gaps, such as community colleges.

According to the National Student Clearinghouse Research Center in the fall of 2010 a cohort of students had the following completion rates: Asian and White students completion rates were 68.9% and 66.1%, respectively, while Hispanic and Black completion was 48.6% and 39.5%, respectively (Shapiro, Dundar Huie, Wakhungu, 2017, para. 3). Shapiro et al., (2017). also found that "Black students represent the only group that is more likely to stop out or discontinue enrollment than to complete a credential within six years. Total completion rate of 39.5% compared to the no longer enrolled rate of 42.8%" should raise awareness in educational policy circles (Shapiro et al., 2017, para.5). There has also been a decrease in public enrollments among minorities in community colleges. The decrease has been "substantial… in proportion of

student enrolling in two-year public institutions" (Shapiro et al., 2017, para. 4). The decline was noted as 37.3% from a 2010 cohort down to 33.8% from a 2011 cohort (Shapiro et al., 2017). Shapiro et al. also stated completion rates for African Americans fell from 39.3% to 37.5%, respectively. Parallel to these findings are studies that indicate the mass exodus of women and minorities leaving STEM educational college tracks (Smith, Jagesic, Wyatt, Ewing, & College Board, 2018). These numbers are rooted in the deeper problem of course completion and pass rates. Thus, the agenda should look to begin a reformation in areas that are faulty and recover those programs which are of benefit. Regarding examining weak areas that need attention, one would do well to highlight the findings of studies done at one of our educational society's pillars that give access to economic advancement: community colleges.

Historical Overview

Community colleges were designed in the early 1900s to address the need for veterans, blue-collar workers, those who needed to stay close to home, and other economically challenged students. It was a path to academic advancement without leaving home for the first two years of college. Joliet Junior College was the first community college that achieved successful outreaches, and by the 1950s, there were over 600 across the nation (Brint & Karabel, 1989). Through community colleges, citizens were given the opportunity to engage in the pursuit of higher education and participate in the university system, without the overwhelming cost of leaving their hometowns. "Within this system, the community college has a crucial role to play: it is, after all, the most common point of entry into college for those groups that have traditionally been excluded from higher education" (Brint & Karabel, 1989, p. vi). Yet, in recent years, the United States has been addressing the crisis of graduation rates and completion rates

among precisely these main groups within the college system. Traditionally, these have been compromised by minority students.

There has been a recognition that the decrease in graduation rates has become critical, and solutions need to be found. Legislatures, and local administration, are confounded on how to increase minority participation and graduation rates best. Some efforts mentioned by researchers include alternative school designs, flexible curriculum, online programming, and blended environments (Watson et al., 2015). However, rates have not improved in comparison with the funding necessary to continue these institutions, and legislatures are contemplating support. For example, in Florida, the legislature has cut funding to most community colleges and transferred those funds to the university system, citing the students' poor performance of the students at the community college level (Murakami, 2020). Murakami (2020) has reported that for colleges, "Already reeling from the pandemic and recession, public colleges face severe state budget cuts in coming weeks" (para. 3). Minorities are the main group struggling in this area, and the main ones who will be affected by these budget cuts.

One underlying cause could also be leadership policy. Strategic leadership in brining innovation to community colleges to address this issue is of importance. The experience of educational leadership in this area will bring substantive and needed change for the better. Drawing on qualitative case studies of six colleges, one study explored the influence of different types of leadership approaches on the implementation of a technology-mediated advising reform and assessed which types of leadership were associated with transformative organizational change (Klempin & Karp, 2018). Transformative organizational change will be the type of leadership change necessary to significantly address the minority gap.

Due to the rapid advancement of technology, many in academia are looking toward alternative methods to address student progress issues via technology. Professors at both community colleges and university levels have engaged with the technological curriculum but with limited resources and training. Advancement in this area has grown but with limited success due to faculty unpreparedness or availability of incorporation into the subject area (Liu & Roohr, 2013; McGoldrick, Watts, & Economou, 2015).

Theoretical Background Overview

Drawing on several theories that could drive such an investigation on this issue begins with those theories based on technology. Van Horne, Russell, and Schuh (2016) conducted a study on markup tools on interactive e-textbook readers. These researchers drew on the concept of the Innovation Diffusion Theory (Rogers, 2003; Scott & McGuire, 2017). Their conclusions emphasized using these markup tools early when introducing such technology. Other studies searched for meaning in comparison to the technology used in classrooms (Edgcomb et al., 2015; Fuller, Risner, Lowder, Hart, & Bachenheimer, 2014).

Although these theories and studies address technology, there is a vacuum to facilitate the ideas when examining minorities and the use of interactive textbooks. Thus, the multimedia learning theory by Mayer (1994) may provide a better framework with which to evaluate a technology-based study. This theory espouses cognitive learning. There are three assumptions Mayer held concerning cognitive learning and the multimedia learning theory (Mayer, 1994). The three assumptions are:

1) There are two (visual and auditory) separate channels that process information.
2) There is a limited channeling capacity.

3) The brain uses processing to filter, organize, select, and integrate information (Mayer, 1994).

Studies related that discuss this theory and which drive such studies were explored in China. One study using Mayer's theory showed positive results of 6,211 students from 74 elementary schools using interactive textbooks and technology via mobile learning terminals using the auditory and visual channeling (Sun & Jiang, 2015). This study highlighted positive results in self-efficacy, behavior, attention, and positive attitude toward learning (Sun & Jiang, 2015). A study based on channeling was conducted at the University of Toledo. Researchers found that students engaged more with the subject matter while using interactive textbooks by accessing both the visual and auditory aspects of the textbooks (Liberatore, 2017). In another study, Van Horne, Russell, and Schuh (2016) examined whether there were preferences among students who used paper textbooks over e-textbooks. The researchers in the study concluded that e-textbooks, which included audio and visual aspects, were better suited for learning (Van Horne et al., 2016). This study provided evidence-based teaching practice on technology and learning that occurred via these textbooks. It may have been more beneficial than just using the auditory channel alone for listening to lectures (Van Horne et al., 2016). Other theories, such as the multimedia theory and the information processing theory, will be discussed in-depth in the following chapter.

Problem Statement

Although there has been much study in the area of educational technology (Ali, 2019; Dinc, 2017; Ponnuswamy & Manohar, 2016), there is a lack of research in the area of interactive textbooks, minorities, and community colleges (Davis & Martin, 2018; O'Bannon, Skolits & Lubke, 2017; Okpalaeze & Primo, 2018). There is also a lack of information on the effects of technological inclusion on aiding minority students in academic success (Okpalaeze & Primo,

2018). Studies have focused little on program effectiveness on the minority community. Problems lie in administration or faculty hesitancy to implement these devices in their classes (Zhang, Niu, & Promann, 2017). “The challenges for institutions include continuing to adapt their programs to better meet the size, demographic composition, and academic needs of these cohorts” (Shapiro et al., 2017, para 4). In addition to these challenges, recent global and national events, have caused learning to go through a transformative process. Learning is now occurring via remote, blended, online, and other venues (Mohmmed, Khidhir, Nazeer, & Vijayan, 2020). Thus, while considering the lack of studies focused on minorities in community colleges. It is timely and beneficial for a further examine trends over extended time periods to make informed decisions (Conceicao & Martin, 2016). Professors at community colleges are being challenged to become more aware of the diversity growing in their classrooms and the need to address any deficiencies in successful learning. Cognizant efforts to recognize these new classroom attributes could help to increase graduation rates among minorities (Buzzetto-Hollywood & Alade, 2018). The transformative nature of the classroom dynamic is at the core of substantive investigative research but still lacks more focus on the gap in graduation rates among minorities. As such, the problem continues to be that while recent education technology studies are beneficial to mainstream college students, studies neglect to address the needs of minority students in a community college setting. Thus, there should be a fundamental cognition that the minority community may have different needs and necessitate other means for engagement or persistence strategies to propel them toward graduation and completion of terminal degrees. The literature has not fully addressed these issues. Thus, the problem is that there is a lack of existing research concerning how minority community college students could benefit from interactive e-textbooks.

Purpose Statement

The purpose of this study was to examine whether the use of interactive e-textbooks by community college minority students made a difference in final course grades and academic learning outcomes. This study expounded on current and recent literature in the area of interactive textbooks, minorities, and the college system. The population studied was minority students attending a community college in an urban area in South Florida. The study involved collecting data from students in a government course and examining whether interactive textbooks made a difference in final test grades and learning outcomes as measured by the Student Assessment of Learning Gains Survey (SALG). The study involved separating the data into two groups of students, including students who would use interactive textbooks and those who would not. For this study, the independent variable was the use and non-use of interactive textbooks. In contrast, the dependent variables were final course grades and student learning outcomes (as measured by the SALG). The findings from the results helped provide information where there is currently a gap in the literature on minorities, technology, and community colleges.

A quantitative study is the best approach to conducting a scientific inquiry to examine the difference between two groups of students (Rovai, Baker, & Ponton, 2013). The study was considered a quasi-experiment due to the lack of random assignment of participants to groups. Additionally, the study was quasi-experimental because the researcher intended to assess differences in the dependent variables by the independent variables. Quasi-experimental studies are appropriate for research intended to compare groups of individuals and test hypotheses that seek to determine differences (Handley et al., 2018). Therefore, using the quasi-experimental design was the best fit to explore the differences between the two groups of student outcomes

(Gall, Gall, & Borg, 2007). Statistics helped measure if there was a difference between the two groups. Once again, the lack of research specifically on minority students and the use of interactive textbooks may be the catalyst to closing the gap academically between minorities and their counterparts and providing more insight into this research area.

Significance of Study

This study adds to the existing literature insight into alternative methods of increasing learning and developing positive attitudes among minorities in the community college setting (Christensen, Horn, & Johnson, 2009). The findings contribute statistical evidence that could pressure legislatures to invest in alternative technology that helps students succeed. Especially in the area of helping minorities, this study was focused on and targeted better methods of teaching. Passive lecture-style teaching is outdated, and innovation requires a more diverse challenge in academic institutions (Brown, Roediger, & McDaniel, 2014; David, 2015). Community colleges across the nation need creative solutions, as many face competition from other private organizations and necessitate adequate levels numerically to justify their programs to their state legislatures. Programs like the Male Minority Initiative at Broward College in South Florida depend on the community college system to help male minorities to reengage in the academic school setting (Broward College, 2020). Veterans from a minority background, well versed in the latest technology, can re-engage in society with confidence once they feel they can compete in a school setting (Evans, Pellegrino, & Hoggan, 2015; Heineman, 2017). This study builds off studies in the area of interactive textbooks and is a significant contribution to academic institutions by bringing forth information that could steer had them toward innovative and beneficial practices.

Research Questions

RQ1: Is there a difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks?

RQ2: Is there a difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG), between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores?

Definitions

The following definitions are important terms used throughout this study.

1. *Ethnic minority group*: Identification of this designation will be defined as student groups who classify within groups defined by the Office of Management and Budget Statistical Policy directive (No. 15, May 12, 1977) and the Census Bureau (2020). Those groups include American Indian or Alaskan Native. Pacific Islander, Black (African American), Black non-Hispanic, and Hispanic. Although not identified as part of an ethnic minority group, White, non-Hispanics will be included for comparing estimates against minority groups.
2. *American Indian or Alaskan Native*: Persons with their origins in North America and peoples who identify with cultural and tribal affiliation communities (U.S. Census Bureau, 2020).
3. *Asian or Pacific Islander*: Persons with origins in the Pacific Islands or the Far East, Indian Subcontinent, pacific Islands, or Southeast Asia. Any persons from Japan, Korea, the Philippine Islands, Samoa, India, Vietnam, or China (U.S. Census Bureau, 2020).

4. *Blended Course*: Courses taught 50% online and 50% Face to Face (FTF: Safar & Alkhezzi, 2013).
5. *Community College*: Serves primarily students seeking certificates, Associate of Arts degree, Associates of Science Degree, and other technical and skills certification (Brint & Karabel, 1989).
6. *Completion Course Rate*: Students who have completed a course and received a letter grade above a C or numerical value equivalent or above a C to count the course as passing and for credit (Sorden & Munene, 2013).
7. *Final Course Grades*: The final course grades will include only grades from two multiple choice tests from the textbook publishing company Pearson- these include Test 1 and Test 2 covering four chapters each at 50 points for each test for a total of 100 points for the test grade (i.e., each grade will be calculated as a numerical number 1-100: Sorden & Munene, 2013).
8. *Hispanic*: Persons with Mexican, Puerto Rican, Cuban, Central or South American or any other Spanish cultural origination (U.S. Census Bureau, 2020). Noted that the term Latino may be preferred.
9. *Interactive Textbooks*: Electronic textbooks with less text, embedded questions; animations; built-in features and tools; audio capability; connect to the Web (Solcova, 2016).
10. *Minority Students:* Non-White or non-Caucasian persons (U.S. Census Bureau, 2020).

11. *White, Non-Hispanic*: Persons with origins of the peoples of Europe, North Africa, or the Middle East, and these groups are included for comparison and estimates (U.S. Census Bureau, 2020).

Summary

African Americans, Hispanics, and other minorities continue to have a much lower graduation rate from higher education and a lower course completion rate than their White and Asian counterparts. Even though educational technology has been axiomatic in much research, there is still a lack of literature in the area specific to minorities and educational technology as a catalyst in improving academic success. More specifically, the problem is a lack of literature and research on the usage of interactive textbooks, minorities, and community colleges. Using an informative quasi-experimental approach, the purpose of this study was to examine whether the use of interactive e-textbooks by community college minority students made a difference in final course grades and academic learning outcomes. Media attention highlights measures of inequality, and thus this theme was timely and necessary. The issue of graduation rate and course completion rate disparity among ethnic groups is at the forefront of many current discussions within academia and government. With new modes of educating students surfacing daily, the importance of teaching and learning using interactive textbooks in the community college setting could be of great value to students, faculty, administration, and legislatures. With this information, legislatures and administrations can make better decisions on where to give added resources that are effective and give positive results for students.

CHAPTER TWO: LITERATURE REVIEW

Overview

Educational strategies that prove effective in helping students achieve higher completion rates are the terminal point of recent studies. This literature review includes an overview of these studies focusing on minorities, interactive textbooks, and the effects of technology in education. This literature review will also encompass various perspectives to analyze differences between institutions, graduation rates among students and the role of ICT devices in higher education. Evaluation of theories helped form a foundation for this study, including synthesis of related literature on the divide among different facets of education to give context to the research. Finally, this review of the literature helps connect the viability of interactive textbooks in improving course completion rates and higher learning outcomes among minority community college students. The review concludes with a summation of the chapter components.

Theoretical Framework

Learning theories abound; thus, an exhaustive search was purported to seek frameworks that would support research on technologies in an educational setting. Specifically, theories were sought out to highlight the impact technology could have on cognitive learning and processing.

> This is the information age. We use various electronic devices to transfer information from one form to another and communicate with each other, often at great distances. It is not surprising then that at least one developmental theory would use the technology metaphor and focus on how humans deal with information. (Miller, 2011, p. 266)

Information Processing Theory

Miller (1956) is one of the earliest writers on the theory of information processing. Miller developed an information processing theory when technologies were becoming part of

societal environments. The information processing theory compares the brain to a computer. The theory holds that the brain, receives stimuli, processes information, and then works with the body's physiology to send signals in the form of outputs. Miller (1956) equated this process to a computer. Atkinson and Shiffrin (1968) expanded these ideas and discussed the sequential method used by the brain to process information systemically. Atkinson and Shiffrin's stage theory modeled a format in which information travels and is assimilated by the brain. Atkinson and Shiffrin's theories were expounded upon and developed recently by researcher Baddeley (2001).

Baddeley (2001) examined the workings of memory. Specifically, he addressed the levels of variation of cognitive load within the functions of memory (Baddeley, 2001). Baddeley shared three ways the brain works through receiving input, storing input, or retrieving information (Baddeley, 2001). First, there is the load or the memory capabilities of a human. Next, the repetitive nature of certain functions can require less effort because memory becomes automatic. Last, according to which task is being performed, there is a processing of selective attention focused on information retained based on its relevance and necessity (Baddeley, 2001). Bartsch and Murphy (2011) went further with this theory and discussed the critical thinking component for students in the health sciences field. Bartsch and Murphy proposed the effects of certain classroom technological aids that could assist students in conceptualization. According to Bartsch and Murphy (2011), when the brain receives stimuli, it will engage different modalities to parts of the brain to retain information and produce positive outputs.

Multimedia Learning Theory

When looking at technology theories that give rich understanding of this recent inclusion in education, Mayer's (2009) cognitive theory of multimedia learning is suitable and appropriate.

Mayer combined the theories of cognition and problem solving to posit an optimum education design via multimedia outlets. Mayer (2009) went on to separate the learning and instruction as two distinct studies. Learning is theoretical, while instruction is the practicum. This learning theory presents the complexity of two basic channels humans have for learning: audio and visual. The first assumption is the limited capacity that both audio and visual channels have individually. When a learner uses just one channel, they do not maximize their capacity to assimilate the subject matter. Mayer (2009) premised his hypothesis on the promise that if audio or visual were used in isolation when learning, there would be a deficiency in assimilation versus if they were used in unison. The theorist also proposed another assumption when learning via multimedia. The second assumption was that information, when received by either or both channels, has three ways of integrating the information based on pre-existing knowledge. The three ways were selecting, filtering, and organizing (Mayer, 2009). These processes are defined by Mayer (2009) as the "cognitive theory of multimedia learning" (p. 1). This idea encompasses the learning behavior needed to learn the best functionally. When both audio and visual are used in learning, the learner is stimulated and learns at a deeper capacity. Mayer shared that the source of explanation as to why two are better than one channel is due to quantitative rationale and qualitative rationale.

Learner-Centered Design Theory

Scaffolding is the basis for the Learner Centered Design (LCD) theory. This theory holds that both motivational and sequential efforts are essential when designing software, supporting intrinsic learning. Contributors to this theory include Soloway, Guzdial, and Hay (1994). This theory centers its focus on the needs and adaptations of the learner. Software is designed to engage the student in such a way that the increased feedback perpetuates increased engagement.

This engagement increases skill and learning. Quintana, Carra, Krajcik, and Soloway (2001) discussed the four central parts of software design that prove most effective in learning: context, interface, tasks, and tools. The researchers indicated that meaningful learning is experienced when these four central parts are present (Quintana et al., 2001).

This LCD theory is undergirded by the earlier concepts of Dewey's idea on the practical methods of education (Tanner, 1997; Waks, 2018). Dewey gave education the means of innovative awareness involved in redesigning the classroom (Tanner, 1997). Learning centered design parallels Dewey's notions of designing the classroom to focus on practical, real-life education (Waks, 2018). Dewey's theories on the classroom as laboratory were examined by Tanner (1997), as he related the concepts of Dewey's real-life education application to current technological needs. Society runs on technology, and Dewey's ideas congruently featured the training of children amid society's most pressing ambulatory functions (Tanner, 1997). Tanner observed that Dewey's method would have education not focus on the technology itself but on how it is incorporated in most of society's everyday life. Furthermore, Dewey's schools were about discovery and the factors that drive creativity and initiative (Tanner, 1997).

Related Literature

Graduation Rates: The Racial and Ethnicity Divide

According to the National Center for Education Statistics of the Department of Education (2019), at the university level, there is a gap between the graduation rates of minorities (Blacks 21%, Hispanics 32%, Pacific Islanders 31%, and American Indian and Alaska Natives 23%) and those of Whites (45%) and Asians (50%), respectively. These statistics are for first-time students entering a four-year university and graduating within the four-year timeline. At the community college level, the graduation rates are similar. Graduation rates for community colleges students,

according to the National Center for Education Statistics of the Department of Education (2019), within the 150%-time frame (three years) and attending for the first-time seeking an associate degree or certificate were reported as follows: Asians (30%); Whites (32%); Blacks (23%); Hispanics (30 %); Pacific Islanders (34%); and American Indian or Alaska Natives (27%). These statistics also come from the National Center for Education Statistics of the Department of Education from a 2013 cohort. These numbers indicate that only one third of community college students entering higher education are completing their degrees. This data also indicates that when students transfer to the university level, minorities are left behind. The graduating rate of transfer students from a two-year college within six years is 11% (Century Foundation, 2013).

Historically, this divide has been due to segregated societies, barriers to minorities, or in most cases, financial constraints (Buzzetto-Hollywood, Wang, Elobeid, & Elobeid, 2018; Conceicao & Martin, 2016). More recently, the divide has come to include the divide between those who have are proficient in using technology and those who are not proficient due to lack of access (Cabero-Almenara, Arancibia, & Del Prete, 2019; Onye & Du, 2016; Patton, 2017; Conceicao & Martin, 2016). Attaining a terminal degree in the 21st century will necessitate finances, but according to Ali (2019), more pronounced is the access and knowledge in technology. College courses are now run through learning management systems, require coursework to be submitted via the same, and a prevalent number of courses require additional software incorporated within the course (Holmes & Prieto-Rodriguez, 2018; Washington, 2019). Studies have shown that the minority community does not have access to technology compared to other communities (McGoldrick et al., 2015; Conceicao & Martin, 2016). According to the U.S. Department of Education, Office of Educational Technology, and the 2016 National Educational Technology Plan (NETP), equity is defined as a student's ability to "access

educational opportunities with a focus on closing achievement gaps and removing barriers students face based on their race ethnicity or national origin" (NETP, 2016, p. 3). The NETP also defined accessibility as the "design of apps, devices, materials and environments that support and enable access to content and educational activities for all learners..." (p. 3).

In addition to these environmental factors, the perspective toward technology by many minorities is not positive. Conceicao and Martin (2016) found three distinct perceptions among Black male's view of technology. The first perception saw persons interacting with technology as persons acting "White," the second perception saw technology as indispensable to advancing their careers, and the third perception was that technology could be used as a tool to exacerbate their discourse in the political arena. Conceicao and Martin noted how, until there is a positive mindset on the use of technology overall by the Black community, there could be a delay in closing the graduation rates gap. The ethnic and racial digital divide is then a concern for all regarding addressing minorities in the educational gap (Okpalaeze & Primo, 2018; Salvo, Shelton, & Brett, 2019).

Ercikan, Asil, and Grover (2018) conducted a study in 21 jurisdictions around the world. The study investigated the digital divide and the effects on assessments, affecting completion and graduation rates. Ercikan et al. divided their groups by socio-economics and gender. They found that as assessments transition from paper and pencil to the web, a student's knowledge of technology was a determining factor in successful or unsuccessful outcomes. Their research also looked at

> Poor and minority families in the USA that have been identified as being less likely to have access to a computer and broadband internet connection at home and less likely to

have the necessary skills and knowledge to meaningfully use these resources. (Ercikan et al., 2018, p. 4)

Ercikan et al.'s study also found that Black males were less likely to engage with information computer technology (ICT) than Caucasian males and Black females. Gasman, Nguyen, and Conrad (2015) also found as minority institutions emerged, there would be barriers the student body would have to overcome, especially in the area of technology.

Graduation rates are an important measure of academic success. The racial and ethnic divide in graduation rates is a key issue the current administration is attempting to address; thus, further study is necessary, but technology is a key component in the context of the discussion. Graduation rates are a national concern as students from the United States will compete with their international counterparts and work alongside people from other countries and in different regions around the globe. Without educational achievement and knowledge of technology, most will stay or suffer the perils of economic demise. With this understanding then, attaining a degree is a conduit toward economic mobility.

University Versus Community College: The Institutional Divide

Traditional four-year universities differ in scope and sequence from community colleges. Universities offer a more traditional experience for higher education students and may offer more resources. Community colleges are usually open access and offer programs and services that attract non-traditional students, such as veterans or the senior population, providing an opportunity to obtain a degree while staying close to home (Gordon, 2014; Heineman, 2017). Demographics are also varied, as students from minority backgrounds are inclined to attend two-year colleges before they move on to a four-year university (Kenyon, Onorato, Gottesman, Hoque, & Hoskins, 2016).

Community colleges provide for remedial and basic skills necessary to enter the workforce (Hagedorn & Kuznetsova, 2016). The agendas are different for each program, and demographics vary. In this dynamic, community college faculty are more pressed to serve students who may not be prepared for college. Community colleges have more challenges, and because of that, they may consider innovative pedagogy. Kenyon et al. (2016) looked at an innovative pedagogy to assist faculty and students in New York. The pedagogy Consider, Read, Elucidate the Hypotheses, Analyze and Interpret the Data, and Think of the Next Experiment (CREATE) was initiated to enhance STEM programs at New York City College (Kenyon et al., 2016). Researchers found that the college faculty supported the initiative, and the need for STEM majors from diverse backgrounds was also enhanced (Kenyon et al., 2016). Similar to this, a study by Hagedorn and Kuznetsova (2016) that examined developmental, basic skills and remedial programs to assist community colleges in their focus. Researchers looked at programs like learning communities, student success courses, and modularization. Hagedorn and Kuznetsova (2016) found that in states like Texas, Florida, California, Tennessee, and Washington, governmental and non-governmental initiatives assisted community college students but were not significant to impact graduation rates and enrollment rates (Hagedorn & Kuznetsova, 2016).

Campuses at the university level and community college level are not only different but are using technology for learning in different formats. Degrees at both institutions can be obtained online or via in-person classes. Due to society's transient nature of society, students can now receive their degrees online which has lent academic organizations to offer more classes via distance learning. Most universities offer traditional 16-week courses, while community colleges will offer eight or even 10-week courses. Both levels of higher education centers across the

United States have gone from primarily brick campuses to “click” institutions. There is a transition and more offerings on obtaining a degree online within both community colleges and four-year level universities. Fuller et al. (2014) conducted a study on the effects of online technology and graduate students at the university level. As recent graduates themselves, Fuller et al. examined perceptions among education students and online programs. Their own experiences were part of the data collected, as was the Community of Inquiry (CoI) model (Fuller et al., 2014). This model measured social cognition and how teaching presences were perceived and possible factors in online degree experiences at the university level. These degrees were specifically online, although universities also offered blended and mixed offerings (Fuller et al., 2014). Fuller et al. found that online degrees had a cognitive presence that reflected more personalized learning, and students created their educational pathway through their discourse and discussions. The online component led to a strong mental and cognitive demand to execute these types of online courses (Fuller et al., 2014). This is not the experience of community colleges (Adam-Turner & Burnett, 2018).

Studies and research conducted at higher instructions vary in scope and sequence. The upper-division environment lends itself to research methods that produce studies that can affect the workforce and, eventually, the economic structure. A society’s advancement depends on the research and advances performed in different fields by those in universities. Thus, the study on the environment of higher education at the university level and at the community college level aides those in academia to understand the nation’s direction given its technology and citizenry development. Organizational structures at the university level affect the systematic learning environment of the classroom. These structures can help determine how and when faculty use methods of curriculum primarily with the inclusion of technology (Allen & Seaman, 2014; Dinc,

2017). Universities and colleges, in most cases, have the resources to fund technology in the classroom. Nevertheless, not all professors at the community college level have the knowledge nor do they see the need to implement technology in the classroom on par with their university-level colleagues (Liberatore, 2017). Rockinson-Szapkiw, Courduff, Carter, and Bennett (2013) likewise found that leadership at the university level may have an influence over the structure of courses and noted that those universities that provided computers for use by the student had an impact. In contrast, community colleges were not on the same performance level and able to provide for students in such a way due to the lack of resources, and in some cases, the need for hi-tech was not there (Gordon, 2014; Patton, 2017).

One study conducted by Ponnuswamy and Manohar (2016) examined the environment in higher education institutions (HEI) in India and found that there was a significant positive correlation between "the constructs of learning, organization culture, knowledge performance, and research performance" (p. 21). A multiple linear regression method was used to analyze the data, and this resulted in positive connections (Ponnuswamy & Manohar, 2016). Measuring only cognitive learning formed a narrow form of analysis.

A study by Ali (2019) showed how the proliferation of new ICT's had launched a new format for producing pedagogy and practice in university-level courses (Bolsen, Evans, & Fleming, 2016; Morrison, 2015). These results also showed how higher education's evolution is morphing into an unexplainable experiment that uses its technological force to expand diverse learning style accommodations (Henderson, Selwyn, & Aston, 2017; Mirzajani, Mahmud, Ayub, & Wong, 2016). The most prominent technological component at the university level has been learning management systems that may carry other technology embedded within the system. Although community colleges may have technology tools, the student population does not have

the experience to implement them as successfully as those at the university level. There are various other ICT's that have been useful for students and have seen both strengths and challenges for students and teachers at both levels.

Jaimez-Gonzalez and Luna-Ramirez (2019) studied the effects of ICT's in higher education at the university level and found that certain ICT's supported self-learning through certain types of labs. At the university where the study was conducted, thematic laboratories were established, and students used ICT's to improve self-efficacy in engaged learning activities (Jaimez-Gonzalez & Luna-Ramirez, 2019). Projects were developed in a series of autonomous assignments. ICTs were used to promote self-learning that would simulate real-life professional practice. The need for students to become active participants in their learning was fostered (Frasen et al., 2015; Jaimez-Gonzalez & Luna-Ramirez, 2019). Community colleges have limited access to advanced ICT's due to budget restraints and training. Faculty attempt to engage students in the material via technology, but a need still exists for deeper training for students in these modalities to gain equality with their peers at the university level. There is a diversity of different types of instructional books in both digital and in print. Both faculty at the university and community college have access. Those in community colleges are hesitant to use a more technical curriculum due to the predominant student lack of experience and sustainability in the classroom with such texts (Adam-Turner & Burnett, 2018). As the world moves toward the digital, the e-texts and their variations are becoming more prevalent, and a topic of discussion among administrations in universities and colleges is ensuing (Rice & Alexakis, 2015; Rockinson-Szapkiw et al., 2013).

Studies completed on the impact of instructors and administration on the digital curriculum selection are varied at both the university and community college levels. One study

looked at university level students in the field of education and their susceptibility to navigating their courses via an e-text, albeit e-texts with different learning tools.

These decisions made by the administration at the university level brought into consideration student preference, advancement in technological readers, costs, and other such elements (Rowsell et al., 2017; Subramony, 2018). Subramony (2018) studied instructors who designed their e-texts with varied results. The findings were related to control over their content and emphasis on a strong grasp on their instruction.

Research is a key difference between university and community college institutions. At the university level, research is more accessible and complete, so that studies such as Subramony's (2018) are active. In contrast, Adam-Turner and Burnett (2018) reviewed the perspective of digital learning (DL) and digital literacy adoption at community colleges in the rural region of the southeast United States and found it lacking in the area of research. Digital learning encompasses all aspects of things digital, including learning management systems (LMS), web classes, and instruction via different digital platforms (Adam-Turner & Burnett, 2018; Cabero-Almenara et al., 2019; Edgcomb et al., 2015). Researchers have consistently found certain aspects to be compatible and other aspects more difficult to implement in a community college setting (Adam-Turner & Burnett, 2018).

Leadership in community colleges recognizes the importance of digital literacy, acknowledging that the current global status limits classroom and face to face instruction. Recent times have necessitated remote learning across the country, and administration realizes now more than ever that digital access and bringing their students up to current standards is not an option (Adam-Turner & Burnett, 2018; Ercikan et al., 2018; Mohmmed et al., 2020). There is an important role for community colleges to play as these local institutions are essential elements

in closing the digital divide and serving the minority population in their areas. Policy research and the demand from the public necessitates that universities and colleges should make the necessary adoptions to incorporate digital literacy (McGoldrick et al., 2015). Instructors reported positive experiences in creating a classroom with digital resources at both institutions, the community college, and university levels. More work needs to be done in training (Subramony, 2018). In some cases, students were more engaged if they were more digitally literate, and the problems of a student's lack of reading ability were able to be remedied, not completely but to a greater extent, when digital literacy was present (Subramony, 2018).

Technology on Campus: The Digital Divide

Most research presents the digital divide by categorizing the divide into three areas of causation. The three categories are access, frequency, and user ability (Rowsell, Morrell, & Alvermann, 2017; Rubinstein-Avila & Sartori, 2016). Recently, many at the university and community college level see the need to close the digital divide gap among their students. Rowsell et al. (2017) presented information on alternative causes of the digital divide. They looked at previous research beyond just comparing the financial issue as the catalyst causing the digital divide. Rowsell et al.'s research found that other confounding elements such as the inequities in computer literacy, literacy in technology, use of single and multi-modal digital text were also contributors to the digital divide (Rowsell et al., 2017). Gutierrez (2016) expanded on this notion by describing digital learning at the core of building resiliency at the university and college levels. This type of resiliency can extend beyond using digital text to better understand course content, and the connections college students need to make for daily school life (Gutierrez, 2016). Karabacak's (2016) study on the Faith Project program in Turkey's universities determined the digital divide relatability to those of the United States. The

government took a proactive measure to distribute technology and instructional material to students. The government then analyzed if the nationwide distribution of technological tools would close the digital divide in their country (Karabacak, 2016). Their findings and final analysis were that there still was the divide within the borders of the country, but in this case, unlike Rowsell et al. (2017), the divide varied depending on geographical location such as residential areas and different provinces (Karabacak, 2016).

Even though Karabacak's study students were given the same materials, there was still a disparity in user knowledge and implementation (Karabacak, 2016). This disparity brings important factors to consider when designing programs to assist students and attempting to close the digital divide. Most notably, in the educational arena, when shifting toward digital instructional tools, assumptions that students will adhere to guides, understand the tools and begin to access the information may not be completely correct (Karabacak, 2016; Thomas, 2017). Bringing forth compelling means to engage the student is a viable solution. In Thomas' (2017) research, merging together the video game concept with the learning text may be a format to demonstrate a sufficient case for effective and innovative learning. This idea for college students to engage with a textbook that mirrors their video games, may be a new venue for bringing learning to the student world (Thomas, 2017).

Levy (2017) conducted a study and examined the technological tools offered to students. These tools were technologically enhanced to assist students in completing their courses and degrees. Levy's study took place in a community college and focused on comparing the benefits of hybrid, online, and other formats of technology-driven classes. As a factor in improving career readiness, technology was looked at and studied to see if there was an effect on the students' success rate at the community college level. (Levy, 2017).

Levine and Dean (2013) encountered positive results when studying the benefits of technological opportunities on campus. Levine and Dean's study conducted a focus group, and one student's definition of technology summed up the focus group expectation of technology, "technology only applies if it happens after you are born," was the student's remark (Levine & Dean, 2013, p. 8). Thus, the perception on campus was that the digital devices they carried were standard and not technology. Levine and Dean gathered data from undergraduates between 2006 and 2012 from across the nation with a sample size of 5000 and used both interviews and focus groups. There were 33 different campuses where the authors met with student leaders and administrative staff. The average age for both full-time and part-time students was between the ages of 18-25. The perceptions of administration and staff were that digital natives pose a new conundrum to universities due to their expectations, which need for immediate responses to their inquiries. There was a new term used "diphobe," or someone who fears being without a technological device, which was a good description of students involved in the study and on-campus overall (Levine & Dean, 2013). Their study also found that today's students have more frequent contact with their families and use their time differently than students of the past (Levine & Dean, 2013). This conundrum has caused both administrations and faculty to find ways to end the technological divide on campus at their respective institutions.

Other studies did result in the student's preference for face to face communication. This was primarily in the area of library consultation. A study by Magi and Mardeusz (2013) sought out library connections and found that although students were digital natives and were immersed in technologies and social media, the library still conducted more face to face meetings at the student's request. Their study, conducted at the University of Vermont, came back with distinctive results from those done that assumed students always wanted digital connections

only. Magi and Mardeusz (2013) interviews with students on campus showed the value placed on face-to-face consultations in the library setting. Results indicated more face to face consultations were requested, and students were hesitant for these to be replaced by online consultations. This contrasted with other studies studying class instruction preference (Magi & Mardeusz, 2013).

The importance of social presence in collaborative learning, blended course offerings, and computer-supported environments were measured using various instruments in a study done by Sorden and Munene (2013). They used the Collaborative Learning, Social Presence, and Satisfaction (CLSS) survey. The demographics on most campuses were varied, with Latinos having a heavy presence. The researchers found that Latinos had a stronger perception of the importance of social presence, and FTF classes were important to them (Sorden & Munene, 2013). Sorden and Munene (2013) also found that collaboration and social presence were linked with higher learning outcomes at the community college level. The study presented recommendations for future studies in better programs and services to support student academic and social needs and found high satisfaction with blending and FTF learning environments (Sorden & Munene, 2013). This is one of the first studies to find a relationship between social presence and the Latino community within higher learning course offerings.

A more expansive study on the implementation of textbook technology decision making included three community colleges. Walters State Community College, Kirkwood Community College, and Delta College were the setting for Patterson's study on implementation decision making and considering the digital divide (Patterson, 2017). Each college took a distinct process to decide on textbooks to include a governance mechanism and to include administrator's faculty and student in these decisions. The process was transparent and displayed on their website to be

updated as the progression of the material was implemented (Patterson, 2017). Patterson conducted a pilot test, and results found that all three universities' process gave a sense of ownership to students and faculty (Patterson, 2017).

Thomas's (2017) study made an aggressive argument into the relatability of textbooks to student lives as the more important factor in the administration's decision to implement curriculum. The process of inclusion of textbook adoption may be an added factor in addressing the digital divide and a more important factor to consider in increasing student/textbook engagement (Thomas, 2017). The use of traditional textbooks and the purchase of these textbooks have steadily dropped, and as the main source of learning outside the classroom, alternatives need to be searched (Edgcomb et al., 2015). According to research, interactive textbooks may meet the needs of the students in this digital age, according to research (Edgcomb et al., 2015).

Online, Blended, Face-to-Face, and Remote Learning: The Teaching Divide

In other countries, some universities offer learning using different formats. These include blended, online, or face-to-face (FTF). Safar and Alkhezzi (2013) noted how technology in learning is advancing due to information and communication technology. These technologies are enhancing learning domestically and worldwide and bridging the learning gap. Due to globalization, learning in other nations is advancing, and students in those systems will need to adapt to learning via digital technology (Dinc, 2017; Ponnuswamy & Manohar, 2016).

Afzal, Gondal, and Fatima (2014) conducted a study to look at the statistically significant difference between instruction methods (online, blended, and FTF). Afzal et al.'s sample size included 78 students, each from four different schools. Groups ranged from low, average, to high achievers and were given a pre-test and a post-test. The subject area was math, and the methods

of instruction included traditional, computer-assisted instruction, and teacher inclusion with software for learning mathematical concepts. The areas of concentration were geometry, integers, and algebra. Students that received instruction with facilitation did better than those students who were given instructions through software and other methods (Afzal et al., 2014). This rate was true for students from mostly low achieving groups. The higher achieving students had no difference in pre-and post-test scores. The school population came from rural and urban areas. The study demonstrated that age level might be a factor when weighing the benefits and cost of computer-assisted instruction (CAI) use (Afzal et al., 2014). Technology in lower grades may not prove useful in this demographic and group unless aided by teacher facilitation (Afzal et al., 2014).

Likewise, a study implemented by Bolsen et al. (2016) examined upper grades for a comparison of instruction given via online versus FTF. Their study was conducted to examine if there was a statistically significant difference in learning outcomes in the teaching of an introduction to United States government courses. Two formats of the course were delivered: face to face and online. Four modes of instruction were given to students in the class. The first was a traditional setting with a teacher-centered approach and was fully face to face. The second method was 50% lecture and 50% of the time in collaborative groups. The third instruction style included an interactive textbook with face-to-face meetings and activities for a mix of discussion and group work. The last was delivered online with no face to face contact. The results were compared, and there was a significant difference in course completion rates, with fully online having the most drop rates (Bolsen et al., 2016). Students learning with interactive textbooks attributed any success in the course to their learning material, and objectivity was seen more in students who were in the online-only and blended format (Bolsen et al., 2016).

Dudaite and Prakapas (2017) conducted a study in the country of Lithuania. The teachers in the sample used ActivInspire technology. This curriculum and learning management evaluation system was examined for its usefulness in the classroom and its impact on student learning. Teachers answered to the response system feature that engaged their audience. Teachers also reported that the material was attractive and user friendly. Safar and Alkhezzi (2013) also conducted a study at Kuwait University on computer literacy. This study used methods to measure if the integration of information communication technology (ICT) made a difference in curriculum transformation and teaching satisfaction (Safar & Alkhezzi, 2013). Unlike Dudaite and Prakapas' study, which only looked at the curriculum, this study also examined the delivery difference. Deploying technology via different modalities is just as important as teaching the technology itself. Safar and Alkhezzi (2013) studied both the teaching technology tool and the course delivery component. Safar and Alkhezzi (2013) reported results based on their experimental groups, which consisted of students in the undergraduate program in the College of Education taking these courses online, blended, and FTF. There were 64 students in the control group and 64 students in the experimental group. The authors' report included findings that implicated the students enrolled in blended learning were more present in their courses, took more tests, and the majority were proactive in all their classes (Safar & Alkhezzi, 2013). Students attending blended courses were involved with ICT modalities and engaged more in class discussions. Teaching and learning experienced were more robust due to the inclusion of technology components in a blended environment, although the online component also showed positive results (Safar & Alkhezzi, 2013).

Garner and Bonds-Raacke (2013) studied the influence of technology's direct use by educators and the level of direct instructions. The purpose of their study was to find the link or

gap in reviewing the conceptualization of teacher efficacy in educational technology (Garner & Bonds-Raacke, 2013). Their study went into more depth regarding the most effective deployment of technology in the classroom and the key factor being the instructor's knowledge and capability. They proposed the five best practices of technological adoption (Garner & Bonds-Raacke, 2013). These practices include teacher familiarization, utilization, integration, reorientation, and evolution. When it came to technology, their teacher efficacy evaluations were much lower than the teacher perceived their efficacy to be. The study evaluated 17 students who were current students in a Master of Education degree program. All 17 students completed a course on technological utilization in the classroom. Results found that the graduate students were knowledgeable in technologies but were not proficient at integrating said technology in the classroom effectively (Garner & Bonds-Raacke, 2013). This study indicated the necessity for further studies into better teacher preparation before, during, and after the technology is purchased by a school.

Gordon (2014) studied the perceptions of non-traditional students in a community college setting in West Texas. This qualitative study effectively examined the experiences of community college students required to take an effective learning student success course. Although this study deviates from the technological theme, it is important to understand community college students' perceptions of engagement. The study concluded that non-traditional students' perceptions were positive regarding active engagement and academic outcomes (Gordon, 2014). Thus, when looking to engage technology in the community college, considerations may also be necessary for students who emphasize the importance of a sense of community in a college setting. Some students stated technology is a key determinant of doing well in their courses. The same holds for non-traditional students who will engage with technology but still want the sense

of community at their institutions (Gordon, 2014). The assumption is that all students know and understand electronics and are proficient in handling technology in their courses. The contrary, in some cases, is true. Gordon's study brings awareness that certain students may be proficient on their cell phones or personal devices but are very ignorant about technology in the classroom (Gordon, 2014).

Hauk, Salguero, and Kaser (2016) studied a web-based activity and testing system (WATS). This interactive tool included various videos, problem sets, scaffold learning, and other systems set up for teachers to monitor and give students feedback. WATS was used in mathematics courses, particularly in the community college setting. The results were mixed, with most students needing remediation due to a lack of understanding of the system (Hauk et al., 2016). This study highlighted the importance of adopting technological tools with examinations that challenge students with content that will lead to mastery (Hauk et al., 2016). This undergraduate program was also tested for implementation, as emphasized by Gordon (2014). The audio and visual components were part of the increase in learning outcomes.

Mathew and Alidmat (2013) discussed the issue of audio and visuals in English as a foreign language (EFL) classrooms. Mathew and Alidmat stated his group's effectiveness when implementing audio and visual aids for effective learning and instructions. Their study focused on EFL specifically, and survey results were at a 73-26% split in favor of audiovisuals for learning. The study was done in Saudi Arabia as their need for higher education has grown in recent years. Several studies have been conducted with technology in the classroom and on mobile devices. Audio and visual is an important part of learning, and studies are determining more and more their usefulness and necessity for student engagement (Lokar, 2015; Mohamedhoesein, 2017).

Zimmerman's (2013) study looked specifically at demographics, technology and mobile devices. One hundred students participated in Zimmerman's study. The researcher divided them up into four sections that used different materials for classification. The professor was the same for all four groups, but two groups used traditional textbooks and the other group of students as part of an online program using simulations. There was a statistically significant difference in exam scores between the two groups. The group in the simulation group exceeded expectations and reported more engagement (Zimmerman, 2013). They reported significant relatability experiences with the real world since engaging with the simulation, mobile device, and the program (Zimmerman, 2013).

Globalization is a reality that will require U.S. educators to prepare students to work nationally and internationally via technology. According to the Organization for Economic Cooperation and Development (OECD), basic skills worldwide will include digital literacy (Art & Jervis, 2017; Nye & Welch, 2017). This organization attempts to bridge the ethnic divide economically and has emphasized the need for more digital literacy to help those of minority status globally to bridge the gap digitally. This type of literacy then is crucial to bridge the gap in the ethnic and racial digital divide here in the United States and around the world (Karabacak, 2016; Onye & Du, 2016). This will enable students to engage in the college opportunity and complete their degrees by graduating and becoming contributing members of the new global society.

E-Textbooks Versus Interactive Textbooks: The Instructional Divide

The digital age has thrust many in circles of education toward looking for different approaches to learning (deNoyelles, Raible, & Seilhamer, 2015; Frasen et al., 2015). Instructors are trying to increase their knowledge of new technological curriculum and the effect on teaching

and learning. E-textbooks have been introduced at the higher education level since the beginning of the century. The idea of e-textbooks was to lower the cost of traditional textbooks and the weight-bearing component for college students (deNoyelles et al., 2015; Florida Virtual Campus, 2016;). Research completed at a four-year university found e-textbook use was on the rise, with younger students gravitating towards purchasing them more than traditional textbooks (Dennis, Abaci, Morrone, Plaskoff, & McNamara, 2016; deNoyelles & Raible, 2017).

There is a diversity of different types of instructional books in both digital and in print. As the world moves toward the digital, e-texts and their variations are becoming more prevalent and a topic of discussion among administrations in universities and colleges (Rice & Alexakis, 2015; Rockinson-Szapkiw et al., 2013). One study looked at college students in the field of education and their susceptibility to navigating their courses via an e-text, albeit e-texts with different learning tools. The administration's decisions considered student preference, technological readers' advancement, costs, and other such elements (Rowsell et al., 2017; Subramony, 2018). Studies done on the impact of instructors and administration on the selection of a digital curriculum is varied. There is more research to be done as this is an influential component of academic life for every student.

Technological devices at higher institutions now are displayed in an array of instruments and the effects are varied but used most often by those fully trained. Researchers at the university level found no difference in cognitive learning or the student’s grades between students who used an e-textbook and those that used traditional print textbooks but did find a difference in engagement (Rockinson-Szapkiw et al., 2013). In some cases, instructors have gone on to be involved in the design of e-textbooks. This movement of faculty designers has begun to spread with few key issues still to overcome. Subramony (2018) studied instructors who designed their

e-texts with varied results. The findings were related to control over their content and emphasis on a strong grasp on their instruction. Instructor designers are gaining more credence and have a mixed objective.

Florida Virtual Campus (2016) conducted a multi-year study into the effectiveness of their program. Florida Virtual is an online program for high school students who do not attend the traditional brick and mortar building but rather attend classes online. There are teachers who communicate with students, and tutors are available when necessary. This was a multi-year study from 2014-2016. Their study on textbooks and course materials found key barriers to a successful implementation of a technology-based curriculum were identified (Florida Virtual Campus 2016). The barriers were availability, effectiveness of the e-textbooks as a guide within a course, state initiatives for student affordability, and the hesitancy for professors to adopt these devices in their courses (Chen, deNoyelles, Patton, & Zydney, 2017; deNoyelles & Raible, 2017; Florida Virtual Campus Survey, 2016). Of the barriers mentioned, instructor implementation was the most critical roadblock to student access.

E-textbooks continue to evolve with little features or changes yet, with a promising expectation of improvement. Publishers and educators, realizing the e-textbook were not achieving projected satisfaction, began to develop a more advanced textbook with features that would mimic daily operational devices. Interactive features would go beyond reading capability (Dennis et al., 2016). The interactive textbook was developed.

Going beyond just e-textbooks, this newest technological learning device has redefined the use of textbooks. This latest initiative has been a topic of discussion among many professors. Interactive textbooks now engage readers through thematic questions woven throughout the text, access to professors while reading the book, and short evaluation methods to reinforce just

learned concepts (Dennis et al., 2016; Safar & Alkhezzi, 2013; Solcova, 2016; Van Horne et al., 2016).

Van Horne et al. (2016) explored an area of interactive textbooks often left alone: the markup tools. Van Horne et al. used Diffusion Theory as their framework and sought out analysis on students' use of highlights, annotations, and questions and answers within the textbooks (Van Horne et al., 2016). The authors also used data mining to compare time spent in an interactive textbook to those that used only printed text marks. Prediction measures were used to relate grade point average (GPA) to time reading (Van Horne et al., 2016). The researchers found that usage of the tools decreased closer to the end of the term and that students who spent their time bookmarking had an improved content understanding (Van Horne et al., 2016).

Dennis et al. (2016) conducted another study using 52 college students of a business course. Students were given either a hard copy textbook or an electronic book. Researchers in this study used random assignments. All students took open-ended tests and multiple-choice tests. Grades for open-ended tests were higher for students using electronic textbooks. Grades were equal for both groups of students on the multiple-choice test (Dennis et al., 2016). Researchers concluded that learning was more substantial with those students using the electronic textbook because of the critical thinking needed to answer the open-ended questions (Dennis et al., 2016).

Edgecomb et al. (2015) also looked at the effects of interactive textbooks on learning outcomes. The researchers also made a comparison of final project grades between students using interactive textbooks and those using traditional textbooks. The study ran across several semesters among three universities. These included the University of Michigan, the University of California-Davis, and the University of Arizona. The sample size was 2,000 participants.

Researchers found students using interactive textbooks improved in all course grades by 16%. Students in the lowest quartile of ranking also improved by 64% (Dennis et al., 2016; Edgecomb et al., 2015). The researchers also conducted a quantitative study to analyze course grades and the statistical difference for STEM program students. Their results showed that students spent more time engaged with the textbook, due to the minimal text in comparison with traditional textbooks (Edgecomb et al., 2015). Interactive textbooks also have question sets for learning, animated figures to give comprehension to concepts as well as markup tools. These results compare with results observed by Van Horn et al.'s study (2016).

Hilton (2016) had similar observations. Hilton's study was on open educational resources (OER). OERs are important for those in financial need. College may become an unattainable goal due to rising costs, and this is most evident in the cost of textbooks. Hilton's (2016) study added the component of efficacy to researching OER's effects and if students were able to participate in higher education with the accessibility of OERs. The two-fold focus was on perceptions of college professors on OERs and the influence these resources had on student learning outcomes. Their conclusions were similar to the studies by Van Horne et al. (2016) and Edgcomb et al. (2015). Their findings led to a positive reception by both instructors and students regarding OERs, but learning was parallel to those students using traditional textbooks (Hilton, 2016).

Liberatore (2017) conducted similar studies as conducted by Hilton (2016). Liberatore (2017) was prompted by the lack of reading students were exhibiting in the field of chemical engineering. Costs of textbooks were likewise a factor of student disengagement in reading (Conradty & Bogner, 2016; Liberatore, 2017). Liberatore (2017) and Conradty and Bogner (2016) found that the use of interactive textbooks increased motivation and knowledge. In

Liberatore's (2017) study, the chemical engineering students who used interactive textbooks were able to complete their projects via their digital textbooks, which allowed for descriptive feedback from the professor. This usage, they concluded, led to more engagement (Liberatore, 2017).

Pacurar and Clad (2015) suggested interactive whiteboards and, digital teaching with a contextualization component to add active learning and processing to education. Their study, conducted abroad, found that teachers had more positive experiences when employing such devices (Pacurar & Clad, 2015). This study conducted in the French school system was guided by analyzing the interaction with both whiteboards and their connectivity with the students' interactive textbooks. Their hypothesis concluded that the functionality of whiteboard and interactive textbooks was dependent on the subject matter taught (Pacurar & Clad, 2015). Teachers in the science and math areas had to add special features to enhance engagement versus other subjects taught. When features were added, there were more similar positive learning outcomes alongside other disciplines (Pacurar & Clad, 2015).

Sun and Jiang (2015) conducted a study abroad to test interactive textbooks' usefulness in China. This study included more than 6000 students across 147 elementary schools. Researchers only selected subjects who could answer surveys online, and thus many potential students were eliminated from participation. These interactive textbooks were able to be used online and offline. These were the types of textbooks also used in Solcova's (2016) study. Both studies used interactive textbooks that connected to the web and were able to receive teacher feedback. In each study, participants were asked about the new books compared to their former textbooks. All groups noted that they seldom read the previous works, which excluded them from full participation in lectures or ready preparation for class (Solcova, 2016; Sun & Jian, 2016; Van

Horne et al., 2016). Solcova's (2016) study focused on the independence that interactive textbooks had on self-learning. These books could provide lessons on schoolwork, leisure activities, and foreign language learning (Solcova, 2016).

Conradty and Bogner (2016) examined research results for learning outcomes and Deeper Learning (DL) in their study. Their instrument surveyed intrinsic motivation. By using the Intrinsic Motivation Inventory (IMI), they monitored efficacy, comparing textbooks and computer-aided books. Their sample included 393 eighth graders and measured technology overload (Conradty & Bogner, 2016). Their study was quasi-experimental and also tested for differences by gender. Their findings indicated the girls' intrinsic motivation was higher than the boys. Long-term memory was also tested, and the study found higher test scores from students using interactive textbook-based lessons. Retention testing was lower than expected. Their final conclusions indicated that although shorter retention was found in the short term, long-term knowledge was high. Therefore, they concluded that deeper learning did occur with the use of interactive technologies (Conradty & Bogner, 2016).

Learning: The Comprehension Divide

Researchers are confounded by the mind and how learning works (Henderson et al., 2017). The field of education is dedicated to improving how the learning process works. In learning, biology presents that synapses spark different wires and humans grow in knowledge (Cozolino & Walker, 2018; Sousa, 2016). However, the paradigm shift has changed, and learning behavior and pedagogy patterns have become transformative in many areas due to the technological age (Onye & Du, 2016). A once teacher-focused classroom is now transforming into a student learner-centered one (Christensen et al., 2009).

Christensen et al. (2009) state that the current status quo in the field of education is stagnating and becoming destructive due to the lack of learning and the continued focus on the teacher center model. Every area of society has advanced, but learning seems to take place in a vacuum when it comes to the public-school system (Christensen et al., 2009; Liu & Roohr, 2013; Roohr, Liu, & Liu, 2017). Christensen et al. (2009) wrote how there must be a disruption in learning if effective outcomes are to take place. The once horse-drawn carriage mode of transportation was not improved upon by getting better horses but rather by inventing the automobile. In education, most administration and faculty agree that they must do the same. The learning and processing stages of education are in need of innovative practices, and some suggest that technology could be the disruption necessary (Christensen et al., 2009).

If the influence of the internet and technology could be positive and positively affect the economic status of those living in emerging and developing countries, the same could hold true for those emerging into the middle class in the United States. According to Pew Research, 64% of the 32 most developed nations commented that the internet's influence has been positive on education (Pew Research Center, 2015). Researchers of the Pew Research Center (2015) on the effects of the internet on emerging nations also suggest that accessibility to internet usage is related to per capita income. The widespread usage of cellphones at 84% in most developing nations has allowed for mobility among the poor classes because they are no longer reliant on landlines but can communicate via text messaging and the internet through their phones (Pew Research Center, 2015). Engagement is the key factor in learning and processing, and younger generations engage and learn via technology.

A comparison study was done by Rockinson-Szapkiw et al. (2013), showing that learning areas were lacking in technology-rich interactivity with students (Christensen et al., 2009).

Focusing on a student learner design, Brown, Roediger, and Mc Daniel (2014) explained how successful learning takes place with instruction that supports scaffolding and in methods that are interleaving. In this method, the student reviews concepts, then leaves the material, engages with other content, and then returns to the original content. This learning is embedded in many technological types of a curriculum (Dennis et al., 2016). Rockinson-Szapkiw et al.'s (2013) study highlighted the traditional methods as lacking and the openness to attempt to remedy learning in today's classroom, through interactive technology versus teacher-centered instruction.

Due to a decrease in higher education funding, administrations across the nation are looking for better ways to improve students' learning outcomes. Kissinger's (2013) study looked at learning via mobile devices and students' experiences using social outlets. Kissinger's study came to four main conclusions. First, students did feel confident in usage, as well as competent. Students also could individualize their learning, which lent themselves to enhance their socially-situated learning. Lastly, the instructor's and students' views on the value did diverge (Kissinger, 2013).

Mobile devices can now connect students of different cultures and races to each other. One day this connection could influence learning internationally so that students could study and learn across borders. Studies on international learning and technology also show the importance of awareness of the digital divide between the United States and other countries (Onye & Du, 2016). This shift in technology can bridge or disparage the learning between developed and underdeveloped nations, which is a case for further study. Students in the United States will need to compete with global peers and interact with individuals from other cultures. Technology does

influence a nation's progress, but the widespread use of technology in learning in other countries may not be at the level it is in the United States.

Millennials Versus Generation Z: The Literacy Divide

A recent study examined minority students' perceptions of attending a Mid-Atlantic university (Buzzetto-Hollywood & Alade, 2018). In this study, students considered to be part of the Gen Z generation were surveyed. The Gen Z generation is considered to be those persons born between the 1990s and 2016 (Buzzetto-Hollywood & Alade, 2018). The Gen Z generation is outnumbering the millennials and is described as the authentic digital natives (Buzzetto-Hollywood & Alade, 2018). Gen Z was born into the era of using cellphones holistically. Many in this group identify as first-generation, minority college students. Their reputation for short attention span, lack of single focus but rather attention to multiple tasking projects is evident in their preferences in technology courses, such as computer literacy courses (Nguyen, Bibo, & Engle, 2012; Patton, 2017). This generation is changing the canvas of teaching and learning. Academic institutions now offer more modalities to serve this generation better, while still having to tend to the millennials (Buzzetto-Hollywood et al., 2018). Gen Z makes up almost 74 million individuals or a fourth of the U.S. population (Buzzetto-Hollywood et al., 2018).

Gen Z individuals are described as technologically knowledgeable but are deficient in thinking critically and have a tethering to their cellphones. Their technological language differs from the millennials in that their technology preference is their phones, where millennials were attached to their computers and their video games. Gen Z individuals' lives are embedded in technology and have an intense relationship with them (Buzzetto-Hollywood et al., 2018; Patterson, 2017). Studies have found that this interconnectedness has built a dependency on their

cell phones. It is the way they learn about the world around them and how they communicate with everyone.

The emphasis in college preparedness in technology is highlighted in a study done by Sparks, Katz, and Beile (2016). Sparks et al. found that there is a direct connection between the deficiency in tech knowledge and lack of employment. This may lead to a lesser quality of life, and those minorities with deficiency are affected the most (Sparks et al., 2016). Dixon (2017) noted in the *Library Journal* that, overall, there were inequities among college students' technological knowledge. These deficiencies were more pronounced among first-year college students. This information gives importance to the study of technology in higher education, especially among minorities susceptible to the digital divide.

Student Engagement: The Emotional Divide

Dinc (2017) stated, "If we would like to design an effective learning environment, this learning environment should represent the real-life and contain the abilities of human beings to connect via technology" (p. 237). This study concluded that students are not motivated or engaged unless they can relate their learning to their real-world (Christensen et al., 2009; Dinc, 2013). Learning styles are another aspect of how technology could be used to effect change in the classroom. This change may be the catalyst for change in higher educational institutions (Liu & Roohr, 2013; Ponnuswamy & Manohar, 2016; Rice & Alexakis, 2015).

The studies on completion rates are a testament that higher education learning is not where it should be, and an investigation on technology is worthy of study. Studies suggest that the social cognitive aspect of learning could be met better with technology (Brown et al., 2014; Christensen et al., 2009; Dinc, 2017; Erlich & Russ-Eft, 2013). Perceptions and satisfaction among students could also improve engagement using mobile devices used in academics

(Kissinger, 2013; Liu & Roohr, 2013). The current technology is also very personalized. Today's two main aspects of technology apparent with young persons are technology is instantaneous and almost always cost less.

Ponnuswamy and Manohar (2016) described the importance of Higher Education Institutions' (HIE) sense of community in their study. There is a need in this environment to adapt and operate more responsively to enhance the learning community. A sense of community is an important aspect that affects college students. This permeates the society, and the connections between a more stable society and the advancement of learning among a community's citizens are strong (Brown et al., 2009; Ponnuswamy & Manohar, 2016). In Ponnuswamy and Manohar's (2016) study, the researchers observed that perceptions of staff at higher educational institutions in India and their learning culture were a strong positive correlation "amongst the constructs of learning organization culture, knowledge performance and research performance" (p. 21). These factors led to better classroom engagement.

The studies by Dinc (2017) and Ponnuswamy and Manohar (2016) lead to similar conclusions on the importance of higher education learning and its connection to engagement. The instrument used in Ponnuswamy and Manohar's (2016) study included the Dimensions of Learning Organization Questionnaire (DLOQ). This tool's employment revealed statistics and perceptions among instructors that would allow the administration to consider changes. Rice and Alexakis (2015) studied the impact of praxis culture in building a stronger academic environment, focusing on the increase in student engagement. This idea of a new practice in how students learn could deviate from what teachers are accustomed to but may be a new format for future learning studies. Rice and Alexakis helped implement an innovative culture of praxis in a particular university, and the results were significant student learning and student engagement.

The International Economic Model: The North and South Divide

The Global North includes the industrial countries in regions that can manufacture various goods, while skilled labor is required, and wages are higher per person (Pevehouse & Goldstein, 2020). The Global South refers to the countries in regions that obtain raw materials such as agricultural goods and uses small amounts of capital while paying their workers very little. Educational resources and the lack of access to them highlight a gap in educational levels between the Global North and the Global South. Groups in the Global South stayed in a life cycle of poverty or extreme poverty (Pevehouse & Goldstein, 2020). The Global North provided more opportunities with capital growth and a presentation of various jobs. Themes on how technology has sped up the globalization process that has brought a more level playing field to underserved areas are evident in education, economics, and research (Art & Jervis, 2017).

Technology and its accessibility have been the change agent in many states in the South. As the internet touches more people, this disruption is more transformative than the printing press, the airplane, or the telephone. More than ever, people in remote places have access and are becoming part of the global market. Those from the Global South are leaving a life of extreme poverty (Perrotta & Alonso, 2019; Scott, Carter, & Drury, 2019). Aside from the temporary economic crisis of 2008, the economic lower classes in countries like Brazil, Argentina, Turkey, and Vietnam were emerging middle class due to economic opportunities with technology aid (Scott et al., 2019). This aspect of people groups attaining better economic status in the international global system is new and partly due to technology (Pevehouse & Goldstein, 2020). As time passed, the introduction of technology in the developed world launched a new economic growth era, and expansive market reaches. The Global South was consistent in its status quo and could not participate in the techno world until recently.

The economic divide between North and South has existed for decades, but in the midst of dynamic change as world markets open for countries of the global South. Until recently, these developing countries seemed light years away from attaining first world status or being partakers of the international market. The idea of the "tragedy of the commons" demonstrates that if efforts are not made to lessen the gap between rich or poor, those that succeed against those who fall behind, then there will be nothing for anyone (Sabzalieva, Martinex, & Sa, 2020). All suffer in the tragedy of the commons because the resources are taken, and nothing is left to replenish for others. Only the very wealthy in these societies could afford to send their children to the Northern countries to study. At the same time, most of the population would continue in the same economic status of survival. But there has been a change in the last seventy years. Within the last few decades, there has been a shift, and those countries, many believed were destined to continue poverty and abysmal living conditions, have risen out of their status to enter the realm of global markets. How has this gap begun to close? Through the introduction of technology to the general population. The divide of the Global North and South continued until recently. The 1980s and the 1990s were marked by a worldwide push toward a neo-liberal economic system (Roy, 2016). This push led to the industrial countries to gain ground while leaving behind the poorer nations.

The International Technological Model: The Accessibility Divide

Third world countries in South America, Asia, and Africa have lived the economic divide which had been stark for several years. Further, within these countries was also an expansive divide between the educated and the uneducated. In the area of technology, countries in these regions have traditionally also experienced a lack of industry to try to compete globally and engage technologically. According to research conducted by Art and Jervis (2017), for decades,

schools and basic needs were unmet due to power outages, expensive trade, and minimal imports. Many were left to study in ill-equipped buildings in schools servicing the poorer students, limited access to basic needs, and much less technology.

Due to this century's expedient move toward globalization, states in the Global South are now entering into more trade agreements and expanding their economies. Recent studies have noted that this scenario has changed with the internet and the transformation to a global society (Pew Research Center, 2020). Access to technology has transformed the landscape of most countries in the world. Currently, there is more easy access provided by cell phones. There has also been an increase in manufacturing plants that have become equipped with more modern technology. These two avenues of technology have helped developing nations become more engaged in the International arena (Sabzalieva et al., 2020). This growth is apparent as access to more modern technology rose by 90% (Pramanik, 2017). The number of those with access to cell phone technology rose to 94% by the year 2015 (Pramanik, 2017). These statistics were even apparent in remote countries like those located in Sub-Saharan Africa (Pramanik, 2017). Countries like Kenya, Ghana, and Nigeria are considered to still experience stagnated economic growth compared to other countries, but the accessibility of technology is allowing for many to rise out of extreme poverty (Pramanik, 2017).

According to Scott et al. (2019), Kenya now has one in ten families using a bank app and can use an interactive system on money flows from their phones. This accessibility has changed the lives and has brought many Kenyans above the poverty line (Pramanik, 2017; Scott et al., 2019). This mobile phone revolution is providing people groups that traditionally could not lift themselves out of poverty the access to progress their economic status. It is also having an effective influence on education in these developing nations (Pew Research Center Global

Attitudes and Trends, 2015). Pew Research Center (2015) surveyed people groups in developing nations and found "the internet as a good influence in education" (p. 2). Less Developed Countries (LDC) have also initiated governmental programs that support digital tools. Ratnakar and Lekey (2017) studied three ways LDC's are coming out of poverty. The three ways are creating greater competition, e-government initiatives (such as Bhutan where 107 programs transact government to citizens services), and thirdly expanding telecoms. Their analysis is that the benefit, especially in the area of access to education, was significant (Ratnakar & Lekey, 2017).

Two examples of successful emergence out of economic stagnation would be India and China (Lamy, Masker, Baylis, Smith, & Owens, 2015). Although very different in culture, India and China used similar means to change their economic positional status upon closer examination. These countries used education and technology. For each 10% of cell phone usage in India, it translates to a rise in the GDP at the national level by 1.2% (Pramanik, 2017). Since 1990, India has a GDP growth rate of 7%, which is impressive while helping 170 million people escape poverty (Pramanik, 2017). There are positive initiatives in the Global South that are closing the accessibility divide.

The International Educational Model: The Academic Divide

Internationally the education gap is apparent in the number of graduates in comparison with the total population in some countries. When students do not have the same access to the proper resources to advance academically or participate on equal levels as others in society, it becomes necessary to examine whether paradigms could offer solutions. There is currently an academic gap between the graduation rates and course completion rates in all countries. A closer

examination of the academic gap internationally may lend insight into the main issues at hand with the United States.

Upon looking globally, studies have focused on the disparity between those students in the first world and those students in the underdeveloped nations (Art & Jervis, 2017; Nye & Welch, 2017; Roy, 2016). The international academic gap between the first world (or industrial countries) and third world countries is termed the North-South Gap (Art & Jervis, 2017; Pevehouse & Goldstein, 2020). Those countries in the Global North are the more industrial nations with advanced technology and economies. Those countries in the Global South are the more underdeveloped nations that have been stagnated in their progress out of extreme and standard poverty. The context of global history and the effects of the past centuries mark the first and third world. According to authors Pevehouse and Goldstein (2020), this was influenced by the Cold War's time period. This time period divided the world into a bipolar system and compounded the threat of nuclear holocaust that left countries unable to escape their economic systems (Pevehouse & Goldstein, 2020). This has been the case since the Industrial Revolution. Students in their respective countries have been subject to their environment and governmental systems of their countries, which dictate their educational opportunities and, eventually, their economic status. The consequence, noted by Roy (2016), has been a divide among the rich and the poor (Mingst, McKibben, & Arreguin-Toft, 2019).

Perrotta and Alonso (2019) conducted a study on trade partnerships among countries with MERCOSUR's trade bloc (established by the Treaty of Asuncion). Using qualitative methods, they found that researcher collaboration, based on the North-South divide, was extended by technology use. Perrotta and Alonso (2019) also found that the countries profiting the most were those governments who were initiating programs to develop academic support for those in

poverty. The University in Kazakhstan is an example where academics in the Global South have become current and mirror some of the Global North institutions (Sabzalieva et al., 2020). This study demonstrated a proactive role of education linked to closing the gap between rich and poor.

Third world nations have begun to rise out of their condemned economies through the populace use of education and technology. This is especially emphasized in the youth of their countries. The gap is closing, and the catalyst has been the increased access to education and increased technology use (Rincon-Gallardo, 2020). Different course offerings are working better than the traditional model and have allowed students access to schooling even if they necessitate to continue working for necessities (Scott et al., 2019). A comparison could be made to those of minority status with a disadvantaged economic background here in the United States and the outreaches that could help them attain graduating and completing their courses. As mentioned, their rise came from a two-pronged approach of expansive access to education and the introduction to technology. This is important to recognize the potential to replicate or create a model in the educational system within the United States and specifically the community college system that could also bring those in students in a stagnate economic or academic status to graduate and complete their courses and attain their place in the competitive first-world job market. This could be done by bringing the two-pronged approach to introduce expansive education opportunities with technological aspects.

Summary

Technology in the 21st century has come like a tidal wave, and there is no decreasing the flow of the digital presence in society's daily lives. Thus, a study of the literature is to examine if this study on the impact of technological usefulness will improve the completion rates among minorities. In many states, the legislature controls the funding for K-12 education, college and

four-year university systems. Educational institutions cannot stay at the status quo and expect to meet the needs of society. When educational levels decrease, crime increases, and so do many of society's ills (Machin, Marie, & Vujić, 2011). Students are not completing college for one reason or another. The educators' job is to produce the most relevant and substantive findings on what works and what does not.

The classroom is a perpetual lab with instructors on the front line of influence. This leaves much responsibility for the educator. Noting the four distinct themes of this literature review has given a synthesis of its meaning. The first section was the grouping of articles focused on learning. These articles were evaluated to bring the most current information on tested research and to look at another's perspective. The second section discussed the usage of interactive textbooks. Articles and books were both reviewed and discussed for the value of the latest technology. Instruction was presented in the third section. These articles were written to compare differing instruction and proven methods were analyzed. The last section was the second technology in schools and on campus. This section looked at individuals and their roles and perspective. Examining learning styles and strategies and whether technology fits in the efficacy component is essential to learning if the technology is a viable solution to the problem of completion rates.

CHAPTER THREE: METHODOLOGY

Overview

The purpose of this study was to examine whether the use of interactive e-textbooks by community college minority students made a difference in final course test grades and academic student learning outcomes. This research aimed to add to the existing literature to include an analysis of interactive textbooks, final test grades, and learning outcomes among minority community college students. The rest of this chapter focuses on the study's research design, including research questions and hypotheses. Information is also presented on the participants, setting, instrumentation, procedures, and data analysis.

Design

The research design for this study was a quasi-experimental nonequivalent control-group design. With many research methodologies and approaches to select from, choosing a design that supports the study's focus and purpose was necessary. Qualitative research is often used to explore perceived experiences (Creswell & Poth, 2017); however, differences cannot be determined through a qualitative design for this study. The basic concept of quasi-experimental design is to identify whether a difference exists between groups as a function of an identified dependent variable (Babones, 2014). Quasi-experimental research allows grouping of participants (Campbell & Stanley, 2015). However, the researcher is not able to randomly assign participants to groups and is not able to control how participants are exposed to the condition of interest (Campbell & Stanley, 2015). A quasi-experimental design was necessary due to the lack of random assignment of participants to each group. Thus, non-random assignment occurred, and a pretest and posttest were given (Gall, Gall & Borg, 2010). For this study, the independent variable was the use and non-use of interactive textbooks, while the dependent variables were

final course test grades and student learning outcomes. Student learning outcomes were measured by the SALG. The focus of this study concerned investigating the effect of the integration of interactive textbooks in a community college setting. The study focused primarily on final test grades and learning outcomes of minority students by comparing a group of minority students who used interactive textbooks and a group that did not. The quasi-experimental design was appropriate for the current study as it involves finding differences in means across identified groups (Hoe & Hoare, 2012; Ingham-Broomfield, 2014). The identified groups in a quasi-experimental design lack random assignment and cannot be manipulated; this was the case for this study (Babbie, 2013; Trochim & Donnelly, 2008). Therefore, a quasi-experimental non-equivalent control group design was appropriate for the study.

Research Questions

Graduation rates and learning outcomes have declined for minority community college students in recent years (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006). As budget cuts in education become a reality, administration and legislatures seek solutions to retain students and help them complete their courses while improving learning outcomes. This study was guided by two developed research questions based on final grades and learning outcomes for minority community college students.

RQ1: Is there a difference in government course final grades between minority community college students who use interactive textbooks and those who do not use interactive textbooks?

RQ2: Is there a difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG), between minority community college

students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores?

The independent variable was the use and non-use of interactive textbooks. The dependent variables were the final course test grades and student learning outcomes. The final test grades were measured on a scale of (1-100), while the SALG measured the student learning outcomes. All variables were measured numerically. This study involved two groups of participants: minority students that use interactive textbooks and minority students who do not use interactive textbooks. The SALG was given as a pretest and a posttest

Hypotheses

Because educational practices call for in-depth review and discussion and reflection of best practices, the use of interactive textbooks may be the catalyst in increasing minority student course completion rates and improving learning outcomes at the community college level. The following are the null hypotheses. The findings from this study could identify if interactive textbooks are beneficial in blended-type environments and if student performance can be enhanced. For this study, the null hypotheses were the following:

$H_0$1 There is no difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks.

$H_0$2 There is no difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG) between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores.

Participants and Setting

The target population for this study included minority community college students from the setting of a large urban area in Florida. According to the Florida Department of Education website, there are 28 community colleges in Florida (Data & Reports, 2019). The identified area has one of the most diverse populations in the country and is located in the Southern part of Florida. The county where the college resides has a large minority population, with 32% foreign-born residents, including naturalized U.S. citizens (Fleshler, East, & Williams, 2012). This community college has over 150 nations represented with an age range of 15 to 60+ age group (Broward College, 2019). As of the Spring of 2020, 69% of the students living in the community college region are classified as a minority (Broward College, 2020). Thirty-nine percent of the student body is Hispanic, 30% are Black, 3% are Asian, 1% are classified as two or more races, and 16% are White (Broward College, 2020).

For this study, the number of participants required for adequate sample size was 128 (Gall et al., 2007). One hundred participants were the minimum necessary when assuming a medium effect size (Gall et al., 2007). A convenience sample was used because of the proximity to the researcher and easy accessibility (Gall et al., 2007). The sample was a convenience sample taken from a government course given in the Spring/Fall Term at the community college. The instructor also served as the researcher, a staff of the college served as the research assistant, and the study was conducted anonymously. The sample consisted of minority community college students between the ages of 18-35.

National Government POS 2041 was the course given in the spring term. The textbook used was *"Government in America: People, Politics, and Policy - 2018 Election and Updates Edition 17e"* by Edwards Revel and access card ISBN is 9780135176627. This is an interactive

textbook. Per the syllabus, this textbook was the required textbook for the course, but students could or could not choose to purchase the textbook. The course was a blended format with 50% of the course delivery online, and 50% was face-to-face (FTF) instruction in the classroom (or remote as dictated by current circumstances). There was a selection of 64 minority students who used interactive textbooks as their text (Section A), and 64 minority community college students who did not use interactive textbooks as their texts (Section B). The first 64 students for each group who signed up for the study comprised these two groups. All enrolled students were taught by the same instructor with the same content taught for each lesson. This was an 8-week course that included two tests as final course test grades. All courses were engaged in active learning techniques, including flipped classrooms and other experiential learning methods.

Instrumentation

There were two measurement methods for this study, including the SALG and final course test grades. The SALG was used to measure the learning outcomes of students. The final course test grades were used to measure academic outcomes (see Appendix C). The SALG was given as a pretest and a posttest. The SALG and the final course test grades are discussed in this section.

The purpose of the SALG instrument is to gather learning-focused feedback concerning course evaluations. The SALG is used to seek measurements learning, including skills, cognition, and attitudes, and the degree to which specific aspects of the course have contributed to that learning (https://salgsite.net/about). The SALG, created by Seymour and Daffinrud, enabled the online instrument in 1997 and was later revised by Carroll, Seymour, and Weston to include a website-based online instrument open to the public (Seymour, Wiese, Hunter, & Daffinrud, 2000).

The SALG has been used in various higher educational institutions. The SALG was used in a community college setting in New York at City College, evaluating a CREATE program, a pedagogy for teaching science (Kenyon et al., 2016). Minority students predominately populated the community college. Validity was assessed by a panel of experts and was supported "by comparing results from three studies in which data were independently gathered from similar student populations all experiencing modular pedagogy" (Seymour et al., 2000).

Research completed at the University of Southern Maine also used the SALG while comparing risk surveys in pedagogy concerning environmental communication (Wagner, 2007). Wagner (2007) used data from the SALG after a four-year study examining student learning concerning environmental issues and problems in social science research (Wagner, 2007). Syracuse University studied peer-led team learning using the SALG to measure the effects of peer leader and student interactions (Winterton, 2018). The SALG has been an instrument used for several years at universities and community colleges throughout the United States to assess student learning gains and assist researchers in more accurate results for their studies.

Using validated instruments supported the validity of data collection and analysis for this study. The SALG is a valid and appropriate instrument. The concurrent validity of the instrument was demonstrated by a high correlation between scores for the SALG questions that probe student understanding of conceptual items, scores on related American Chemical Society conceptual questions, and the instructor's examination questions explored the same kind of material (Seymour et al., 2000).

The SALG is comprised of 57 items where students are asked to respond to each item using a five-point Likert scale, ranging from a score of 1 (no gains=lowest) to 5 (great gains=highest) or 1 (no help) to 5 (great help) in terms of its perceived value in aiding their

learning (Seymour et al., 2000). There are 10 sections with three to eight questions as sub scale in each section. The combined possible score on the SALG will range from 57 to 285 points. A score of 57 is the lowest possible score, meaning the student gained little or no learning. The highest possible score is 285 points, meaning that there were superior learning gains.

The SALG was administered to both sections of the government class at the end of the semester. The SALG takes approximately 20 to 25 minutes to complete. At the end of the data collection, the SALG scores were calculated by the researcher. Each subject received a number and the website to log in. Once logged in, the link provided directed the student to the survey. The SALG was automatically scored and the scores were obtained by the researcher to add to the data to be collected, and the SALG scores were calculated by the researcher.

Regarding reliability of the SALG, Seymour et al., (2000) argued that the SALG instrument is "more reliable than student evaluations based on unstated, mixed, or ill-defined criteria" (p. 20). "Although Seymour et al. noted SALG had not been strictly tested for reliability due to various factors, they recommended researchers establish reliability in new studies by ensuring the conditions under which the instrument is administered [are] as isomorphic as possible, and to solicit student assessments of their gains from the current class in subsequent class" (p. 20).

Permission to use the SALG is granted to anyone conducting research by creating an account. There is no fee for the use of the site or for the adaptation of the instrument; however, a citation of copyright is required. Anyone may go to www.salgsite.org to build or use a SALG survey.

There is no instrument used to measure student grades. However, final test grades were obtained from the instructor. The grades given at the end of the term were calculated as the final

test grades. Thus, final course test grades were used to measure academic outcomes (see Appendix C). The purpose of using final course test grades was to measure knowledge acquisition of the course content and to determine a causal relationship between the use or nonuse of an interactive textbook by the student and knowledge acquisition (Verma & Doshi, 2017). Tests were used throughout most college courses to evaluate the knowledge acquired by the student during the course.

The course was National Government, a 2041 level course that had two main assessments: Test 1 and Test 2. These two test grades were used to calculate the final course test grades. Each test was worth 50 points, and each test covered five chapters of the book. Test 1 covered Chapters 2, 11, 12, 15, 17, and 18, and Test 2 covered Chapters 3, 4, 5, 17, 18 from the textbook *"Government in America: People, Politics, and Policy - 2018 Election and Updates Edition 17e"* by Edwards Revel access card ISBN is 9780135176627. The test was developed by the publisher of the textbook publishing company Pearson (see Appendix C). These tests have been used by several professors and have been part of the course for the past five years. Ulmer (2020) used final course grades (including test grades) as a basis of a study to determine professionalism in engineering. This study conducted at a Midwestern university involved 729 participants and observed the program's progress over seven years. A correlational study done by Keyser (2019) was conducted to determine industrial engineering course grades and absenteeism. Course grades included tests, quizzes, assignments, and exams (Keyser, 2019). Keyser (2019) studied a hybrid (blended format) class and found correlation, using the course grades as a measurement of analysis. In Carver, Mukherjee, and Lucio's (2017) study on course grades and time in online courses, the researchers found that using final grades was a beneficial measurement to determine relationships between the two variables. They determined that these

two determinants and the results were “important information for instructors when providing scaffolding for students” (Carver et al., 2017, p. 303). Upon researching learning styles, Hostager (2018) from the University of Wisconsin studied differences in grades as learning outcomes between finance and business majors. These studies relied on course grades in some measure as an effective agent of measurement.

Internationally key studies have used course grades and textbook usage. In Verma and Doshi’s (2017) study, the researchers explored the “association between student’s final semester grades and text book usage” (p. 11). Course test grades were assessed and used to measure the learning outcome difference between students who used interactive textbooks and those who did not. Each test consisted of 25 multiple choice questions, five questions from each chapter. Each question was worth 2 points to total 50 points for each test. One hundred points were considered a perfect score, and a score of 59 or below indicated failure or minimal knowledge acquisition of the course content in the chapters assigned to each test. The test was administered via the course Desire to Learn (D2L) learning management system. Each student was required to use the honor lock system to avoid cheating. The honor lock system is a video conference-style testing site where the student will be observed during the duration of the test. The student had 75 minutes to complete each test. Scoring was automated through the learning management system D2L, and permission from Pearson is automatic when using their textbook (see Appendix F).

Procedures

Before data collection, the researcher secured IRB approval obtained from research institute and the community college (see Appendices A and B). Approval letters from the community college were also obtained from the academic department. All students in the course were asked to take a self-report survey embedded in the course learning management system

D2L. Students' ethnicity and textbook status was taken from a self-report survey taken at the beginning of the course. The survey asked students to identify with an ethnicity and designate their textbook status. Self-reporting of which resource students have chosen and their ethnicity via an in-class survey was more accurate and avoided bias. Participants were elicited from the six courses (POS 2041 National Government) being taught in the semester. A convenience sample of 124 total students was part of the study. The subjects were comprised of 64 minority students who use interactive textbooks and 64 minority students who are not using interactive textbooks in the course.

The researcher informed students of the study on the first day of class and directed students to a consent form within their learning management system to fill out, sign, and email to the research assistant if they were interested. Students could mail, email, or drop off their consent forms to the research assistant at the college campus office. Signed and completed consent forms were required for participation in the study (see Appendix D). Consent forms were due by the second week of the course. The research assistant was informed on how to respond to interested students and obtain their names and give them a participant number. Each student was assigned a number and letter “a” combination: 1a-64a ITB (Interactive Textbook) for students with interactive textbooks and assigned a number and letter “b” combination for non-interactive textbooks use, 1b-64b NITB (Non-Interactive Textbook). Data collected included a numerical value assigned to each subject in each category to preserve anonymity. If a student in this group decided to obtain an interactive textbook at any point, they were eliminated from the study. The research assistant was the only person to record the student’s name, their final test course grade, and their number. Students used this number to log in and access the survey, and numbers were given to the researcher to collect and analyze data. The research assistant only gave data to the

researcher, according to the number assigned. The research assistant had their own secure office and college computer with a secured and locked password where all data would be secured and retained for three years from the study's commencement. The research assistant will then destroy all data. The research assistant was the only one to communicate with the students interested in being part of the study.

A pretest was given to all students in the course on the first day of the course. This test was developed by the publisher of the textbook and covered general concepts in government. The pretest included 20 multiple questions. Gall et al. (2010) stated that "pretests and posttest used in any experimental design can include any of the measurements, methods, tests, questionnaires, interviews, and direct observation" (p. 301). "Tests measure an individual's knowledge, skills, or depth of understanding with in a curriculum domain" (Gall et al., 2010 132). Once samples and measures have been selected, the execution of the study involves obtaining data from the subjects (Lodico, Spaulding, & Voegtle, 2010). Test 1 was given on week four, and Test 2 was given on week eight. The course was taught by the same instructor using the same assessments and materials; all content was exactly the same in each course.

Data Analysis

Two statistics were used to analyze the data. For null hypothesis one, an independent sample *t* test was run. For null hypothesis two, an analysis of covariance (ANCOVA) was run.

Null Hypothesis One: Independent Sample *t* Test

Descriptive statics for RQ1, will be reported on the dependent variable for each group of the independent variable. Research question one was then analyzed by an independent samples *t* test. The independent samples *t* test is used to compare the means of two or more independent groups to determine whether there is statistical evidence that the associated population means are

significantly different (Warner, 2013). Specifically, the researcher conducted an independent sample *t* test to evaluate whether a statistically significant difference exists in the final test grades between minority community college students enrolled in a government course using interactive textbooks and minority students in the same course who are not using an interactive textbook. According to Borg and Gall (1989), in quasi-experimental research, a *t* test supports testing relationships. As this study aimed to examine whether interactive textbooks by community college minority students made a difference in final course test grades, a *t* test was appropriate to test relationships.

According to Warner (2013), the independent *t* test is the appropriate test to utilize due to the analysis of means, variance, and sums of squares as examples of parametric statistics. Warner (2013) also stated that the *t* test is most effective when the "researcher's goal is to show there is a significant difference in the means scores on *Y* between the groups" (p. 181). Data analysis was conducted using SPSS analysis software.

Data was visually inspected; this screening helped to identify missing data points and inconsistencies. Once the data was cleaned, before conducting the independent *t* tests, parametric assumptions were tested. A box and whisker plot was prepared for each group of the independent variable (the use and non-use of interactive textbooks) to examine the data for extreme outliers. Before conducting the independent samples *t* tests, there were parametric assumptions tested. These assumptions included the absence of outliers, normality of data, and homogeneity of variances. Outlier detection was assessed by examination of standardized scores. Standardized scores outside -3/+3 were considered an outlier (Field, 2013). Normality was assessed by using Shapiro- Wilks statistics. Skewness and kurtosis values should be below 3 and 10, respectively, to establish approximate normality (Kline, 2011). Levene's test of equality of variances was used

and a non-significant ($p > .05$) test indicated that the assumption was not violated. Data was coded in an Excel spreadsheet for Section A and Section B. The data was recorded on a flash drive and will be securely stored for three years before deleted.

A Bonferroni correction was applied to both the independent sample *t* test, thus hypotheses testing was done on all analyses, with a 0.05/2=0.025 level of significance (Weakliem, 2016). This means that all p-value output of the independent sample *t* test was assessed using a 0.025 level of significance. A p-value of less than 0.025 dictates that there is a statistically significant difference and that the null hypothesis is rejected, whereas a value of greater than 0.025 dictates that there is no statistically significant difference that exists between the groups being compared.

Null Hypothesis Two: ANCOVA

Descriptive statics for RQ2, for both pretest and posttest measures, was reported on the dependent variable for each group of the independent variable. Research question two was then analyzed by an ANCOVA statistic test. An analysis of covariance (ANCOVA) was conducted to measure the significance of the SALG, using the pretest as the covariate. An analysis of covariance helped control the differences between students in Group A and Group B on the measures of the pretest. An ANCOVA was appropriate because of the independent variable, which had two groups that were categorical in nature. In addition, the dependent variable was measured on a continuous scale. An ANCOVA was also appropriate because the instrument was given as a pretest and posttest, and the pretest served as a covariate.

Before conducting an ANCOVA, there were parametric assumptions tested. The assumption of outliers used a box and whisker plot for each group and variable to look for extreme outliers. By using standardized scores, anything outside of -3/+3 was considered an

outlier (Field, 2013). The assumption of normality used a Shapiro-Wilks statistic. Kline (2011) states that values of skewness and kurtosis should be below 3 and 10, respectively, to establish approximate normality. The assumption of linearity used a series of scatter plots between the pretest variable and posttest variable for each group.

The assumption of bivariate normal distribution used a series of scatter plots between the pretest variable and posttest variable for each group, looking for the "cigar shape." The assumption of homogeneity of slopes looked for interaction. The assumption of equal variance used Levene's Test of Equality of Error Variance, and a non-significant ($p>05$) test indicated that the assumption is not violated.

A Bonferroni correction was applied to the ANCOVA; thus, hypotheses testing was done on all analyses, with a $0.05/2=0.025$ level of significance (Weakliem, 2016). This means that all p-value outputs of the ANCOVA were assessed using a 0.025 level of significance. A p-value of less than 0.025 dictates that there was a statistically significant difference and that the null hypothesis was rejected, whereas a value of greater than 0.025 dictates that there was no statistically significant difference that existed between the groups being compared. Data was coded in an Excel spreadsheet for Section A and Section B. The data was recorded on a flash drive and will be securely stored securely on the researcher's computer with a password lock for three years before being deleted.

Summary

Many educational leaders, educators, and researchers are looking at the data on graduation rates among different ethnic groups. African Americans and other minorities continue to have much lower graduation rates from higher education institutions and a lower course completion rate than their White and Asian counterparts. With media attention highlighting

inequality measures, there has never been a more apropos time to research different teaching methods and learning to bridge the gap among minorities in higher education. Even though technology has been researched in recent decades, a focused study on the impact of interactive textbooks usage among minorities in a community college course could lead to a paradigm shift. A disruption in educational methods is needed to address the needs of minority students in higher education. Thus, the focus of this study was to research new and alternative methods needed for teaching and learning using interactive textbooks in the community college setting among minorities.

CHAPTER FOUR: FINDINGS

Overview

There is a lack of research in the area of interactive textbooks and their effects on minority students in a community college setting. Thus, the purpose of this study was to examine whether the use of interactive e-textbooks by community college minority students makes a difference in final course grades and academic learning outcomes. The population to be studied was minority students attending a community college in an urban area in South Florida. Data from students were collected in a government course and examined whether interactive textbooks made a difference in final test grades and learning outcomes as measured by the Student Assessment of Learning Gains Survey (SALG).

Research Questions

The following research questions and corresponding hypotheses were addressed:

RQ1: Is there a difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks?

RQ2: Is there a difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG), between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest SALG scores?

Null Hypothesis

$H_0$1 There is no significant difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks.

$H_0$2 There is no significant difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG) between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores.

Descriptive Statistics

The following is a discussion of the projects' population and sample as well as a demographic description of the sample. Demographic descriptions included frequencies and percentages for categorical (nominal). Also presented are the testing of parametric assumptions for the statistical analysis and results of statistical testing. This chapter concludes with a discussion of the results of this project.

The target population for this study included minority community college students from the setting of a large urban area in Florida. The sample was a convenience sample taken from a government course given in the Spring/Fall Term at the community college. The instructor also served as the researcher, and a staff of the college served as the research assistant and the study was conducted anonymously. There were $N = 118$ students enrolled in the government class in which 55 (47%) used an interactive textbook and 63 (53%) did not. The final grades of the students were collected at the end of the semester and used to address the first research question. The SALG instrument was administered at the beginning of the semester and the end in order to address the second research question. Regarding final score in the class, scores ranged from 11 to 100 ($M = 89.57$, $SD = 13.38$). This information is provided in Table 1 below.

Table 1

Final Grades

	Minimum	*Maximum*	*M*	*SD*
Final Grade	*11.00*	*100.00*	*89.57*	*13.38*

Descriptive statistics of final scores based on whether or not the student used an interactive textbook are provided in Table 2. Students that did not utilize an interactive textbook had a lower mean final score (M = 87.82, SD = 14.94) than those that did use an interactive textbook (M = 91.56, SD = 11.14).

Table 2

Final Scores by Interactive Textbook Use

Interactive	*N*	Minimum	Maximum	*M*	*SD*	Skewness	Kurtosis Statistic
no	63	11.00	100.00	87.83	14.94	-2.649	10.412
yes	55	48.00	100.00	91.56	11.14	-2.279	6.048

Skewness values were within acceptable boundaries to support normality (-3 to +3) however kurtosis values were beyond this acceptable threshold (Field, 2018). Acceptable values of skewness ranged between -3 to +3 whereas kurtosis values should fall below 10. (Kline, 2011).

Additionally, visual inspection of histograms for final grades combined and the two separate groups showed that the grades were negatively skewed. This indicates a violation of normality. Figures 1, 2, and 3 depict this information.

Figure *1 Histogram of Final Grades (Total)*

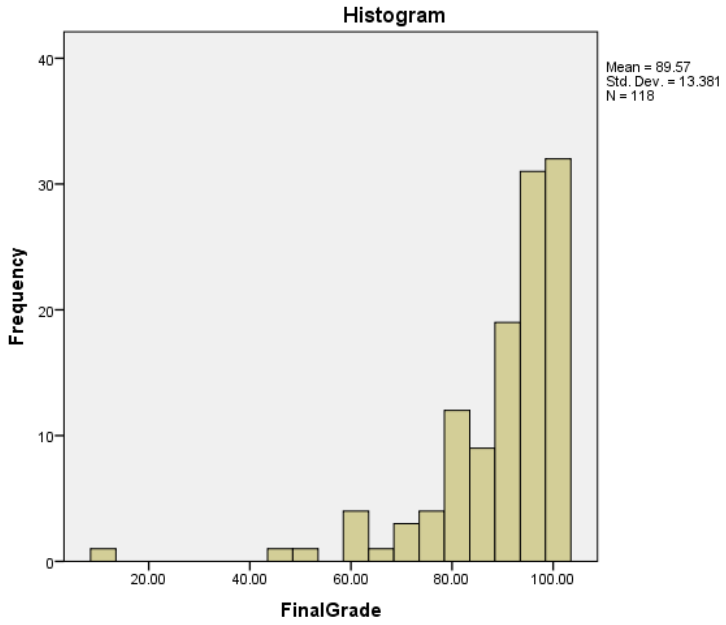


Figure *2*

Histogram of Final Grades (Did not use interactive textbook)

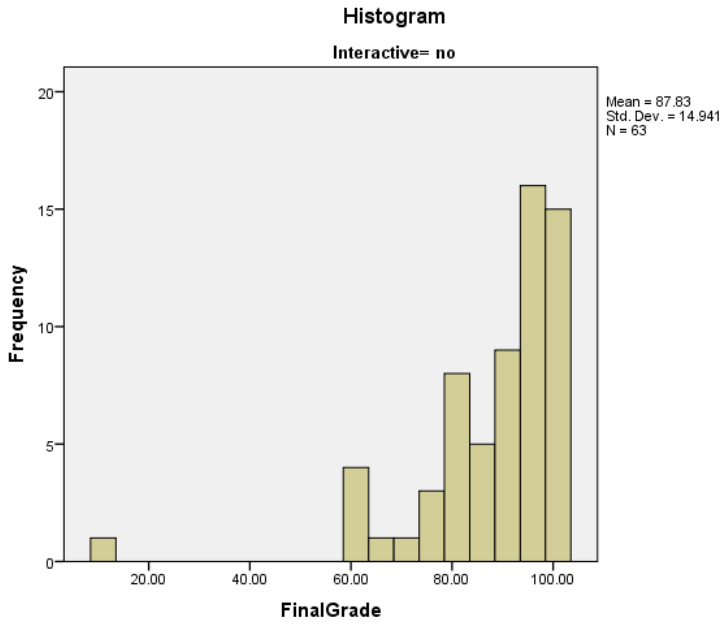
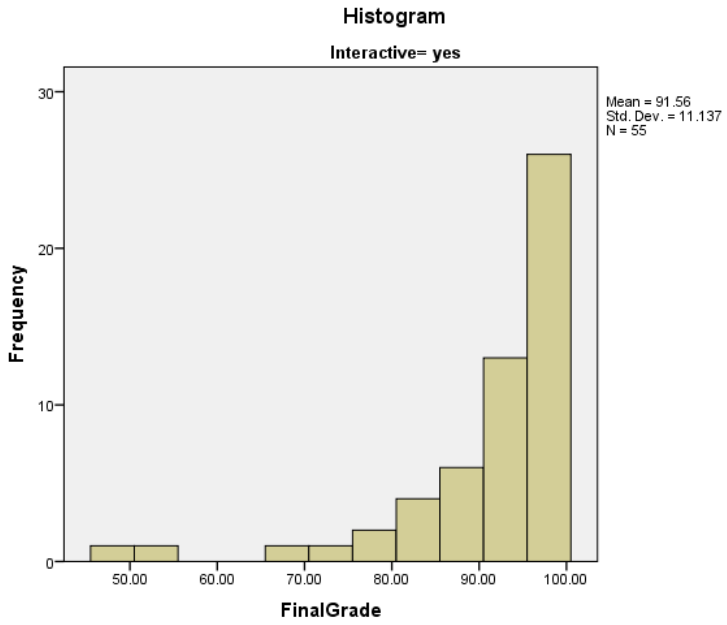


Figure *3*

Histogram of Final Grades (Used interactive textbook)



Standardized scores ranged from -5.87 to 0.78. Values outside -3 to +3 are considered outliers and affect normality. Skewness and kurtosis values were generated excluding the cases that had standardized scores outside -3 to +3. There were two such cases. Skewness values were within –3 to +3, and kurtosis was below 10, thus suggesting normality (Table 3). Therefore, analysis was run on 116 cases regarding final grades (RQ1).

Regarding SALG scores, pre and post scores are depicted in Table 4. On average Pre-scores (M = 451.49, SD = 271.33) were higher than post SALG scores (M = 307.75, SD = 43.56). Table 3 provides this information.

Table 3

Pre and Post SALG Scores

	Minimum	Maximum	*M*	*SD*	Skewness	Kurtosis
SALG_Pre	117.00	1542.00	451.49	271.33	2.088	4.197
SALG_Post	152.00	369.00	307.75	43.46	-1.199	1.410

Skewness and kurtosis values were within -3 to +3, thus supporting the normality of SALG scores. Additionally, there were no standardized scores that were outside -3 to + 3. Thus, all cases were kept in the analysis of SALG scores (RQ2).

What now follows are the results of hypotheses tested conducted to address both research questions. The first research question was addressed by conducting an independent *t* test. The second research question was addressed by conducting ANCOVA. All tests were conducted at the 5% level of significance.

Results

An independent *t* test was conducted with SPSS in order to address this first research question and hypotheses:

RQ1: Is there a difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks?

$H_0$1 There is no significant difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks.

There was no violation of normality assumption, as skewness and kurtosis values were within -3 to +3 after the removal of three outliers. There was no violation of the homogeneity of variances assumption, indicated by a non-significant Levene's test, $F(113) = 3.3384$, $p = .068$. The mean final scores of the students that used the interactive textbook ($M = 92.37$, $SD = 9.48$)

were indeed greater than those that did not use the interactive textbook (M = 89.06, SD = 11.34). The test, however, was not significant, $t(114) = -1.689$, $p = .094$. See Table 4. Therefore, the null hypothesis is not rejected and it is concluded that there is no significant difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks.

Table 4

Results of Impendent t test for RQ 1

Levene's Test for Equality of Variances		*t* test for Equality of Means						
							95% Confidence Interval of the Difference	
F	*p*	*t*	*df*	*p*	Mean Difference	*SE* Difference	Lower	Upper
3.384	.068	-1.69	114	.094	-3.31	1.96	-7.18	.57

ANCOVA was conducted in order to address this second research question and hypotheses:

RQ2: Is there a difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG), between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores?

$H_0$2 There is no significant difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG) between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores.

An ANCOVA was run to determine the effect of utilization of an interactive textbook on post-SALG scores after controlling for pre-SALG scores. There was a linear relationship

between pre-and post-SALG scores for each group, as assessed by visual inspection of scatter plots (Figures 4 and 5)

Figure ***4***

Scatter Plot of Pre Versus Post SALG Scores for the No Interactive Text Book Group

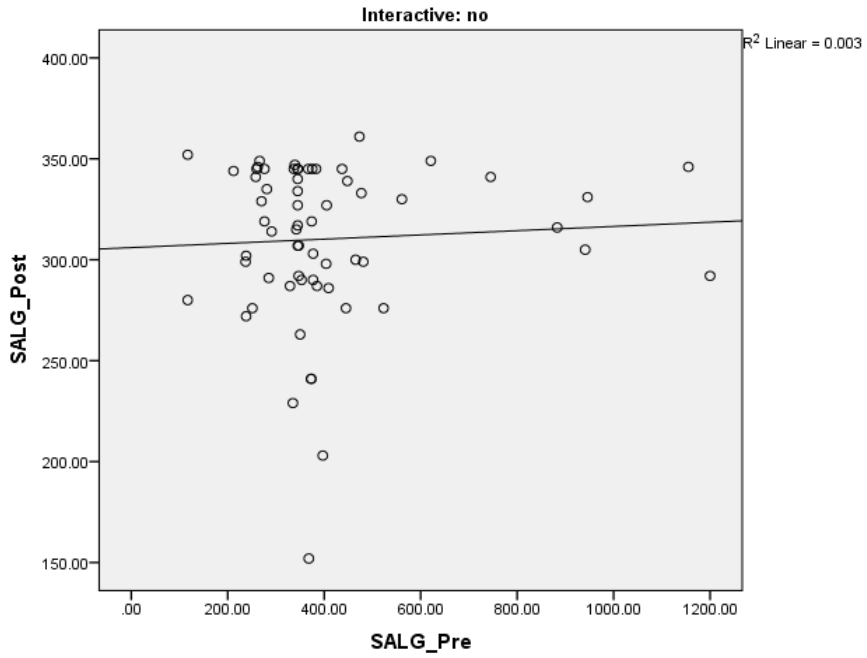
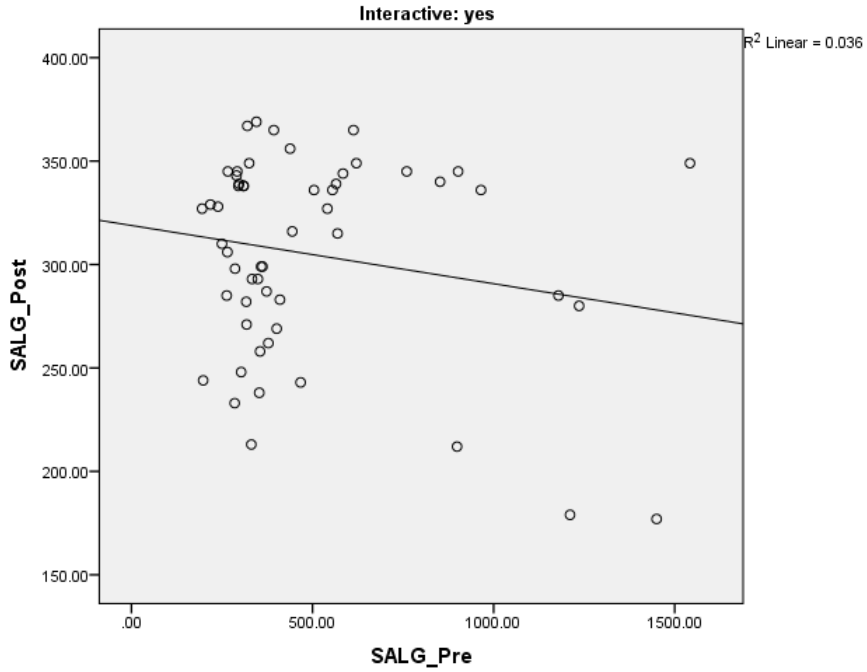


Figure *5*

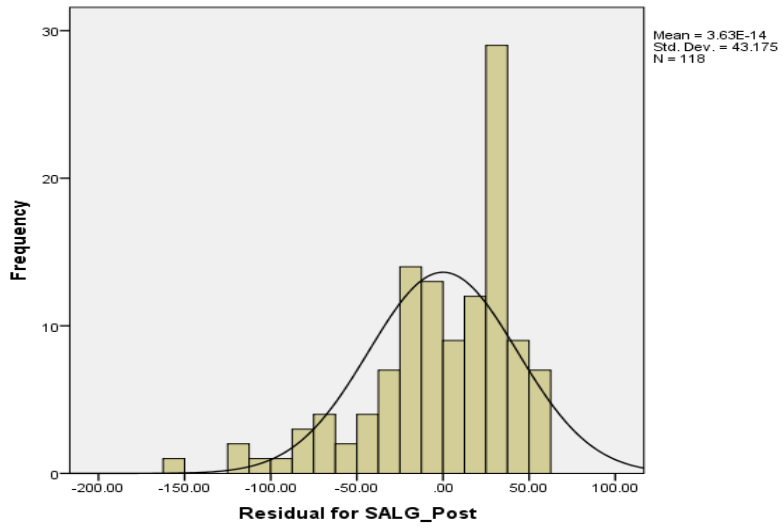
Scatter Plot of Pre Versus Post SALG Scores for the Interactive Text Book Group



Standardized residuals for the interventions and the overall model were normally distributed as depicted in Figure 6.

Figure *6*

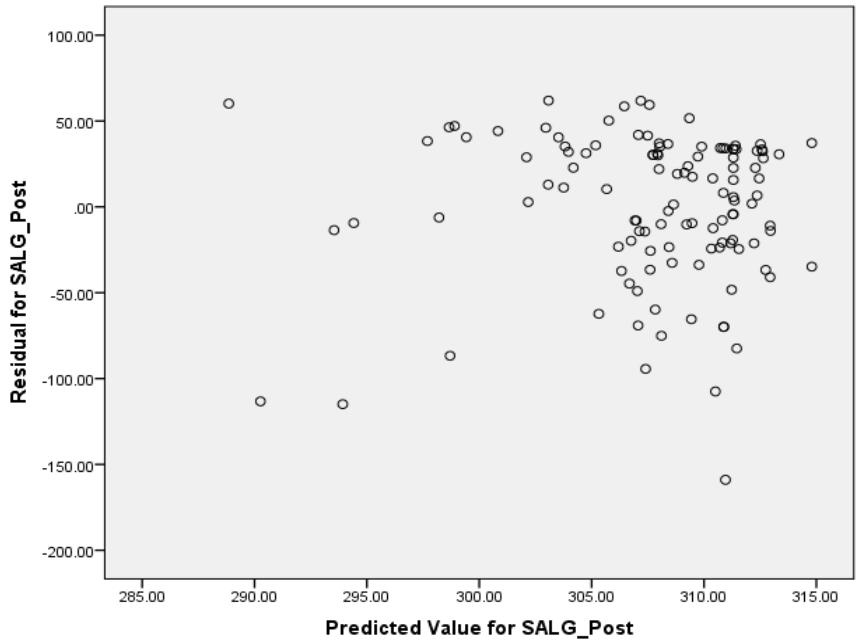
Histogram of Standardized Residuals



There was homoscedasticity and homogeneity of variances, as assessed by visual inspection of a scatter plot (Figure 7) and Levene's test of homogeneity of variance, respectively, $F(1, 116) = 3.737$, $p = .056$.

Figure 7

Scatter Plot of Predicted Residuals Versus Model Residuals



There were no extreme outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations. After adjustment for pre-SALG scores, there was no statistically significant difference in post-SALG scores between the groups. Specifically, the adjusted mean post SALG scores (controlling for pre-SALG scores) of those students that used interactive textbooks ($M = 305.56$, $SE = 5.92$) was not significantly different from those that did not ($M = 309.67$, $SD = 5.52$), $F(1, 115) = 0.255$, $p = .614$ and the null hypothesis was not rejected. This information is depicted in Tables 5 and 6 below.

Table 5

Marginal Means of Post-SALG Scores Controlling for Pre-SALG Scores

Interactive	*M*	*SE*	95% Confidence Interval	
			Lower Bound	Upper Bound
no	309.67	5.52	298.73	320.61
yes	305.56	5.92	293.84	317.28

Table 6

Results of ANCOVA Conducted for RQ2

Source	Type III Sum of Squares	df	Mean Square	*F*	*p*
Corrected Model	2852.294	2	1426.147	.752	.474
Intercept	2981195.325	1	2981195.325	1571.916	.000
SALG_Pre	1964.254	1	1964.254	1.036	.311
Interactive	484.349	1	484.349	.255	.614
Error	218101.579	115	1896.535		
Total	11397049.000	118			
Corrected Total	220953.873	117			

Summary

The purpose of this study was to examine whether the use of interactive e-textbooks by community college minority students makes a difference in final course grades and academic learning outcomes. The following research questions were addressed:

RQ1: Is there a difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks?

RQ2: Is there a difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG), between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores?

Although the mean final score of students that used interactive textbooks was greater than those that did not, the mean difference was not significant, as indicated by a non-significant independent *t* test. Additionally, the results of ANCOVA verified that there was no significant difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG), between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores. Students that used interactive textbooks did not score significantly different on SALG than those students that did not use interactive textbooks.

What follows in Chapter 5 is a discussion as to how the results of this study are interpreted in the context of the theoretical framework. Any limitations of the results of the study will be provided. Additionally, recommendations for future research will be discussed.

CHAPTER FIVE: CONCLUSIONS

Overview

This study examined whether the use of interactive e-textbooks by community college minority students makes a difference in final course grades and academic learning outcomes. The population studied was minority students attending a community college in an urban area in South Florida. Data from students were collected in a government course and examined whether interactive textbooks made a difference in final test grades and learning outcomes as measured by the Student Assessment of Learning Gains Survey (SALG). The following research questions and corresponding hypotheses were addressed:

RQ1: Is there a difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks?

$H_0$1 There is no significant difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks.

RQ2: Is there a difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG), between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest SALG scores?

$H_0$2 There is no significant difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG) between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores.

The following is a discussion of the research findings, implications, and recommendations.

Discussion

Research Question 1/Hypothesis

In line with this study, Ali (2019) learners who use interactive textbooks enjoy benefits such as real-time feedback on classroom problems and text-speech features. Interactive textbooks are appropriate for minority students with tight budgets because they have automatic grading features for assignments. According to Ali (2019), "the automatic grader also helps to reduce the number of teaching assistants required and so reduces university operating costs" (p. 51). Due to these benefits, interactive textbooks have been adopted for introduction of many courses in different universities, especially those with high number of minority students. The adoption of interaction textbooks has improved students' performances by about 12% (Bolsen et al., 2016). The most engaging part of these textbooks are the exercise engaging tools.

Although the transition from traditional textbooks to electronic textbooks seem to be a logical step in the digital world, the performances of students using interactive textbooks is slightly higher of those using traditional textbooks, especially in minority communities. This study indicates that digital devices and technologies such as interactive textbooks have been developed to improve students' learning process. Classroom support has to be based on students' knowledge and competencies. A digital learning environment should include the technical features. For African American students, schools have developed interactive textbooks such as ALICE:fractions to support their understanding of fractions. Learning materials provided on ALICE:fractions are available on all digital devices. Buzzetto-Hollywood (2017) was consistent with this study that interactive textbooks allow hand-on activities on smart devices in form of manipulatives. Topics are developed to encourage learners to revise already established

concepts. The current version of interactive textbooks consists of seven sections; each section lasts for about 90 minutes.

Interactive textbooks are viewed on smart devices thus can integrate computer-based learning environment features such as quick and automatic feedback. According to Buzzetto-Hollywood and Alade (2018), frameworks such as iBooks Author can be used to create interactive textbooks for minority students. “Interactivity is put into effect using encapsulated web pages, so-called widgets, that can be accessed from the book and run in full-screen mode or even run in the page itself” (Buzzetto-Hollywood & Alade, 2018, p. 42). For minority communities with low income, interactive textbooks are preferred due to their low production cost. As compared to the traditional textbooks, digital publishing helps individuals reduce their production cost by removing some aspects that are not important. By reducing printing and transportation costs, publishers can save resources. Furthermore, interactive textbooks are easier to publish. These software tools also allow you to publish the content. The main challenge when developing these tools is the final quality of the books. “With these online tools, publishers can preview what the final output would look like and then hit the publish button after being completely satisfied with the result. And if you find a typo in the text after publishing, it can be easily corrected later” (Bolsen, 2016, p. 41). Although this study established that the use of interactive books does not result in improved performances, these textbooks have enhanced access to education among minority students.

Research Question 2/Hypothesis

The interactive textbooks are an effective tool for improving minority community college students’ performances, especially in social subjects. Both at the elementary and college level, books play a key role in teaching and learning activities. Interactive textbooks are used as

valuable tools for designing the learning process and contribute immensely on the way learners acquire knowledge. This study also indicates that the introduction of interactive textbooks by the government was aimed at enhancing the motivation and interest of minority students in reading in order to improve their academic outcome. In line with this study, Gasman et al. (2015) suggested electronic books have been designed to overcome some limitations that minority communities experience when accessing education. E-books can increase the access to information quickly and easily in obtaining educational materials. Furthermore, e-books make it easier for students to understand the learning materials. While at home, students will spend a lot of their time reading electronic books than the printed versions, which in turn will improve their academic performances.

As technology continue to develop, e-books are designed to include images and other symbols to develop into an interactive media, which can include video, animation, audio, and simulation. Interactive textbooks are used as an effective teaching aid in colleges across the US. Hagedorn and Kuznetsova (2016) argued Electronic School Book (BSE) provided by the government has not been fully accepted as an interactive media because it only consists of images and texts. The use of BSE has helped overcome the challenges of printed textbooks, however, student satisfaction in using it is still low. Effective interactive textbooks are designed to include interactive exercises, video, audio, texts, and images. For minority students, learning videos are included in these textbooks to make it easier for the students to understand abstract materials. The exercises are designed interactively so that the learners can answer questions and get feedback from teachers on where and how to improve.

This study suggests that interactive textbooks are designed based on the needs of students. Animated media make learners understand the topics presented easily. The use of

interactive textbooks in colleges provide a new reading experience for black students due to structural racism in education, which reduces their access to quality education. According to Haas et al. (2017), students who use interactive e-book obtain slightly higher outcomes as compared to those who did not. The authors noted "students are easier to pay attention to and the lesson becomes more interesting when the teacher uses a variety of multimedia teaching tools rather than just textbooks" (p. 55). The learning outcomes of students applying the contextual learning model using e-books are higher than those using the contextual learning model using printed media. Implementation of e-books with an epub extension can improve students' academic outcomes by aboutb70%. The use of interactive textbooks on problem-based learning improves material understanding and mastery of important concepts in the learning process. Multi-media learning and teaching materials can effectively enhance students' educational achievements thus bridging the gap between the Whites and other minority groups across the United States.

Implications

Research Question 1/Hypothesis

There was no violation of normality assumption, as skewness and kurtosis values were within -3 to +3 after the removal of three outliers. There was no violation of the homogeneity of variances assumption, indicated by a non-significant Levene's test, $F(113) = 3.3384$, $p = .068$. The null hypothesis was not rejected and it is concluded that there is no significant difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks. Across the US, interactive textbooks have become more popular with college level faculty. However, the findings of this study have shown that students who use interactive textbooks and those who do not record same performances. Colleges in the US are looking for creative ways to enhance the performances of

their students and their comprehension. As indicated by this study, it is important to identify tools to engage students from minority communities. Many universities have explored the use of interactive textbooks as a way to improve student comprehension and enhance their overall academic performances.

Research Question 2/Hypothesis

The results of this study showed that after adjustment for pre-SALG scores, there was no statistically significant difference in post-SALG scores between the groups. Specifically, the adjusted mean post SALG scores (controlling for pre-SALG scores) of those students that used interactive textbooks was not significantly different from those that did not. The results of ANCOVA verified that there was no significant difference in government course learning outcomes, as measured by the Student Assessment of Learning Gains Survey (SALG), between minority community college students who use interactive textbooks and those who do not use interactive textbooks when controlling for pretest scores. Students that used interactive textbooks did not score significantly different on SALG than those students that did not use interactive textbooks.

Summary of Implications

This study has established that there is no significant difference in government course final grades of minority community college students who use interactive textbooks and those who do not use interactive textbooks. Based on these findings, several recommendations for practice are provided. Universities and colleges should move from classical to electronic textbooks, which seems to be a logical step in the digitization advancing worldwide. Interactive textbooks ensure convenience in classrooms since it is downloadable making content easily available for students from minority communities. These textbooks contain interactive content

that is not available in the traditional textbooks. As established by this study, the collaborative and interactive features of interactive textbooks increase the engagement of minority students in the learning process. Furthermore, these features allow teachers to incorporate real-world experiences in their classrooms. Another important feature of interactive textbooks is portability. The findings of this study show that students may be more likely to bring these textbooks to class because they are more mobile than printed textbooks. According to Haas et al. (2017), the perceptions of students regarding the incorporation of interactive textbooks in the learning process is an influential factor that most universities must consider.

Community college minority students should learn how to use interactive textbooks to enhance access to quality content. There is discrimination in the US public education system. Although the government of the US has prohibited discriminations based on gender, race, color, disability, and national origin, students from minority groups still find it difficult to access quality education. However, interactive textbooks ensure these students access quality content in classroom thus enhancing their academic outcomes. Relevance of information is another key factor in students' perceptions of the usefulness of a digital textbook. Digital textbooks can be updated in real-time thus resulting in a more versatile learning resource, which changes based on the new available information.

Colleges across the US should impress the use of digital textbooks following complaints by parents that traditional textbooks are too heavy for their children. Digital textbooks eliminate this problem because they can be accessed through computers and other smart devices. The findings of this study suggest that teachers should first familiarize students with the interactive textbooks and then show them how to read and search for the information they need. According to Ali (2019), these textbooks can be utilized as teaching tools. “For new instructors in particular,

it can provide a reassuring backbone for class planning and from which you can draw and explicate concepts" (Hagedorn & Kuznetsova, 2016, p. 42). Teachers should harness the textbooks to meet both their teaching goals and the learning goals of students.

Digital textbooks should be used to increase student engagement in colleges. This study established that higher student involvement with interactive textbooks resulted in higher student engagement in the learning process. Interactive textbooks are cheap and easily accessible thus making it appropriate for students from minority communities. However, the only challenge is that not all students from low-income families can afford these textbooks. One downside of e-texts is that students lease their textbooks for a limited time instead of owning them. Therefore, schools should purchase these textbooks on behalf of students, especially those from low-income families, to ensure equal access to quality education.

Limitations

Every research study is not without some limitations. For this study, the causal-comparative approach to research did present limitations. Gall et al. (2007) noted that one limitation of quantitative causal-comparative research is that the independent and dependent variables already occurred, meaning the research was not experimental, and students were not assigned to a group. However, a causal-comparative study does support the researcher in making inferences about causation based on the analysis results. Another limitation to the study was the time available to conduct and complete the study. An experimental study would have involved considerable time; however, using a causal-comparative approach was a suitable alternative based on the available time to conduct and analyze the data.

Recommendations for Future Research

This study explored whether the use of interactive e-textbooks by community college minority students makes a difference in final course grades and academic learning outcomes using quantitative method. Therefore, future researchers should explore the same research problem using qualitative methods and compare the findings in order to improve reliability. The scope of the study was limited to data collection from students in a government course and examining whether interactive textbooks make a difference in final test grades and learning outcomes as measured by the Student Assessment of Learning Gains Survey (SALG). Therefore, future researchers should collect data from different sources to improve the quality of the findings. Furthermore, the study was delimited to minority students attending a community college in an urban area in South Florida. Future researchers need to include participants from others states in order to increase the generalizability of the findings. Another interesting area that needs more research is the use of digital textbooks to bridge the gap in educational outcomes between the White and African American students.

Conclusions

The problem addressed in this study is the lack of existing research concerning how minority community college students could benefit from interactive e-textbooks. The purpose of this study was to examine whether the use of interactive e-textbooks by community college minority students makes a difference in final course grades and academic learning outcomes. This study expounded on current and recent literature in the area of interactive textbooks, minorities, and the college system. The target population for this study was minority community college students from the setting of a large urban area in Florida. There were two measurement methods for this study, including the SALG and final course test grades. The SALG was used to

measure the learning outcomes of students. The final course test grades were used to measure academic outcomes (see Appendix C).

The findings of this study indicate interactive textbooks can be used to enhance student engagement among minority community college students thus improving their academic performance. Students who use interactive textbooks enjoy benefits such as real-time feedback on classroom problems and text-speech features. Interactive textbooks are used as valuable tools for designing the learning process and contribute immensely on the way learners acquire knowledge. As the world continues to experience technological advancements, e-books are designed to include interactive media such as include videos, animations, audios, and simulations. Therefore, especially in minority communities, interactive textbooks can be utilized as an effective teaching aid. The outcome of this study may illuminate how colleges in the United States can use digital textbooks to bridge the gap in educational achievement between White students and those from minority groups. Therefore, it is recommended that Universities and colleges should move from classical to electronic textbooks because interactive textbooks increase convenience in classrooms since they are downloadable, making content easily available for students from minority communities.

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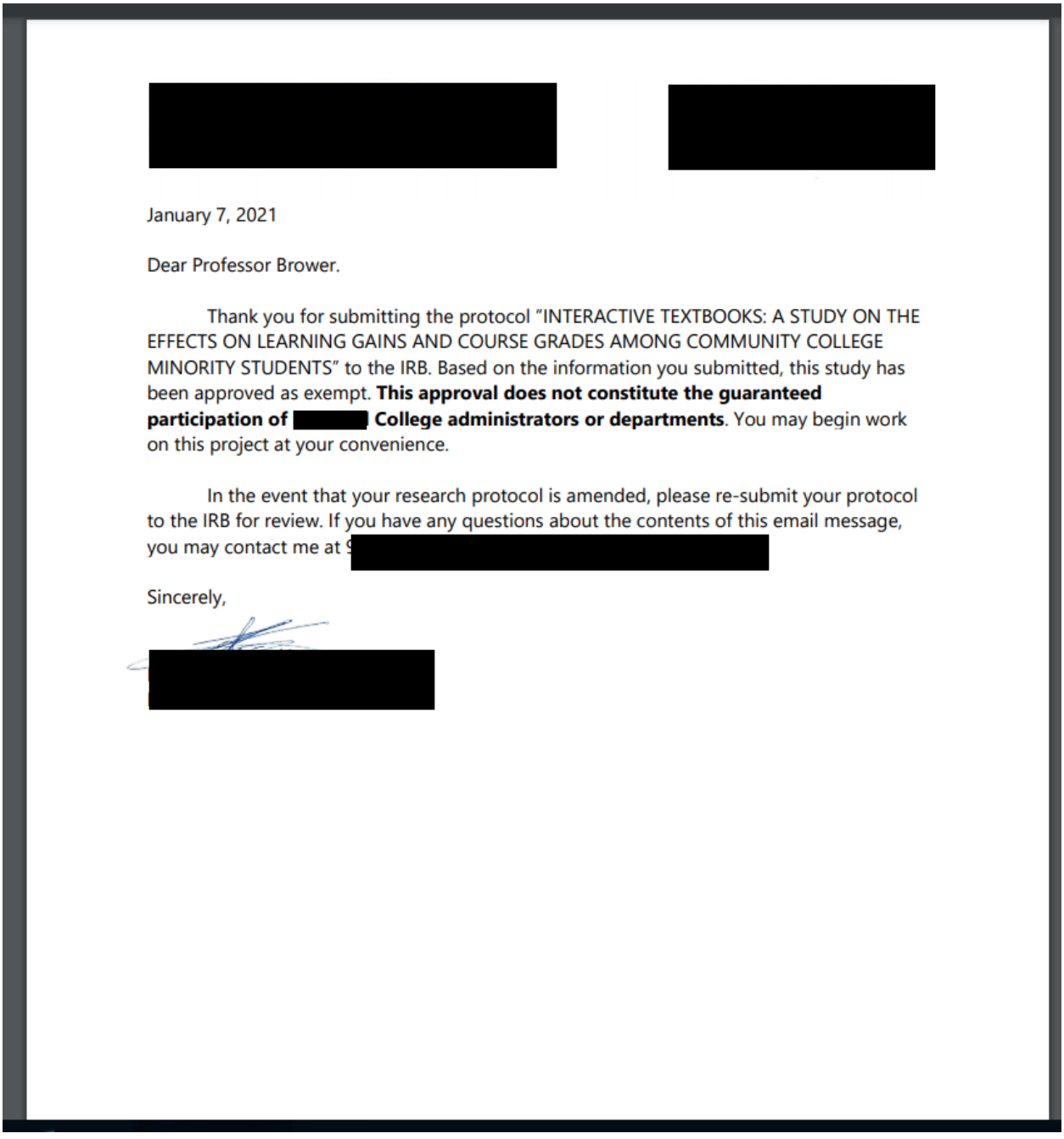
Appendix A

IRB Approval Broward College



[redacted] [redacted]

January 7, 2021

Dear Professor Brower.

Thank you for submitting the protocol "INTERACTIVE TEXTBOOKS: A STUDY ON THE EFFECTS ON LEARNING GAINS AND COURSE GRADES AMONG COMMUNITY COLLEGE MINORITY STUDENTS" to the IRB. Based on the information you submitted, this study has been approved as exempt. **This approval does not constitute the guaranteed participation of [redacted] College administrators or departments**. You may begin work on this project at your convenience.

In the event that your research protocol is amended, please re-submit your protocol to the IRB for review. If you have any questions about the contents of this email message, you may contact me at [redacted]

Sincerely,

[redacted]

Appendix B

Liberty University IRB

January 27, 2021

Victoria Brower
Shante Austin

Re: IRB Approval - IRB-FY20-21-441 Interactive Textbooks: A Study on the Effects on Learning Gains and Course Grades Among Community College Minority Students

Dear Victoria Brower, Shante Austin:

We are pleased to inform you that your study has been approved by the Liberty University Institutional Review Board (IRB). This approval is extended to you for one year from the date of the IRB meeting at which the protocol was approved: January 27, 2021. If data collection proceeds past one year, or if you make modifications in the methodology as it pertains to human subjects, you must submit an appropriate update submission to the IRB.
These submissions can be completed through your Cayuse IRB account.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your stamped consent form can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. This form should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document should be made available without alteration.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

Appendix C

Student Recruitment Letter

Dear Students

As a graduate student in the School of Education at Liberty University I am conducting research as part of the requirements for a doctorate degree. The purpose of my research is to study the effects of interactive textbooks on learning gains and course grades for minority community college students, and I am writing to invite eligible participants to join my study.

Participants must be 18 years of age or older, enrolled in POS 2041 National Government course, be of minority status with the college. Participants, final course grades will be requested/analyzed and will be asked to complete the SALG (student assessment learning gains) survey at the beginning of the course and again at the end of the course. The survey will be the same. Completion of the survey should take approximately 15-25 minutes each time. Participation in this study will be completely confidential.

In order to participate, please

1) open attached consent form

2) read through the consent form, the form will have additional information about the study

3) sign the consent form at the bottom (typed name is considered a signature)

4) email signed consent form to [redacted], the research assistant

5) After you have read the consent form and emailed it to the research assistant, please click to proceed to the survey. Please take the beginning survey within Week 1 of the course and the final course survey in Week 8 of the course.

Please follow the instructions below to access the survey:

* Go to https://salgsite.net/student

* Fill in your email address

* Enter the instrument number: 91696 for the beginning course survey

* Provide the instrument password: POS2041B

The beginning survey will be open during Week 1 of the course. The end of course survey will be available Week 8 of the course. A follow up email will be sent to participating students with the end of course survey password.

Sincerely,

Victoria Brower
Government Instructor/Researcher
[redacted]

Appendix D

Student Consent Form

Title of the Project: Interactive Textbooks: A Study on the Effects on Learning Gains and Course Grades Among Community College Minority Students

Principal Investigator: Victoria Brower; Doctoral Student; Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, students must be 18years of age or older, a student at Broward College enrolled in the National Government Course (POS 2041) and part of a minority group (according to the US Department of Education). Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the study about and why is it being done?

The purpose of the study is to compare the impact of interactive textbooks and their effect on final course grades and learning outcomes for minority community college students. This study is being done to provide information that could promote technologies to help students complete their course work and attain terminal degrees. The results of this study will be used to compare the impact of interactive textbooks versus the non-use of interactive textbooks in students learning outcome and final course grades and possibly assist governmental agencies and institutions to further provide support needed by minorities.

What will happen if you take part in this study?

If you agree to be in this study, I would ask you to do the following things:

1.Complete the SALG (student assessment and learning gains) online survey at the beginning of the course and at the end of the course. Students who have used interactive textbooks and students who have not used interactive textbooks will both be surveyed. There will be a comparison on learning outcomes and final course grades among both groups of students. This survey may take an estimated 15-25 minutes to complete each time.

2.Allow the researcher and/or research assistant to access and use of your final course grade or research purposes. Student final course test grades will be compared among students who use interactive textbooks and those who do not.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from participating in this study. The findings of this study may improve research in the area of student learning outcomes and academic achievement. Benefits to society include improving the quality of education for

minorities, by providing research to educational institutions and governmental agencies that could encourage financial benefit.

What risks might you experience from being in this study?

The risks involved in this study include are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify any subject. Research records will be stored securely, and only the researcher and research assistant will have access to the records.

- Students will receive a coded number to identify their grades and surveys will be confidential.
- Data will be stored on researcher or research assistant's password locked computer and then transferred to a USB once the study is completed. The data will be destroyed within 3 years of the completed study. Data may be used in future presentations.

How will you be compensated for being part of the study?

There will be no compensation for being part of the study.

What are the costs to you to be part of the study?

There is no cost to participate in the research.

Does the researcher have any conflicts of interest?

The researcher serves as an instructor of the course at the college in which the course is being given and the study is being conducted. To limit potential or perceived conflicts, a research assistant will ensure that all data is stripped of identifiers before the researcher receives it. This disclosure is made so that you can decide if this relationship will affect your willingness to participate in this study. No action will be taken against an individual based on his or her decision to participate in this study.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Broward College nor Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

Inform the research assistant that you wish to discontinue your participation, and do not submit the surveys. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researchers conducting this study are Victoria Brower and the research assistant [redacted]. You may ask any questions you have now or at any point of the study. If you have questions later, you are encouraged to contact either one of us at [redacted] or [redacted]. You may also contact the researcher's faculty sponsor, [redacted]

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researchers, you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researchers will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

(_) The researcher/research assistant has my consent to access and use my final course grade for research purposes.

_____

Printed Subject Name

_____

Signature & Date