THE EFFECTS OF BLENDED LEARNING ON STUDENT ACHIEVEMENT, INTERACTION LEVELS, AND ONLINE READINESS SKILLS IN THE HIGH SCHOOL SOCIAL STUDIES CLASSROOM

by

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ABSTRACT

MICHELLE RINEHARDT-CLINE THE EFFECTS OF BLENDED LEARNING ON STUDENT ACHIEVEMENT, INTERACTION LEVELS, AND ONLINE READINESS SKILLS IN THE HIGH SCHOOL SOCIAL STUDIES CLASSROOM.
(Under the direction of DR. JIM BIRD)

The purpose of this experimental design study was to use quantitative research to explore the effects of the teacher-reach model of blended learning and its effectiveness on student academic achievement, student interaction levels, and development of online readiness skills. The research questions address whether students enrolled in a blended section of American History II can achieve comparable achievement growth on the North Carolina Final Exam as measured by EVAAS growth score and comparable interaction levels with content, peers, and their teacher as measured by the Student Interaction Survey as their peers in a traditional section of American History II. Another research question addresses whether students perceive improved online readiness skills after being in a blended course. Two groups of students participated in the study, and data were collected in the form of EVAAS growth scores, test scores, and survey results.

There was no statistically significant difference in the academic achievement and interaction levels demonstrating that the students in the blended section did achieve comparable levels than students in the traditional section. Students in the blended section did experience improvement in the development of their online readiness skills; however, the improvement was not statistically significantly higher than students in the traditional class.

DEDICATION

This dissertation is dedicated to David, Mason, and Miles who have supported me through this arduous process. David, thank you for loving me and always believing in me, especially when I didn't. Mason and Miles, thank you for giving me a reason to aspire to be my best self and for expecting nothing less of me. Always remember that you are the only person who can define your limits. I love you all.

I also want to dedicate this dissertation to Scott Nolt. Thank you for embarking on this journey of blended learning with me. Thank you for always representing what is amazing about public school education and for always challenging me to grow as a professional.

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LIST OF ABBREVIATIONS

AYP	Adequate Yearly Progress
EOC	End-of-Course Test
ESSA	Every Student Succeeds Act
ETS	Educational Testing Service
EVAAS	Education Value-Added Assessment System
LMS	Learning Management System
NCDPI	North Carolina Department of Public Instruction
NCFE	North Carolina Final Exam
NCLB	No Child Left Behind
OECD	Organization for Economic Cooperation and Development
PISA	Program for International Student Assessment
PLC	Professional Learning Community
SAT	Scholastic Aptitude Test
SEA	Secondary Education Act

Chapter 1: Introduction

History of Educational Reform

"Our nation is at risk." These were the first words written by the congressional subcommittee which had been assembled to evaluate the US Education System in 1983. The introduction continued to elaborate the specific concerns of this risk:

> We report to the American people that while we take justifiable pride in what our schools and colleges have historically accomplished and contributed to the US and the well-being of its people, the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a nation and a people. (p.13)

According to this committee, some of the indicators of this increasing risk: 23 million Americans are functionally illiterate, the average achievement of most American high school students on standardized tests is now lower than when Sputnik was launched in 1957, and scores on College Board's SAT demonstrate a consistent decline from 1963-1980. "Our society and its educational institutions seem to have lost sight of the basic purpose of schooling and of the high expectations and disciplined effort needed to attain them" (US Cong, 1983, p.13-14). Therefore, "for the first time in the history of our country, the educational skills of one generation will not surpass, will not equal, will not even approach, those of their parents" (US Cong, 1983, p.19).

This report and its condemnation of the US Educational System represents the first major push, in the long list of others, to make strategic changes and improvements to the current, faltering US Educational System. In 1965, President Johnson, who believed that full educational opportunity should be "our first national goal" signed the Elementary

and Secondary Education Act (*Every Student Succeeds ACT (ESSA)*, 2015, p.2). This law offered grants for textbooks, library books, special education centers, and college scholarships to school systems and schools serving low-income students. Two decades later, in 1994, the Improving America's Schools Act introduced legislation and the concept of holding schools accountable for student performance on state assessments (Corry & Carlson-Bancroft, 2014). Later in 2002, the No Child Left Behind Act (NCLB) enforced this concept and attempted to illuminate where students were making progress and where they still needed additional support regardless of race, income, zip code, disability, or home language (*Every Student Succeeds ACT (ESSA)*, 2015, p.1). This act required a regimen of annual testing and imposing sanctions on schools that failed to make adequate yearly progress (AYP) (Corry et al., 2014, p. 2). In 2008, the Institute of Education Sciences (IES) reported that out of 98,905 schools nationwide, 65,546 (70%) made AYP during the 2006-2007 school year. Out of the remaining schools that did not make AYP, 10,676 schools were designated as schools in need of improvement, and 2,302 schools were designated as schools in need of restructuring (Corry et al., 2014, p. 7). According to the US Department of Education, schools that did not meet AYP for multiple years were labeled "failing" and "were required to implement the same one-size-fits-all interventions that did not result in significant improvement" (Corry et al., 2014, p. 2).

In 2015, President Obama signed the Every Student Succeeds Act (ESSA) which renewed the federal government's commitment to public education. This new law continued to build upon some of the successes of NCLB including increased high school graduation rates and increased college admission rates while relaxing some of the more

stringent and expensive accountability, and designation of schools of that same law (*Every Student Succeeds ACT (ESSA)*, 2015). More specifically, ESSA includes provisions designed to ensure success for student and schools:

- The law advances equity by upholding critical protections of America's disadvantaged and high need students.
- The law requires, for the first time, that all students in America be taught to high academic standards that will prepare them to succeed in college and career.
- The law ensures that vital information is provided to educators, families, students, and communities through statewide assessments that measure students' progress toward those high standards.
- The law helps to support and grow innovations, including evidence-based and place-based interventions developed by local leaders and educators, consistent with our Investing in Innovation. (*Every Student Succeeds ACT (ESSA)*, 2015)

Despite the national wake-up call initiated by "A Nation at Risk" and the subsequent legislation directed at improving US education, the headline of *Business Insider Magazine* in December 2016 boasts, "The Latest Ranking of Top Countries in Math, Reading and Science is out—and the US Didn't Crack the Top 10" (Jackson & Kiersz, 2016, p. 1). This headline and its accompanying article reference the release of the data from the 2013 Program for International Student Assessment (PISA). PISA is a worldwide exam administered to randomly-selected 15-year-olds in 72 countries every three years (Jackson & Kiersz, 2016). Among the 35 countries in the Organization for Economic Cooperation and Development (OECD) who participate in PISA, the US

performed about average in science and reading. However, the US performed below average in math and showed an 11point decline since the prior test in 2010 (*Key Findings from PISA 2015 for the United States*, 2016). Therefore, the concern that was launched in A Nation at Risk of "what was unimaginable a generation ago has begun to occur—others are matching and surpassing our educational achievements" (1983, p. 13) is still true today --25 years later.

Statement of the Problem

This root problem is the fact that, despite the previous legislative changes, the essential structure and foundation of our educational system have remained the same for several centuries. The structure of this system still supports the idea that all students can and should learn the same information and skills at the same time, at the same rate, in the same way, and to the same level (Balentyne & Varga, 2016). According to DuFour and Eaker (1998), pioneers of Professional Learning Communities (PLCs), though this model may have been effective in cultivating an educated and literate citizenry in the 1800's, when only the sons of white, wealthy landowners attended school, data over the past few decades clearly show that it is not effective today when schools serve a multitude of different types of students. One universal belief in education is that students learn at different rates and in different ways (Balentyne & Varga, 2016). Therefore, the current US model of placing 25-35 high schoolers in one classroom for the same fixed amount of time each day (typically 90 minutes), for the same fixed number of days (typically 90 days per semester), and expecting all students to learn the same number of standards to a preset level of proficiency and demonstrate growth in their individual achievement is a

recipe for the mediocrity that the Committee raged about in *A Nation at Risk* (Schwahn & McGarvey, 2012).

The problems of varying student ability levels and varying levels of student motivation have to be addressed. Realizing this problem, educators began to seek ways to individualize and personalize instruction. Dr. Madeline Hunter, Principal of the UCLA Lab School; Dr. John Goodland, also of UCLA; and Dr. Dwight Allen, Professor at Stanford, who were highly respected educators and researchers and acknowledged as innovative thinkers of their day, all promoted "Individualized Instruction" (Schwahn & McGarvey, 2012). Their strategies took the form of team teaching, non-graded schools, multi-age grouping, flexible scheduling, but all these strategies for individualizing instruction were still basically within the "assembly line" structure/model of education (Schwahn & McGarvey, 2012, p. 14). Educators have known what needed to be done to truly teach and grow students for a long time but have been stuck in a "group paced" paradigm that couldn't be escaped under the current US Education structure. "It is difficult to implement something new when surrounded by self-organizing forces that tends toward equilibrium and reinforcement of the status quo" (Dron, Seidel, & Litten, 2004, p. 172).

Instructional Concepts

According to Keefe and Jenkins (2000), the movement to individualize instruction began as early as 1925 in New York with "Non-Graded Education" (p.37). Other implementations to individualize instruction have been Continuous Progress (CP) Education, Individually Guided Education, and Adaptive Instruction (Keefe & Jenkins,

2000). While earlier initiatives toward individualized instruction have enjoyed some isolated success, they have "failed to penetrate the barricades of traditional practice" (Keefe and Jenkins, 2000, p. 32). Fortunately, Madeline Hunter and her work with non-graded classrooms proved to be early an early advocate of individualized instruction, and Carol Ann Tomlinson has surfaced as the leading voice on differentiation (Schwahn & McGarvey, 2012). As a result of the new emphasis placed on the need to individualize learning, several important terms and concepts have been introduced in the last few decades. While often confused as being interchangeable, *differentiation*, *individualized instruction*, and *personalized learning* are different, yet often related concepts. According to Tomlinson (2000), *Differentiation* is a type of teaching in which instruction is tailored to meet the learning needs, preferences, and goals of individual students. The overarching academic goals for groups of students are the same, yet teachers have the latitude to use whatever resources and approaches they see fit to connect with a student or use practices that have proved successful for similar students (Tomlinson, 2000, p.2). Regardless of what a teacher decides to differentiate — whether it's subject matter, the learning process or even the environment where learning occurs — "*differentiation* is an awareness *of* and active response *to* students' various learning styles. It involves exercising flexibility in assessment, grouping, and instruction to create the best learning experience" (Basye, 2016, p.1).

"Instruction calibrated to meet the unique pace of various students is known as *individualized learning*. If differentiation is the "how," then *individualization* is the "when" (Basye, 2016, p.1). The academic goals, in this case, remain the same for a group of students, but individual students can progress through the curriculum at different

speeds, based on their own particular learning needs. This approach serves students who may need to review previously covered material, students who don't want to waste time covering information they've already mastered, or students who need to proceed through the curriculum more slowly or immerse themselves in a certain topic or principle to really get it (Keefe & Jenkins, 2000, p. 38). "With *individualized instruction*, learning strategies are based on student readiness, learning styles, interests and best practices. All this is meant to help each student master the skills they will need as defined by established academic standards" (Basye, 2016, p.1).

Perhaps the most confusing term of them all is *personalized learning* or *personalization*. Some misuse the term, thinking it refers to a student's choice of how, what, and where they learn according to their preferences. Others confuse it with individualization, taking it as a reference to lessons that are paced at different rates to accommodate different students. Really, "*personalized learning* refers to all aspects of learning and teaching: learning that is tailored to the preferences and interests of various learners, as well as instruction that is paced to a student's unique needs. Academic goals, curriculum and content — as well as method and pace — can all conceivably vary in a *personalized learning environment*" (Basye, 2016, p.1).

Unlike individualized instruction, *personalized learning* is much more student-centered and involves the student in the development of learning activities which revolve around a student's personal interest and innate curiosity (Keefe & Jenkins, 2000). "Instead of education being something that happens *to* the learner, it is something that occurs as a result of what the student is doing, with the intent of creating engaged

students who have truly learned how to learn" (Basye, 2016, p.1). P*ersonalization*, in addition to responding to students' needs and interests, teaches them to manage their own learning — to take control and ownership of it. For teachers, *personalized learning* is about facilitation more than dissemination (Keefe & Jenkins, 2000).

Purpose of the Study

Blended learning is a model which can help schools achieve this goal of providing a more personalized instructional experience for individual students. "Since the most effective (and unrealistic) application of true *personalized learning* would require one-on-one tutoring for every student based on their interests, preferences, needs, and pace" (Basye, 2016, p.1), the adjusted class schedules and implementation of digital resources of blended learning offers the opportunity for individualized instruction and growth that a single teacher in a classroom of 35 students cannot normally accomplish. Christensen (2011) emphasizes the power of a more student-centered approach by insisting that in order to truly "disrupt" our current dysfunctional classes and educational system, we need a less standardized, and more customized and personalized approach to engage our students in the learning process (p.11).

Of all the factors that contribute to the widening or closing of achievement gaps, the one that educators can impact the most is the motivation of students. In *Disrupting Class*, Christensen (2011) explains, "Motivation is the catalyzing ingredient for every successful innovation. The same is true for learning" (p. 7). A significant body of research exists explaining strategies to increase student motivation and engagement including specific strategies to help with *personalization*, including cooperative learning,

problem-based learning, student-choice, and technology interaction (Schelechty, 2005). While there has been a significant increase in technology usage in the classroom in the last 10 years, faculty and students still differ in their opinions regarding its usefulness and appropriateness. For example, Project Tomorrow's Speak Up Survey (2011) shows that the majority of administrators, parents and students say that while the use of individual mobile devices can enhance the potential for student engagement in learning, 65% of principals would not change current school policies prohibiting the use of such devices. The use of technology as an engagement strategy extends beyond the authorization of students' usage of personal devices in classrooms into the realm of online classes. In this same survey, students ranked their top five reasons for taking online classes as 1) schedule accommodation, 2) more control over their learning, 3) ability to work at own pace, 4) ability to earn college credit, and 5) more opportunities to review course material. Despite these advantages, many administrators, teachers, students, and parents still have reservations about online learning and the lack of dynamic interaction and lack of critical thinking online learning has traditionally inspired. In an attempt to ease some of these reservations and still capitalize on the engaging possibilities technology enhanced learning can offer digital native students, many schools have begun offering courses via a blended learning delivery system. Lloyd and Smith (2010) have shown that blended learning has emerged as a potential solution to address the diverse learning needs of community college students. Similarly, Du and Wang (2013) suggested that blended learning is more effective than purely online or purely face-to-face.

Definition of Blended Learning

As a relatively new educational concept, blended learning means different things to different people. "Blended learning is critically different from--but easily confused with-- the much broader trend of equipping classrooms with devices and software" (Horn & Staker, 2015, p. 34). However, for the purposes of this study, blended learning will be defined as Horn and Staker (2015) do by the three following characteristics:

- Blended learning is any formal education program in which a student learns at least in part through online learning, with some element of student control over time, place, path, and/or pace.
- The student learns at least in part in a supervised brick-and-mortar location away from home.
- The modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.

These characteristics, which are what distinguish blended learning from all other learning delivery systems, are also what helps engage students on their personalized journey through standards-based content.

Many educators, researchers, and legislators see technology as one solution or one tool for meeting the need to change the structure of education to make it more personalized. A 2001 Project Tomorrow Survey suggests that the learning environments and experiences that technology and great teachers can create can be "so engaging and compelling that they ignite a new, insatiable curiosity for more and more knowledge"

(Corry et al., 2014, p. 25). Therefore, it is not surprising that many state departments of education, school districts, and schools have written goals about digital learning into their strategic plans. For example, the North Carolina Strategic Plan Objective 2.2 is aimed at increasing the number of students and teachers using online learning tools. In Cabarrus County Schools (CCS), which is the ninth largest school system in NC, Goal 1 is "Every student in CCS will graduate from high school prepared for work, further education, and citizenship." One of the measures for achievement of this goal is the number of students successfully completing one blended or online course. Goal 2 is "All students will experience a personalized education in CCS system." One of the measures for this goal is the percentage of digital tool usage.

While little research currently exists on this model of blended learning, much research has been conducted in the last 30 years on these issues within online learning, particularly at the collegiate level. Online learning, according to the National Center for Education Statistics (2008), is one of the fastest growing educational trends (as cited in Means, Toyama, Murphy, Bakia, & Jones, 2009). Cavanaugh, Barbour and Clark (2009), illustrate that even though the verdict is still uncertain as to how effective online learning really is, the number of colleges, universities, and high schools offering these courses, as well as the number of students enrolling in them, continues to rise dramatically, by at least 10% per year. National data indicates that in the fall semester of 2013, over 5.2 million, or 25% of all higher education students took at least one online course (James, Swan, & Daston, 2016). Picciano and Seamon (2009) estimate that more than one million K12 students took online courses in 2007-2008). Though these studies indicate many reasons for success and failure in online courses, according to Picciano, 2002; Swan,

2002; and Wanstreet, 2006, "**interaction** is the heart of the learning experience and is widely cited as a defining characteristic of successful learning in both traditional and online learning" (as cited in Baker, 2010, p. 3).

Therefore, one way to evaluate the effectiveness of an online learning experience would be to consider it through the lens of Moore's Transactional Distance Theory. "Distance education is not simply a geographic separation of learners and teachers, but, more importantly, is a pedagogical concept. It is a concept describing the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/ or by time" (Moore, 1997, p.25). According to this theory, which Moore began developing in the 1970's and which was elaborated by Saba and Shearer in 1994, "learning happens through mutual sharing and negotiations of meaning between teacher and learner in such a manner that the locus of control shifts from one to the other constantly through the feedback process" (as cited in Gokool-Ramdoo, 2008, p. 7). Moore's use of the term 'distance' in this theory does not refer to the geographical distance between the teacher and the student. Rather, it refers to the development (or not) of a transaction, or the development of a particular form of interaction between teacher and learner because of their geographical separation (Giossos, Koutsouba, Lionarakis, & Skavantzos, 2009). Because the success of this transaction between teacher and learner is essential and often correlated with the student's success in the course, Moore (1989) elaborated his theory to focus on three levels of interaction: learner to teacher, learner to learner, and learner to content.

Nature of the Study

This study used quantitative inferential research to compare test growth of students in a blended course to students in a traditional non-blended course. Survey data completed by students in both classes compared levels of learner to content, learner to learner, and learner to teacher interaction within each course as well as provided student perceptions of online readiness skills. This study will use archived data from the 2016-2017 school year as part of a pilot program for a public high school in Cabarrus County, NC.

Using the analysis of the comparisons of growth scores and the comparisons of student survey data for the blended class and the traditional non-blended class this study addresses the following research considerations:

1. Do students in a blended class attain the comparable levels of achievement growth as their peers in a traditional class?
2. Do students in a blended class experience comparable levels of learner-to-content, learner-to-learner, and learner-to-teacher interaction as their peers in a traditional class?
3. Do students in a blended class experience greater improvement in online readiness skills than their peers in a traditional class?

Significance of the Study

Despite the multitude of wide-spread educational reform legislation in the past 40 years and improvements in graduation rates and some state testing results, current PISA data suggests that the American nation is still at risk:

> The time is long past when America's destiny was assured simply by an abundance of natural resources and inexhaustible human enthusiasm, and by our relative isolation from the malignant problems of older civilizations. The world is indeed one global village. We live among determined, well-educated, and strongly motivated competitors. We compete with them for international standing and markets, not only with products but also with the ideas of our laboratories and neighborhood workshops. America's position in the world may once have been reasonably secure with only a few exceptionally well-trained men and women. It is no longer. (Nation at Risk, p. 1)

Results of the 2013 PISA show that if America wants to compete globally, then we have to continue to make changes to the traditional educational system. Educators have to be allowed, and more importantly encouraged, to innovate to make changes that will really make a significant difference to student learning. The word innovate means to think in a way that creates something new and better (Couros, 2015). Learning and innovation go hand in hand (Couros, 2015) and “an innovator’s mindset begins with empathy for our students and a desire to create something better” (Couros, 2015, p. 41). As evidenced by state and local school system strategic plans, individualizing instruction using digital resources and implementing the teacher reach model of blended learning are efforts to innovate and make these differences.

This study illustrated whether students in these sections, with different instructional delivery methods, performed similarly, statistically higher, or statistically lower than the other method. The conclusion of these results indicated whether this teacher- reach blended learning delivery method is as effective as traditional face-to face delivery method in this course. Either way, this could have implications on staffing choices and resource allocations for schools. For example, if the blended learning model is as effective as the traditional model, then schools can make choices which require less face-to-face time for students, thereby, extending the reach of their teachers. In a traditional setting, a high school teacher typically teaches three sections of 30 students each semester, allowing him to teach approximately 90 students per semester. A teacher using a blended model could technically teach six sections of 30 students each semester, since students only have face-to-face instruction every other day. Another possible implication of this finding may not increase the number of students for a teacher but may increase the time for planning or professional development on the alternating days.

Finally, if the blended model is as effective as the traditional delivery model, there will be implications for all teachers on the effectiveness of using more digital instruction regardless of their actual class format. Even on the very limited scale of one instructor and one section of blended and one section of regular, the results of this study could open up the possibility for school administrators to offer flexibility within a traditional school schedule, allocate staffing choices differently, and engage students with 21st Century Learning skills and more personalization. In other words, the results could empower building and district level administrators to begin to "disrupt education" by

encouraging paradigm shifts in that education does not have to and really should not look the same as it has for 200 years.

Organization of the Study

Chapter 1, the introduction, provided background of educational reform efforts in the US and data which indicated the need for continued and innovative types of educational reform to meet the needs of varying student ability levels and motivation. It also provided background of educational initiatives to individualize and/or personalize student learning. Chapter 1 defined blended learning and provided an overview of the various models of blended learning. Chapter 1 stated the significance of this study, which is centered on the Teacher Reach Model of Blended Learning and its use as a strategy to individualize students' learning experiences and increase the reach of the most effective teachers. Chapter 2 included a literature review which shows that while blended course offerings continue to increase at the high school level, very little research exists to indicate the effectiveness or lack thereof of this model. Existing research of online learning indicates that success in these courses center around three key levels of interaction: learner to content, learner to learner, and learner to teacher. These interactions support and expound the theoretical base of Transactional Distance Theory introduced in chapter 1. The literature review also showed other benefits and challenges of online learning. Chapter 3 detailed the quantitative research design and methodology, including the participants, variables, and the treatment introduced in the research-question portion of the paper. A detailed review of the North Carolina Final Exam for American History II as well as the EVAAS growth model, used by NCDPI, American History Essential Skills Test, Student Interaction Survey, and Online Readiness Survey

was outlined in the instrumentation section. The study also compared the student growth scores and student perception survey data from students in a blended American History II class to students in a traditional non-blended American History II class. Chapter 4 reported the findings of this study, and chapter 5 discussed their implications on education and make recommendations for future areas of research.

Chapter 2: Literature Review

Introduction

The foundational structure of the US educational system has remained basically the same for the last 200 years (Tomlinson, 2000). However, the ability levels and personal interests within a single classroom, which teachers rely on to engage and motivate students, have changed drastically over the last 200 years. Consequently, because of their one size fits all approach to teaching and learning, schools are failing to tap into what truly enables students to learn. In essence, according to Horn and Staker (2015), we need a more student-centered approach to education, which focuses on a personalized approach to standards-based learning. While the definitions of personalized learning, differentiation, and individualized learning may be difficult to discern, they all make up ways "a teacher can respond to student needs" (Tomlinson, 2000, p.15). The challenge for one teacher to design student-centered learning, which is individualized for each student's interests, and which allows each student to progress according to his/her abilities, is taxing at best and impossible at worst. Hence, blended learning has and continues to offer authentic possibility and hope for student-centered learning. Furthermore, Moore's Transactional Distance Theory states that the quality of teaching interactions among students and their instructor relates less to geographical separation and more to the structure of a course and the interactions that take place within it (Moore, 1997). This theory is important conceptually because it provides an explanation for why the use of electronic communication tools may bridge the distance between learners and the teacher in an online environment.

History of Technology in Education

Technology has always been a major part of education. Papert, a professor at Massachusetts Institute of Technology, was among the first to recognize the potential of technology to fundamentally change the learning enterprise. During the 1960s, after collaborating with renowned Swiss psychologist Piaget, Papert developed the Logo programming language and began introducing it to children. Designed to be simple enough for those who do not yet have sophisticated mathematical understanding, Logo enabled students to use the computer to take control of their learning environment. With minimal instruction, they were able to write -- and debug -- programs that controlled the movements of a turtle robot. They not only gained deeper understanding of geometry concepts along with programming expertise but also showed an engagement in learning that's rare in more traditional, drill-and-practice classroom activities (Boss, 2011).

In the early1900's, the most important resources in a classroom were textbooks, blackboard slates, and chalk. In 1925, film projectors were being introduced to the classroom. During the 1930's, overhead projectors were being used to project words and images from books and maps onto a larger screen. In the 1940's, teachers began using the mimeograph machine to print and multiply classroom materials. In the early 1950's, headphones were being used to listen to audiotapes in classrooms. In the 1960's, the filmstrip projector and viewer were introduced to classrooms. In the 1970's, students began using handheld calculators and teachers began using scantrons to create and grade multiple choice tests. In 1977, students could use the Apple II desktop computer to learn geography and math using computer games. In the early 1980s, early IBM computers

were used to create reports and assignments. In the early 1990's, the World Wide Web and the Internet became public via an Ethernet cable. By the late 1990's, blackboard and whiteboards were being replaced with interactive whiteboards. At the beginning of the 21st century, students were using clickers to provide and record poll-type responses, and YouTube was being used to connect and create. In 2010, broad-band internet connections enabled students to access a wealth of digital resources from classroom provided devices like laptops, Chromebooks, iPads, and even their own mobile smart phones ("A History of Technology in Education," n.d.).

Since Papert's groundbreaking work, the tools available for learning have become increasingly powerful and widespread. Today's learning landscape includes an almost overwhelming array of tools, from inexpensive personal computers and handheld devices to interactive whiteboards, digital video cameras, and a constantly expanding suite of Web 2.0 tools. Currently, many school systems and classrooms utilize Learning Management Systems (LMS) such as Canvas, Schoology, Google Classroom, etc. to organize, store, and disseminate entire courses. Likewise, in the quest to meet individual student needs, many classrooms employ Adaptive Technology Programs, which assess students and make adjustments to instruction based on student responses. The analyses and calculations that these programs are able to perform instantaneously to provide the appropriate level of question/passage for students would be far too time-consuming and complex for a single teacher to perform for a class of students in order to benefit the students.

In a 1998 Educational Testing Service (ETS) Survey on math achievement scores, scientist Wenglinsky found positive benefits for educational technology, as long it was used for challenging activities such as simulations. In a 2000 report, a team from SRI International, Rochelle, Pea, Hoadley, Gordin, & Means identified four ways that technology enhances how children learn: it offers active engagement, the opportunity to participate in groups, frequent interaction and feedback, and connections to real-world contexts. Technology also expands what students can learn by providing them with access to an ever-expanding store of information (Boss, 2011). In contrast, studies found that using computers to drill students on fundamental skills had a negative impact on achievement. The same SRI researchers emphasized that merely making computers available does not automatically lead to learning gains. They described technology integration as only one element in "what must be a coordinated approach to improving curriculum, pedagogy, assessment, teacher development, and other aspects of school structure" (Boss, 2011, p. 1).

The Rise of Online Learning

According to the US Department of Education (2010a), online learning is one of the fastest growing trends in education-- collegiate and K-12. In Allen & Seaman's Online Report Card (2016), distance education enrollments in higher education illustrated the following trends in 2014:

- Student online enrollment rates continued to grow at a healthy rate, showing a 7% increase overall between fall 2012 and fall 2014 despite the decrease in overall higher education enrollment.

- Public institutions continue to lead in overall distance education enrollments, despite the efforts of the other sectors to increase their distance enrollments.
- 87% of undergraduate students were enrolled in “Some but Not All” online courses.
- 56% of graduate students were enrolled in “Some but Not ALL” online courses.

According to the International Association for K-12 Online Learning’s (iNACOL) most recent report in 2013, online enrollment in K12 students also continues to rise:

- 25 states have state virtual schools operating in 2013-2014.
- 29 states and Washington, DC have statewide full-time online schools operating in 2013-14.
- There were an estimated 1,816,400 enrollments in distance-education courses in K-12 school districts in 2009-2010, almost all of which were online courses.
- 74% of these enrollments were in high schools. Online courses with the highest level of enrollment fall under the categories of credit recovery (62%), dual enrollment (47%), and advanced placement (29%).
- This enrollment estimate does not include students attending most full-time online schools — approximately 200,000 full-time students in 2009-2010. As of 2012-2013, the number of students has grown to 310,000.

- Single and multi-district blended and online programs are the largest and fastest-growing segment of online and blended learning.

The US Department of Education compares the origin of distance learning to early correspondence courses available over 100 years ago. Distance and online learning originated in the 1980's and 1990's as opportunities to enhance the quality of learning experiences and outcomes (Corry & Carlson-Bancroft, 2014, p. 8). Distance learning, which is also referred to as online learning, virtual learning, cyber learning, and e-learning, is defined as education in which instruction and content are primarily delivered through a format other than face-to face, typically over the phone or over the Internet. It can be offered with synchronous (real-time) or asynchronous communication between instructors and learners, ultimately providing more flexible access for content and instruction at any time and from any place (Corry & Carlson-Bancroft, 2014).

Research in Online Collegiate Learning

In colligate online learning, there seems to be two major clusters of research: one focuses on the development of the instructional designs of the courses and the other focuses on students' satisfaction with online courses compared to traditional face-to-face courses (Czerkawski & Lyman, 2016). Key studies over the last five years by Bakia, Jones, Means and Murphy and Toyama (2010) and Lim, Morris, and Kupritz (2007) indicate that "in terms of student learning outcomes, online learning environments are able to match-- and in some cases potentially exceed—traditional classroom-based instruction. However, a plethora of research by Blazer (2009), Moody (2004), and Ni (2013) also exists showing the higher attrition rates in online college courses compared to

attrition rates in face-to-face college courses. Therefore, these high attrition rates suggest that many students do not finish online courses, and are, therefore, not included in the earlier statistical conclusions that online courses meet or exceed traditional learning outcomes. A study by Leeds, Campbell, Baker, Ali, Brawley, & Crisp (2013) indicated that "Success in online learning depends, to some extent, on the characteristics students bring to online learning environments" (p. 35). Furthermore, Allen & Seaman (2013) and Zatynski (2013) asserted that high attrition rates can be attributed to the lack of motivation, initiative, and management skills from the online student (Corry & Carlson-Bancroft, 2014). Research by Tunison and Noonan (2001) also found that "online courses place a great deal of responsibility on the student and conclude that the degree of autonomy may be too overwhelming" (as cited by Beese, 2014, p. 292). However, a 2008 study by Robinson and Hullinger also indicated that instructors and instructional course design can "contribute to student success by adopting purposeful course designs that promote interaction, participation, and communication in an online learning environment" (as cited in Czerkawski & Lyman, 2016, p. 532). The predominating features of purposeful design which foster interaction, participation, and communication are self-pacing, engaging, and personalization of content (Horne & Staker, 2015).

Research on Online K12 Learning

Unlike collegiate online learning, few rigorous studies of the effectiveness of online learning for K-12 students have been published. According to the US Department of Education, a systematic search of research literature from 1994-2006 found no experimental or quasi-experimental studies comparing the learning effects of online versus face-to-face instruction for K-12 students that provide sufficient data (Means et

al., p. xiv). In fact, after a plethora of "no significant difference" studies, researchers are beginning to move beyond the question of whether online courses were as effective as face-to-face courses and are moving into the realm of identifying which instructional strategies are most effective for online learning (Baker, 2010). As a result, the US Department of Education conducted a meta-analysis and review in 2010. In this study, Means, Toyoma, Murphy, Bakia, and Jones determined that students enrolled in distance courses performed as well or better than students in traditional courses. Furthermore, the researchers found that when a face-to-face component was combined with the online course, the difference in the achievement levels was more significant than when the students took completely online courses (Harris-Packer & Segol, 2015).

What is Blended Learning?

This approach of combining face-to-face elements and online learning is referred to as hybrid learning or blended learning. Blended learning seeks to achieve the same ends as distance learning, including flexibility and greater access to content. However, realizing that there is a limited number of students, as suggested by collegiate online research, who possess the autonomy necessary to work without the explicit supervisors and face-to-face mentoring of an adult, blended learning seeks to fill in the gaps of purely online learning alone (Horne & Staker, 2015). In blended learning, students learn partially via online learning, with student control over time, place, path, or pace, and students learn a portion of the time inside the traditional classroom and a portion of the time outside the traditional classroom (Horn & Staker, 2015). Multiple models and varieties of blended learning exist in order to optimize student opportunity. According to Horn and Staker (2014), there are four commonly used models:

1. Rotation model — a course or subject in which students rotate on a fixed schedule or at the teacher's discretion between learning modalities, at least one of which is online learning. Other modalities might include activities such as small-group or full-class instruction, group projects, individual tutoring, and pencil-and-paper assignments. The students learn mostly on the brick-and-mortar campus, except for any homework assignments.

a. Station Rotation — a course or subject in which students experience the Rotation model within a contained classroom or group of classrooms. The Station Rotation model differs from the Individual Rotation model because students rotate through all of the stations, not only those on their custom schedules.

b. Lab Rotation — a course or subject in which students rotate to a computer lab for the online-learning station.

c. Flipped Classroom — a course or subject in which students participate in online learning off-site in place of traditional homework and then attend the brick-and-mortar school for face-to-face, teacher-guided practice or projects. The primary delivery of content and instruction is online, which differentiates a Flipped Classroom from students who are merely doing homework practice online at night.

d. Individual Rotation — a course or subject in which each student has an individualized playlist and does not necessarily rotate to each available

station or modality. An algorithm or teacher sets individual student schedules.

2. Flex model — a course or subject in which online learning is the backbone of student learning, even if it directs students to offline activities at times. Students move on an individually customized, fluid schedule among learning modalities. The teacher of record is on-site, and students learn mostly on the brick-and-mortar campus, except for any homework assignments. The teacher of record or other adults provide face-to-face support on a flexible and adaptive as-needed basis through activities such as small-group instruction, group projects, and individual tutoring. Some implementations have substantial face-to-face support, whereas others have minimal support. For example, some Flex models may have face-to-face certified teachers who supplement the online learning on a daily basis, whereas others may provide little face-to-face enrichment. Still others may have different staffing combinations.

3. A La Carte model — a course that a student takes entirely online to accompany other experiences that the student is having at a brick-and-mortar school or learning center. The teacher of record for the A La Carte course is the online teacher. Students may take the A La Carte course either on the brick-and-mortar campus or off-site. This differs from full-time online learning because it is not a whole-school experience. Students take some courses A La Carte and others face-to-face at a brick-and-mortar campus.

4. Teacher Reach/ Enriched Virtual model — a course or subject in which students have required face-to-face learning sessions with their teacher of record and then are free to complete their remaining coursework remote from the face-to-face teacher. Online learning is the backbone of student learning when the students are located remotely. The same person generally serves as both the online and face-to-face teacher. Many Enriched Virtual programs began as full-time online schools and then developed blended programs to provide students with brick-and-mortar school experiences. The Enriched Virtual model differs from the Flipped Classroom because in Enriched Virtual programs, students seldom meet face-to-face with their teachers every weekday. It differs from a fully online course because face-to-face learning sessions are more than optional office hours or social events; they are required. This model is also commonly referred to as the hybrid model.

Regardless of the model, blended learning aspires to personalize each student's learning experience, extend each student's access to content by offering some flexibility as to when and where content is accessed, and control costs while offering innovative educational experiences (Horne & Staker, 2015). Essentially, "blended learning is the engine that can power personalized and competency-based learning" (Horn & Staker, 2015, p. 10).

Concerns with Blended Learning

Despite the personalized benefits that blended learning proposes to achieve, the reduction of face-to-face time within a teacher-reach blended model class is problematic for many teachers, parents, and students. At an invitational symposium, "Computers in Education: A Critical Look," held in June 1995 sponsored by the School of Public Health at the University of California, Berkeley and the Center for Eco-literacy, the following concerns were expressed by invited speakers:

> "All projects that propose to substitute a computer system for a human function that involves interpersonal respect, understanding, and love should not be undertaken at all. (Joseph Weizenbaum as cited in Nussenbaum and Walker, 1998, p.416).
>
> "I am opposed to the use of computers in primary and secondary education. I think their use will deemphasize human exchange and the forms of knowledge that go with that (Jerry Mander as cited in Nussenbaum and Walker, 1998, p.416).
>
> "To use computers in the teaching of reading and writing is akin to a doctor prescribing poison for a dying patient. Students need human contact; they need to hear human voices. They need teachers. (Barry Sanders as cited in Nussenbaum and Walker, 1998, p.417).

Philosophically, many products of the US Education System believe that the tradition of teachers teaching and students learning together in one room is still an effective model. The teacher-centered mantra that "students can't learn it if the teacher didn't teach it" is still very deeply ingrained. Therefore, a radical shift like this causes some teachers to feel

as if they are no longer needed and are being "pushed out by computers." According to Nussenbaum and Welker (1998), some students and parents feel very leery of the level of student responsibility involved and the lack of interaction by the teacher:

> Some critics worry that computers threaten the educational benefits of the human relationship between student and teacher. They fear that computers may displace teachers from their respected place at the hub of classroom activity. Whereas teachers now serve as the social and intellectual leaders and the ultimate arbiters of both academic standards and standards of good conduct, they may be relegated to less powerful roles, becoming mere facilitators, attendants to the computer. (p.420-421)

Goals of Blended Learning

The true goals for blended learning teachers and students, however, could not be more opposite than these concerns. Instead, the goal is that "such flexible, self-paced, and engaging environments provide learners the freedom to customize aspects of their learning experience to meet their personal and educational preferences, creating personalized learning for all students" (Corry & Carlson-Bancroft, 2014, p. 18). Working from these ideas, teachers are no longer only content experts but experienced learners and mentors who ask questions that lead to critical thinking and deeper learning, and who arrange their online courses in ways conducive to active student engagement (Czerkawski & Lyman, 2016). Rather than being passive recipients of transmitted knowledge, students are engaged by helping to create their learning environment (Corry & Carlson-Bancroft, 2014).

According to Durrington, Berryhill, and Swafford (2006), "although an online environment is different from face-to-face instruction, the goal of creating a stimulating, interactive learning environment is the same" (p. 190). Dixon (2010) categorized online learning activities as active (online discussions, online lab activities, problem solving activities, group projects) and passive (test taking, reading, watching lecture videos) and found no significant difference in student engagement levels among these activities. However, he did find that when students were required to interact with content, instructor, or their peers, they demonstrated higher levels of engagement. Therefore, Dixon concluded that "it is not the activity type but rather the level of interaction provided in online courses that affects student engagement" (p. 5). Because the physical distance from the student to the teacher and the student to the other students in online or blended courses is greater than in traditional face-to-face courses, designing and achieving an appropriate transactional distance is necessary for student engagement and success.

Transactional Distance Theory

Moore's Transactional Distance Theory states that the quality of teaching interactions among students and their instructor relates less to geographical separation and more to the structure of a course and the interactions that take place within it (Baker, 2010). This theory is important conceptually because it provides an explanation for why the use of electronic communication tools may bridge the distance between learners and the teacher in an online environment. The electronic tools used in most course management systems (discussion boards, emails, chat, and messaging) increase the level of interaction, thus allowing learners and instructors to reduce the psychological and

physical distance between them to achieve levels of social interaction similar to those in a face-to-face classroom (Baker, 2010). According to Moore and Kearsley (1996), this theory asserts that it is the transactional distance rather than the physical distance which h is of greatest significance in any educational transaction. Moore explains that transactional distance is measured on a continuum of structure and dialogue: the more structure, the less dialogue and vice versa. “A highly structured course will afford little opportunity to challenge concepts and explore other paths, while dialogue will inevitably lead to departures from planned outcomes and result in new, unanticipated learning outcomes” (p. 163). Moore doesn’t suggest that either structure or dialogue is an inherently good thing—each may be appropriate in different circumstances. His theory does posit that high structure and low dialogue result in greater transactional distance and more responsibility on the part of the learner to be autonomous to succeed (Stein, Wanstreet, Calvin, Overtoom, & Wheaton, 2005).

The relationships among the dimensions of transactional distance with groups of learners have only been explored by a few studies with mixed results. Saba and Shearer (1994) assumed a “systemic and dynamic relationship between structure and dialogue and observed, as Moore’s theory suggests, that the transactional distance varies by the rate of structure and dialogue” (as cited in Stein et al., 2005, p. 107). Through their study, they found that as dialogue increased in a video conferencing environment, structure decreases to keep the system stable. Likewise, when structure increased, transactional distance also increased and dialogue decreased (Stein et al., 2005). Chen and Willits (1998) found that dialogue, in the form of in-class discussion, was the only factor found to decrease transactional distance between instructors and learning in a

videoconferencing environment. “In-class discussion contributed positively to learning outcomes, whereas transactional distance was inversely relating to learning outcomes” (Stein et al., 2005, p. 107). Moore and Kearsley (1996) asserted that transactional distance is lessened in courses with high levels of dialogue and little predetermined structure. In this situation, learners receive ongoing guidance from instructors and are able to modify instructional materials to meet their needs (as cited in Stein et al., 2005). They also suggest that “success in distance teaching is determined by the extent to which the instructor, and the institution, are able to provide appropriate structure and appropriate quantity and quality of dialogue between the instructor and learner” (as cited in Stein et al., 2005, p. 106). Research by Kanuka, Collett, and Caswell (2002) supported this premise that instructors can lessen transactional distance by developing dialogue and structure that match learners’ needs and abilities to be autonomous. Through their interviews with online instructors, they concluded that when learners receive guidance though both a high degree of course structure and high dialogue, there is a low level of transactional distance and high levels of learning.

Learner-to-Content Interaction

In online learning environments, the nature of particular means of communication and how effectively they can be manipulated to increase student interaction, thereby lessening transactional distance, is key. Furthermore, Moore recommends incorporating three levels of interaction into distance education courses: learner to content interaction, learner to instructor interaction, and learner to learner interaction (Moore, 1989). Wagner (1994) distinguished between interaction and interactivity and noted that neither concept has been sufficiently defined. She thus wrote: “Simply stated, interactions are reciprocal

events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another" (Wagner, 1994, p. 8). In distance education, such interactions are interpersonal and occur within an instructional context. She distinguishes between such human interaction and interactivity, which she describes as the technology itself. "Interactivity may eventually be viewed as a machine attribute, while interaction may be perceived as an outcome of using interactive instructional delivery systems" (Wagner, 1994, p.26; Woods & Baker, 2004, p. 2). The first type of interaction, learner to content interaction, is the defining characteristic of education. Since the process of intellectually interacting with content results in changes in the learner's understanding, perspective, or cognitive structures, without it, there can be no learning or education (Moore, 1989). Holmberg (1986) called this learner to content interaction "internal didactic conversation" when learners "talk to themselves" about the information and ideas they encounter in text, lecture, movie, or elsewhere. Learner to content interaction is the process in which students examine, consider, and process the course information presented during the educational experience (Woods & Baker, 2004, p. 2). According to Moore and Kearsley (1996), every learner has to construct knowledge through a process of personally accommodating information into previously existing cognitive structures. It is interacting with content that results in these changes in the learner's understanding (Moore, 1989). Frequent and engaging interactions with course content has been shown to be an important feature of course design (Swan, 2001).

Learner-to-Learner Interaction

Learner to learner interaction among members of a class or a group is sometimes a very valuable resource for learning (Moore, 1989). In fact, Gunawardena, Lowe, and

Anderson (1997) found evidence that students were constructing knowledge in online discourse. Ruberg, Moore, and Taylor (1996) found that online communication among learners including online discussion boards, collaborative assignments, and chat features encouraged experimentation, sharing of ideas, increased and more distributed participation, and collaborative thinking. According to James et al. (2016), class discussions seem to be one of the most influential features and most researched of online courses. Research by Harasim (1990), and Levin, Kim & Riel (1990) has indicated that students perceive these practices to have shown to promote learner to learner interactions which are more "equitable and democratic" than face-to-face discussions. In the online setting, all students have a voice and it's more difficult for one student to dominate the conversation. In addition, because of their asynchronous nature, online discussions afford participants the opportunity to reflect on their classmates' contributions while creating their own writing before posting them. Research by Hiltz (1994) and Poole (2000) suggested that this reflection contributes to the creation a certain mindfulness among students and a culture of reflection. In 1998, Picciano similarly found that students' perceived learning from online courses was related to the amount of discussion actually transpiring in the course. In contrast to this research on the positive influence of discussion as a function of learner-to-learner interaction, research by Sturgill, Martin, & Gay (1999) and Hawisher & Pemberton (1997) indicated that collaborative learning (having students work together to create a new product or complete an assignment) has been "remarkably unsuccessful." Finally, Eastmond's research reminds educators that computer-mediated communication is not inherently interactive; rather, it depends upon the frequency, timeliness, and nature of messages posted. Students who reported high

levels of interaction with their classmates also reported higher levels of satisfaction and higher levels of learning from courses (Swan, 2001).

Learner-to-Teacher Interaction

Learner-to-teacher interaction is the interaction between the learner and the expert who prepared the subject material (Moore, 1989). Having planned or been provided a curriculum, a program of content to teach, all teachers seek to stimulate or at least maintain the student's interest to motivate the student to learn. Teachers provide counsel, support, and encouragement to each learner to the extent and nature of this support varies according to educational level of learners, teacher's personality, and other factors. Likewise, teachers create and organize opportunities for students to apply what they have learned. Finally, teachers organize evaluation to determine whether learners are making progress and whether strategies need to be modified (Moore, 1989). Online teachers, like all face-to-face teachers, seek to achieve these aims in each lesson. Just as the relationships and interactions that face-to-face teachers have with students have proven to positively impact student perceptions of learning as well as student achievement, the importance of learner-teacher interaction also significantly affects online learning (Swan, 2001). In an online survey, 45% of students rated their overall interaction and participation as 'higher' or 'much higher' than in traditional classrooms, 35% rated it 'about the same.' (Swan, 2001, p.315). Furthermore, 84% of online students surveyed reported that they interacted with their online teacher 'a great deal' or 'sufficiently' (Swan, 2001, p. 316). These survey results indicate that students who feel they had adequate access to their instructors feel they learned more and are more satisfied with their courses.

One aspect of student-teacher interaction, which has also been explored as Instructor Presence or Instructor Immediacy by Feeler in 2012 and Richardson et al. in 2015, is defined as "the specific actions and behaviors taken by the instructor that projects him/herself as a real person' (p. 84). According to Anderson, Rourke, Garrison, and Archer (2001), teacher presence begins before the course begins as the teacher designs the course of studies and continues as the teacher facilitates discourse and provides direct instruction. Picciano (2002) noted that teachers must be 'seen' to be perceived as present in online learning classes; in the online world, presence requires action. In order to establish online presence, instructors can develop consistent patterns of interaction, communicate accessibility, provide feedback, moderate discussions, and provide content expertise (Baker, 2010). Jensen (1999) noted that verbal immediacy behaviors are especially relevant for online instruction because they are easily controlled and not bound by physical proximity. O'Sullivan, Hunt, and Lippert (2004) identified the following verbal behaviors that online teachers should establish immediately to increase student-to-teacher interaction: initiate discussions, ask questions, use self-disclosure, address students by name, use inclusive personal pronouns (we, us), respond frequently to students, offer praise to students, and show attentiveness. In addition to verbal cues, online teachers should employ visual cues, such as color, graphics, and instructor's picture, which "signal expressiveness, accessibility, engagement, and politeness and can help decrease the distance between teacher and learner" (Baker, 2010, p. 5).

While teacher-to-student interaction in online learning occurs in variety of formats, recent research indicates that the three most important formats are teacher modeling, direct feedback, and willingness of teacher to assume different teaching roles.

Sheridan and Kelly (2010) found that students ranked instructor modeling as the most important element for online learning and building an online community (as cited in Richardson et al., 2016). Similarly, Picciano (1998) and Jiang and Ting (2000) found correlations between perceived interactions with instructors and the average numbers of responses students themselves made in course discussions (as cited in Swan, 2001). In these studies, students' perceptions of interaction with their teachers were related to the percentage of their grade which was based on discussion and to the frequency and immediacy of instructor feedback (Swan, 2001). As teachers assume various roles in online instructional environments, they establish a presence. To overcome the geographical distance, teachers can actively facilitate discussion and attempt more social interaction with students (Richardson et al., 2016). At other times, teachers must know when to take on the role of direct instructor and to be the content expert (Baker, 2010).

Online Readiness Skills

Because of the increase in students taking online classes, as well as the concerning student attrition rates in these online courses at the college and university levels, significant research has been devoted to student perceptions of online learning. A study by Dron et al., (2014) found that some students lacked confidence and, therefore, avoided posting questions or comments out of fear of ridicule by other students. Students also reported concerns in their willingness to help other students, feeling this help as a "diversion from their own studies" (Drone et al., 2014, p. 169). The most popular reason given by students for dropping out of online classes was the student's "inability to cope with the demands of the course work" (Drone et al., 2014, p. 168). In research by Balentyne (2016), students also indicated that challenges with communication and self-

pacing were significant factors in their lack of success in online courses. According to Edwards (2013) and Kim (2012), “motivation is a critical factor in students’ success,” and many students perceived their difficulty with self-motivation as detrimental to their online endeavors (as cited in Balentyne, 2016, p. 206.). Barbour and Reeves (2009) asserted that most successful online students are “independent learners with high intrinsic motivation and solid time management, reading, and technology skills” (as cited in Harris-Packer & Segol, 2015, p. 9). “By its very nature, the blended environment requires that learners display more independence, autonomy, and self-regulated learning in order to be successful” (Futch et al., 2016, p.142). Studies by Tunison and Noonan (2001) found that “online courses place a great deal of responsibility on students and conclude that the degree of autonomy might be too overwhelming for some students” (as cited in Beese, 2014, p. 292).

As a result of this research, many colleges and universities have developed tests for online readiness skills. Sample categories and questions from two of these online readiness skills Tests, University of Arkansas and University of North Carolina, are listed below and the complete tests are displayed as Appendix D and E.

1. Basic Technical Skills and Equipment
    - I am capable of attaching files to an email message.
    - My browser will play several common multimedia formats.
2. Ability to study independently
    - I am capable of seeking and finding help when I have a problem.
    - I learn best when I figure things out on my own.

3. Time Management and Organization Skills
    - I plan my work in advance so I can turn in assignments on time.
    - I often complete tasks at the last minute, or I have to ask for extensions.
    - I can ignore distractions around me when I study.
    - I am willing to spend 10-20 hours each week on an online class.

Colleges and universities use these skills and sample statements/questions to help student's gauge their readiness for online courses. These categories mirror the research and further emphasize the importance of time-management, responsibility, self-motivation, and autonomy as skills imperative for online student success. Blended courses are designed to help students improve these online readiness skills.

Summary

This chapter chronicled much of the key research conducted on online learning and specifically interactions within online learning. Most of the previous research has focused on student retention rates, student course pass rates, and students' feelings of efficacy in online courses. Therefore, most of the studies have utilized university data for retention and pass rates and student survey data compared to face-to-face student data. While these findings are important, particularly for a college which is determining whether to offer a course digitally or face-to-face, it is obvious, as explained by the US Department of Education, that there is no existing significant research on Blended Learning in the high school setting. Therefore, it is imperative that we continue to study

and measure the pilot programs and efforts of schools and teachers who experiment with blended learning to truly measure its effectiveness. In a high school setting, effectiveness is determined based on student achievement growth. Therefore, this particular study will focus on student achievement data in a course delivered via blended learning delivery system compared to student achievement data in the same course delivered via a traditional face-to-face delivery system. Furthermore, because Moore's Transactional Distance Theory illustrates the importance of student to content interaction, student to student interaction, and student to teacher interaction in a digital learning environment, student survey data will also be used to ascertain these levels of interaction within the blended course as compared to the traditional course.

As students' needs, interests, and ability levels continue to multiply, schools must rely on technology to help necessitate the design of individualized learning for our students. Therefore, teacher understanding of digital environments, like blended learning, where students will not have face-to-face instruction each day must also evolve (Johnson, 2015). High school students must learn to communicate in an online learning environment and often need different supports than traditional students (Beese, 2014). A hybrid model of blended learning can help students acclimate into online learning by familiarizing them with course expectations, developing organization skills and time management skills, and gaining the appropriate technology skill all while being scaffolded by a teacher the student has face-to-face contact with every other day (Beese, 2014). Despite the concerns echoed about the loss of human interaction associated with the increase of online learning, this research will focus on the importance of these levels

of interaction to ensure an appropriate transactional distance for student achievement growth and student development of online readiness skills:

> In a world where digital interaction is the norm, we crave human interaction more than ever. That's why the three things you need to ensure innovation flourishes are relationships, relationships, relationships. Fifty years ago, relationships were the most important thing in our schools, and 50 years from now, it will be no different. (Couros, 2015, p. 79)

Chapter 3: Research Study

The purpose of this study was to determine whether a blended class was comparable to a traditional, face-to-face class with regard to student achievement growth, levels of student interaction, and advancement of online readiness skills.

Research Questions

1. Do students in blended classes attain comparable levels of academic achievement growth as their peers in traditional classes?
2. Do students in blended classes experience comparable levels of learner-to-content, learner-to-learner, and learner-to-teacher interaction as their peers in a traditional class?
3. Do students in blended classes experience greater improvement in online readiness skills than their peers in traditional classes?

Hypotheses

1. Students in a blended class will achieve comparable levels of academic achievement growth as their peers in a traditional class.
2. Students in a blended class will experience comparable levels of learner-to-content, learner-to-learner, and learner-to-teacher interaction as their peers in a traditional class.
3. Students in a blended class will experience greater improvement in online readiness skills than their peers in a traditional class.

Research Design

In this experimental design, archived test and survey data were used from the fall semester of 2016 during Cabarrus County School system's pilot implementation of the teacher-reach model of blended instruction. In this model, one teacher taught two sections of the same course: American History II. Instruction in section A was delivered in a traditional method in which students have face-to-face time with the instructor every day for 90 days of the semester. Instruction in section B was delivered in a blended method, in which students have face-to-face time with the instructor on an A/B schedule with 45 face-to-face days and 45 digital learning days. On the digital days, the students have the option to work from home or from a designated school media center or learning lab. No instruction is provided in either of these settings. In this quantitative study, a pre- and post- test and EVASS ratings of students' performance on the American History II North Carolina Final Exam was used to compare academic growth between the traditional section and the blended section. Student survey data was also be used to compare student levels of interaction between the two sections. Finally, pre- and post-student data was compared to indicate the progression of students' online readiness skills.

Participants and Setting

The teacher and school have been provided with pseudonyms. Teacher Mr. Lee, from J High School in a Cabarrus County School, was selected for this study because in the fall semester of 2016 he taught a blended American History II class and a traditional American History II class. In order to truly measure the difference between the instructional delivery system and class format, it is important to eliminate the differences

in instructor variable (Gay, Airasian & Mills, 2012). The population of the students who were selected for enrollment in the blended section of American History II occurred in the fall semester of 2016. American History II is a course required of all students for graduation in North Carolina, and at this high school, it is taken by twelfth grade students. The sampling began with 325 students, seniors who needed to complete American History II in either the fall or spring semester in order to graduate in June of 2016. Of these 325 students, 51 of them had taken Advanced Placement US History, which can be also fulfill the requirements of American History II. During their registration process in spring of 2015, 130 students elected to take Honors American History II. Ultimately, there were 144 students who registered to take American History II during the 2016 school year. Through the process of the computer-generated program Power-School, these 144 students were randomly assigned to four sections of American History II. In their pilot implementation of their teacher-reach blended model and for logistical purposes, this high school designated the blended section of American History II as first period with Teacher Mr. Lee. Therefore, the students randomly assigned by Power-School to Mr. Lee's first period comprise the blended sample of this study, and the students randomly assigned to Mr. Lee's 3rd period make up the traditional sample of this study.

Typically, different sections of the same course are similar and comparable in number of students, median IQ, percentage of AIG, EC, and ESL students. There were 41 students enrolled in the Blended section: 25 males and 15 females. Two students were identified as Exceptional Children (EC) and one student was identified as English as Second Language Learner (ESL). In the traditional section, there are 32 students: 11

males and 21 females. Four students were identified as EC and one student is identified as ESL, and two students are identified as both EC and ESL. The $\chi 2(1, n=72) = 6.40$, $p = .01$. The chi-square test shows that the distribution of gender is not the same between traditional and blended sections. The traditional section had more females (66%) and the blended section had more males (63%). However, because this is the result of random selection and random assignment, gender will not be used as a control variable in data analysis. Since the number of students categorized as EC and ESL status (less than 5), a chi-square test was not performed to test distribution of EC/ESL status between blended and traditional status.

Instruments:

North Carolina Final Exams (NCFEs)

In order to answer Research Question One, "Do students in blended learning classes attain comparable levels of academic achievement growth as their peers in traditional classes?" three instruments were used: North Carolina Final Exam (NCFE), EVASS, and Test for American History II Essential Standards. The first of these is the North Carolina Final Exam for American History II. North Carolina Final Exams (NCFEs) were developed to replace locally developed assessments, providing teachers and principals with a common measure for all students state-wide during a given testing window. North Carolina's Final Exams for High School Social Studies courses measure students' academic progress in the NC *Essential Standards,* adopted by the North Carolina State Board of Education in June 2010. North Carolina educators were recruited and trained to write new items for the NC Final Exams. The diversity among the item

writers and their knowledge of the current standards was addressed during recruitment. Trained North Carolina educators also review items and suggest improvements, if necessary. The use of North Carolina educators to develop and review items strengthens the instructional validity of the items (NCDPI, 2015).

NCFE Development Process

The North Carolina State Board of Education policy GCS-A-013 outlines a clear process for NCFE test development. Prior to Step 1, the standards to be measured must be defined. The test development process begins after new content standards are adopted by the North Carolina State Board of Education. All item writers and reviewers are required to complete North Carolina developed online-training modules available through the NC Education site. The training includes a general course on item writing guidelines, including lessons on sensitivity and bias concerns. The writers and reviewers must also complete subject-specific courses on the Essential Standards or North Carolina Standard Course of Study. Each test item undergoes a seventeen-step process and can be removed or returned to the beginning of the process at every step. This rigorous process involves NC teachers and NCDPI content specialists in social studies, EC, and ESL to ensure test alignment and validity as well as eliminate bias (NCDPI, 2015).

NCFE Test Specifications

The American History II NCFE contains 40 items: 38 multiple-choice items and two constructed response items. Students are allowed 120 minutes to complete the test. Table 3.1 shows how the 40 questions address the 8 Essential Standards. (NCDPI, 2016b, p. 2):

Table 1 American History II NCFE Standards Ratios (NCDPI, 2016b)

Standard 1	Standard 2	Range of Total Items
AH2. H.1	AH2. H.2	15-20%
AH2. H.1	AH2. H.3	18-22%
AH2. H.1	AH2. H.4	15-21%
AH2. H.1	AH2. H.5	11-15%
AH2. H.1	AH2. H.6	11-15%
AH2. H.1	AH2. H.7	12-16%
AH2. H.1	AH2. H.8	3-7%
Total		100%

EVAAS

The Educational Value-Added Assessment System (EVAA) model used by NC Public Schools predicts a student's score on an assessment, in this case the American History II NCFE, given the student's past assessment data combined with the expectation that all students should make at least the average amount of growth in each subject. These tests are conducted for each individual year, subject, and grade (if relevant). For example, students' prior social studies test scores such as World History NCFE, Civics and Economics NCFE, and American History I NCFE was observed in relationship to their scores on the American History II NCFE. Once that relationship was defined, a predicted score can be calculated for each individual student based on his or her own prior testing history. With each predicted score based on a student's prior testing history, this information can be aggregated to the district, school, or teacher level. The predicted score

can be thought of as the entering achievement of a student for that course (NCDPI-EVAAS, 2016a).

In order for a student's score to be valid as a growth predictor, the student must have at least three valid predictor scores that can be used in the analysis, all of which cannot be deemed outliers. These scores can be from any year, subject, and grade that are used in the analysis. It will include subjects other than the subject being predicted. The required three predictor scores are needed to sufficiently determine the error of measurement in the tests to provide a reliable measure. If a student does not meet the three-score minimum, then that student is excluded from the analyses. It is important to note that not all students have to have the same three prior test scores. They only have to have some subset of three that were used in the analysis. There are multiple advantages for using the Univariate Response Model of EVAAS:

- The model does not require students to have all predictors or the same set of predictors, as long as a student has at least three prior test scores in any subject/grade.
- The model minimizes the influence of measurement error by using many prior tests for an individual student. Analyzing all subjects simultaneously increases the precision of the estimates.
- The model uses scores from multiple tests, including those on differing scales.
- The model accommodates teaching scenarios where more than one teacher has responsibility for a student's learning in a specific subject/grade/year (NCDPI, EVAAS, 2016a).

American History II Essential Standards Test

This test was used to gauge students' understanding of American History II essential standards. The classroom teacher, in collaboration with the two other teachers in his school's American History II Professional Learning Community (PLC), created this formative assessment to establish a baseline of understanding for classroom instruction and individual student instruction. Currently, the state of North Carolina Assessment system does not utilize a pre-assessment for any if its NCFEs. Therefore, this PLC utilized their knowledge of the Essential Standards of American History II, their previous experiences with this NCFE, and previously used NCFE test items which have been released by North Carolina Department of Public Instruction to develop this test with a high level of content validity.

This test is comprised of 20 multiple choice questions. Five of the questions are released questions from previous NCFEs. The American History II NC Course of Study has eight overarching Essential Standards. Each of these eight standards is addressed in two of the 20 questions of the pre/post-test. Standards 3 and 4 are addressed in four questions, and standards 5 and 6 are addressed in three questions. These question/standard ratios are intended to mirror information about the American History II NCFE, which is shown in Table 1. The test was designed and implemented by this teacher for the first time as part of the pilot project for teacher-reach blended learning, so there is not a history to determine reliability. This test did not undergo the rigorous seventeen- step development process that NCFEs do, and it is based largely on the knowledge and understanding of three American History II classroom teachers. While there are clearly larger concerns for validity and bias in any test made in this manner, the

teachers consider it reliable as an indicator of growth. Because the students take the same test at the beginning and at the end, the focus is on growth rather than proficiency. For the purposes of this study, the pre- and post-test results are not used alone but rather are used as an additional instrument/measure combined with EVASS scores to help determine student academic achievement growth. A copy of this test is located in Appendix A.

Learner Interaction Survey

In order to answer Research Question Two about whether students in blended classes experience comparable levels of learner-to-content, learner-to-learner, and learner-to-teacher interactions, a student survey was used. Students were given the anonymous Interaction Survey during the final week of the semester. After being introduced to Michael Moore's Transactional Distance Theory (Moore, 1989) and reading one of his articles, Mr. Lee, and the other teachers of the American History II PLC, designed a survey with questions centered on Moore's three levels of interaction: learner-to-content, learner-to-learner, and learner-to-teacher. The answers for each question are based on a Likert scale with 4 choices: never, rarely, sometimes, and often. Given concerns of online and blended learning about the levels of interaction in these non-traditional models of learning, these teachers wanted to ascertain whether students felt comparable levels of interaction in the face-to-face class and the blended teacher-reach class. The Learner Interaction Survey is displayed as Appendix B.

Online Readiness Skills Survey

In order to answer Research Question Three, “Do students’ online readiness skills improve after taking a blended class?” a survey was administered to the blended and the traditional sections at the beginning and the end of the semester. Because one of the goals of the blended teacher-reach model is to increase students’ fluency and confidence in online readiness skills, Mr. Lee needed to develop a way to determine whether this goal was being accomplished. He reviewed several Online Readiness Quizzes from various universities and developed nine survey questions which integrated these skills. These answer choices were also on a Likert numerical scale of 1 to 5, with 5 being the highest. This archived survey data represents the first time this survey was given. The Online Readiness Skills’ Survey is displayed in Appendix C.

Instrument Reliability and Validity

Clearly, the NCFEs and the UMV model of EVASS have adopted a thorough process to account for and eliminate bias for all different types of students, as well as to ensure reliability and validity of their results, which includes multi-step processes that can be stopped and restarted at any step and pre-requisites that must be fulfilled in order for data to be applicable in developing the tests. However, less information is published about the process for testing the reliability and validity of the NCFE tests. Personal communication with the psychometricians at NCDPI indicates that "Cronbach Alpha internal consistency reliability estimate for the past years for American History II is 0.87" (Auman, D. email, 2017). In comparison to the NC EOC tests, which all have reliability ratings greater than .92, the American History II NCFE reliability average is rather low.

The other instruments in this study, however, were made either by an individual teacher or a small group of teachers at the same school. Unlike the processes of NCFEs and EVAAS, these instruments were created in a short amount of time because they were needed to provide real-time feedback for this teacher in this pilot project. The American History Essential Standards Test, the Learner Interaction Survey, and the Online Readiness Survey were all developed and administered for the first time in the fall of 2016. Therefore, it is difficult to discern any patterns in reliability or validity of particular questions or of the instruments as a whole.

Data Analysis Procedures

An analysis of covariance (ANCOVA) was used to compare the growth means of the traditional section to the blended section measured before and after the course, respectively. The dependent variable was EVAAS growth scores, and independent variables will be the instructional delivery method and time. A 2 x 2 analysis of variance (ANOVA) was performed on students' academic growth on the American History Essential Skills Test. The dependent variable was American History Essential Standards Test Score and the independent variable was the instructional delivery method (blended or traditional) and time. Results from these two tests provided an answer as to whether students in a Teacher Reach Model of blended learning class attain comparable levels of academic achievement growth as their peers in a traditional class (Research Question 1).

In order to answer Research Question Two about whether blended students had comparable levels of interaction, the responses for each question were tabulated per class. Next, those tabulations were added together for each interaction category. For example, in the blended class, 12 responses were never, 22 responses were rarely, 135 responses

were sometimes, and 117 responses were often in the learner-to-content interaction section. These tabulations were then compared to the tabulations from each corresponding section of the traditional classes using a mixed ANOVA.

Finally, in order to answer Research Question Three, about whether students in blended classes experienced greater improvement of online readiness skills than their peers in traditional classes, the responses from the Online Readiness Skills Survey, pre- and post- surveys, were tabulated. An Independent Samples T-test and Chi-Square Test were conducted to determine and compare the means of change in the results for each class.

Summary

The purpose of this chapter was to describe the research questions, participants, procedures, design, and data analysis procedures for this study. This quantitative study used descriptive and inferential statistics to analyze the academic achievement scores of the NCFE American History II test while EVAAS growth scores were controlled, results from pre- and post-test, and student survey data to analyze the research questions. The target population were heterogeneous eleventh and twelfth grade students who signed up for American History II at J High School during CCS' blended implantation. The control group consisted of students who were randomly assigned to Mr. Lee's traditional section of American History II in the fall semester of 2016, and the treatment group consisted of students who were randomly assigned to Mr. Lee's blended section of American History II in the fall of 2016.

The findings of this research are presented in chapter 4. Chapter 5 presents conclusions from the study, including interpretations, implications, and applications of the results.

Chapter 4: Research Findings

Introduction

This chapter reports the results from the analyses of data collected from the students enrolled in a teacher-reach blended section of American History II and students who enrolled in a traditional section of American History II. The data were analyzed to see if enrollment into different sections (traditional versus blended) contributed to comparable academic achievement scores on the American History II NCFE; comparable content, peer, and teacher interaction levels; and comparable student perceptions of online readiness skills development. This chapter is organized around the following three research questions posed in chapter 1:

1. Do students in a blended class attain comparable levels of academic achievement growth as their peers in a traditional class?
2. Do students in a blended class experience comparable levels of learner-to-content, learner-to-learner, and learner-to-teacher interaction as their peers in a traditional class?
3. Do students in a blended class experience greater improvement in online readiness skills than their peers in a traditional class?

Because all students at this Cabarrus County high school must take American History II in order to fulfill a graduation requirement, random selection was employed in this research design. There is not an option to sign up for the blended section. All students who sign up for this course are randomly assigned to different class sections by a computer program called PowerSchool based on their other course selections. The study

first compares achievement scores on the American History II North Carolina Final Exam, the scores from American History II Essential Skills Test, student survey responses to Learner Interaction Survey, and student responses to online readiness skills Survey from students in the blended section of American History II with students enrolled in a traditional section of American History II.

Research Question One

Achievement scores were analyzed in order to explore the quantitative research question: Do students in blended classes attain comparable levels of achievement growth as their peers in traditional classes? To address this question, a one-way between-subjects' analysis of covariance (ANCOVA) was performed to determine whether statistically significant differences existed between the students enrolled in the blended American History II class and the students enrolled in the traditional American History II class. The EVAAS growth score was used as a covariate because it can be considered as the entering level of students. Table 2 provides more details.

Table 2 Descriptive Statistics for US History Achievement Test Scores

	N	Mean	*SD*
Blended	37	648.38	8.05
Traditional	33	647.45	9.67

Levene's test of equality of error variances showed that the assumption of homogeneity of variance is met. Figure 1 of the normal Q-Q plot of the unstandardized residuals of the regression model showed that observed values match the expected values, and that they all fall on the expected 45-degree diagonal line, which means that the residuals are normally distributed.

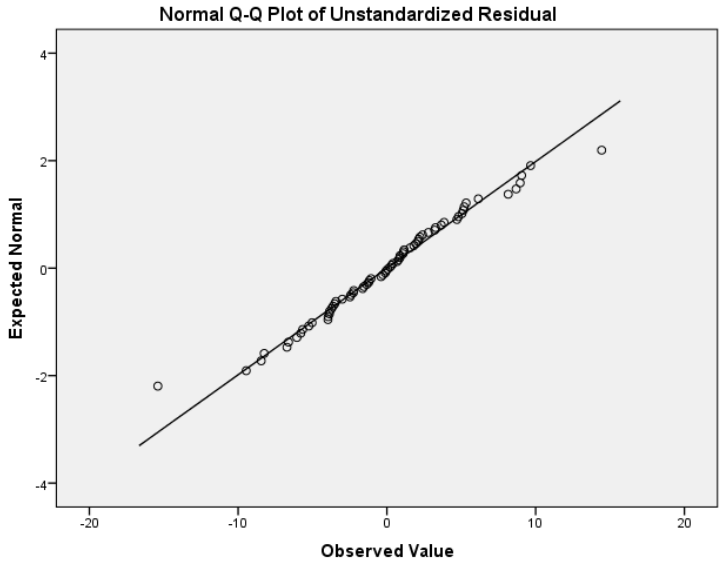

Figure 1 Unstandardized Residual of EVAAS Growth Scores

The predicted score was statistically significantly related to actual achievement scores for students in both the blended and traditional sections, F (1, 67) = 136.51, $p <$ .001, $\eta^2 = .067$, with a medium effect size, which means that the assumption of using

predicted scores as a covariate is met. However, no statistically significant differences were noticed between blended and traditional sections with respect to their achievement while the EVAAS growth scores were controlled, F (1, 67) = 0.07, $p = .79$, $\eta^2 = .001$ with a small effect size (Cohen, 1988). Table 3 provides data for this ANCOVA.

Table 3 Analysis of Covariance Summary

Source	Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared
EVAAS Growth Score	3571.84	1	3571.84	136.51*	<.001	.67
Delivery Method	1.80	1	1.80	.07	.79	.001
Error	1753.04	67	26.17			

*$p < .05$

A 2 x 2 mixed analysis of variance (ANOVA) was performed on the American History Test for Essential Standards as a function of time and delivery method. The within subjects' independent variable was time with two levels (pre-test and post-test). The between subjects' independent variable was delivery method with two levels (traditional and blended). The assumption of homogeneity of covariance was met, Box's $M = 4.453$, $F(3, 711811.014) = 1.470$, $p = .220$.

Tests of between-subjects effects indicated that the difference in American History Test scores among delivery methods (blended and traditional) was not statistically significant, $F(1,58) = 0.17$, $p = .68$, partial $\eta^2 = .003$ (small).

Tests of within-subjects effects showed a statistically significant growth of students' American history **knowledge** from beginning to the end of the semester, $F(1, 58) = 65.60$, $p < .001$, partial $\eta^2 = .53$ (large). The interaction between time (beginning and end of the semester) and delivery method (traditional vs. blended) was not statistically significant, $F(1, 58) = 0.04$, $p = .85$, partial $\eta^2 = .001$ (small). Table 4 contains more detailed information of the results of mixed ANOVA.

Table 4 Summary of Growth on American History II Essential Skills Test

	Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Time	340.19	1	340.19	65.60	<.001	.53
Delivery Method	3.08	1	3.08	.18	.68	.003
Time*Delivery Method	.19	1	.19	.04	.85	.001
Error	300.78	58	5.19			

*$p < 0.05$

Because neither of the two data sets, achievement scores with EVAAS Growth Data or American History II Essential Skills Test, demonstrated a statistically significant difference between the traditional and blended classes, research question one can be

answered affirmatively: students in blended classes do attain comparable levels of academic achievement growth as their peers in traditional classes.

Research Question Two

Student responses to the Student Interaction Survey were analyzed to answer the research question: Do students in blended classes experience comparable levels of learner-to-content, learner-to-learner, and learner-to-teacher interaction as their peers in traditional classes? The survey questions were grouped into three categories which measured students' perceptions of their levels of learner-to-content interaction, levels of learner-to-learner interaction, and levels of learner-to-teacher interaction. Then, independent samples t-tests were performed. Table 5 shows more details on the Student Interaction Survey.

Table 5 Descriptive Statistics of Student Interaction Survey

		M	*SD*
Learner-Content	Traditional (*n* = 28)	3.20	.37
	Blended (*n* = 27)	3.35	.35
Learner-Learner	Traditional (*n* = 28)	3.25	.54
	Blended (*n* = 27)	3.26	.43
Learner-Teacher	Traditional (*n* = 28)	3.15	.73
	Blended (*n* = 27)	3.04	.51

No statistically significant differences were noted between the traditional and blended sections for any one of the constructs measured by the survey. Specifically, $t(53) = 1.48$, $p = .14$ for learner content interactions; $t(53) = 0.11$, $p = .92$ for learner-learner interactions; $t(53) = -0.61$, $p = .54$ for learner-teacher interactions.

Because the Interaction Survey data did not reveal a statistically significant difference between the traditional and blended classes, research question two can be

answered affirmatively: students in blended classes do experience comparable levels of learner-to-content, learner-to-learner, and learner-to-teacher interaction as their peers in traditional classes.

Research Question Three

Student responses to the Online Readiness Skills Survey were analyzed to answer the research question: Do students in blended courses experience I greater improvement in online readiness skills than their peers in traditional classes? Table 6 shows the breakdown of responses for each question for this survey.

Table 6 Descriptive Statistics of Online Readiness Skills Survey

		Pre		Post		
		M	*SD*	*M*	*SD*	*n*
Q1	Traditional	4.15	.662	4.22	.934	27
	Blended	4.38	.852	4.15	.784	26
Q2	Traditional	3.67	1.038	3.93	1.174	27
	Blended	3.96	1.183	4.23	.863	26
Q3	Traditional	4.11	.641	4.22	.847	27
	Blended	4.19	.801	4.31	.679	26
Q4	Traditional	4.26	.764	4.44	.577	27
	Blended	4.35	.689	4.46	.811	26
Q5	Traditional	4.22	.751	4.22	.801	27
	Blended	4.31	.928	4.46	.647	26
Q6	Traditional	3.48	1.05	3.70	1.103	27
	Blended	4.04	.958	3.96	.916	26
Q7	Traditional	3.19	1.47	3.63	1.50	27
	Blended	3.69	1.19	3.85	1.12	26
Q8	Traditional	3.11	.847	3.48	1.01	27
	Blended	3.50	.762	3.69	.736	26
Questions	Traditional	3.77	.490	3.98	.530	27
1-8	Blended	4.05	.559	4.14	.548	26

A 2 x 2 mixed analysis of variance (ANOVA) was performed on the Online Readiness Skills Survey as a function of time and delivery method. The within subjects'

independent variable was time with two levels (pre-test and posttest). The between subjects' independent variable was delivery method with two levels (traditional and blended). Box's Test of Equality and Covariance was used and the assumption of homogeneity of covariance was met, F (3, 491898) = 3.14, p =. 39.

Tests of between-subjects' effects showed no statistically significant differences between the traditional and blended sections with respect to their online readiness skill, F (1, 51) = 3.00, p = .09, η^2 = .06 with a medium effect size (Cohen, 1988). Tests of within-subjects' effects also failed to see statistically significant differences between pre and post measurement for both traditional and blended sections (See Table 7).

Table 7 Summary of Growth on Online Readiness Skills Survey

	Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Time	.58	1	.58	3.48	.07	.06
Delivery Method	1.27	1	1.27	3.00	.09	.06
Time*delivery method	.09	1	.09	.59	.44	.01
Error	8.43	51	.17			

*$p < 0.05$

The difference in the online readiness skill level responses among delivery methods (blended and traditional) was not statistically significant, F (1, 51) = 3.48, p = .07, η^2=.06, with a medium effect size. The difference in online readiness skills between

the delivery methods was not statistically significant, F (1, 51) = .594, p = .44, η^2= .01, with a small effect size. Independent T-tests were conducted on each of the eight Likert style questions individually and none of the results were statistically significant.

Overall, the difference within the blended class from the beginning of the semester (pre) and the end of the semester (post) of student perception of online readiness skills was statistically significant, the difference between the blended and traditional sections were not. Therefore, research question three cannot be answered affirmatively. Instead, this study reflects that students in a blended class did not experience improvement in their online readiness skills.

For the ninth question of the survey, can online/digital learning be as effective as traditional, in-class learning, which required a yes or no response, data were analyzed with Chi-square tests. Table 8 presents the frequencies of participants' responses to this question.

Table 8 Frequencies for online readiness skills Question 9

	Trad. Pre	Blend Pre	Total Pre	Trad. Post	Blend Post	Total Post
No	10	3	13	9	9	18
Yes	22	23	45	4	31	35
Total	32	26	58	13	40	53

A Chi-Square Test was performed to measure the difference between the 2 delivery methods for the pre-test results: X^2 (1, n = 58) = 3.21, p = .07. An additional Chi-Square Test was performed to measure the change in the post-test results: X^2 (1, n = 53) = 9.55, p= .002, indicating that there was a statistically significant increase in the number of students, among both delivery methods (traditional and blended), who answered yes from the beginning of the semester (pre-test) to the end of the semester (post-test). The significant increase in 'yes' responses that "online/digital learning be as effective as traditional, in-class learning" seems to indicate a positive impact of and a favorable attitude toward blended learning.

Summary

Chapter 4 presents the findings of the quantitative data collection. Analysis of covariance (ANCOVA) was performed to determine whether statistically significant differences existed between academic achievement on the American History II NCFE of the students enrolled in the blended American History II section and the students enrolled in the traditional American History II section while their EVAAS growth scores were controlled. No statistically significant differences were noticed. An additional 2 x 2 ANOVA was performed on students' academic growth on the American History Test for Essential Standards. No statistically significant differences between the blended and traditional were observed. Therefore, in response to research question one, students in blended classes do attain comparable levels of academic achievement growth as their peers in traditional classes.

A mixed ANOVA was also used to analyze students' interaction levels. No statistically significant differences were noticed in any of the three levels of interaction. Thus, in response to research question two, students in blended classes do experience comparable levels of leaner-to-content, learner-to-learner, and learner-to-teacher interactions as their peers in traditional classes.

Independent sample t-tests and Chi-Square Test were used to analyze students' perceptions of their online readiness skills and to compare the responses between the blended and traditional classes. One test resulted in statistically significant differences of improvement from the beginning to the end of the semester, but there were not statistically significant differences in the improvement among blended and traditional students. Therefore, the third research question must be answered that students in a blended class did not experience greater improvement in their online readiness skills than their peers in traditional classes.

Based on the results described, Chapter 5 presents an interpretation and discussion of the findings. The findings will be discussed within the context of the existing body of literature and prior research. Additionally, implications of the findings for future students, teachers, administrators, and legislators will be presented. Finally, recommendations for future research will also be offered.

Chapter 5: Discussions, Implications for Practice and Recommendations for Future Research

Introduction

This study was conducted to determine the impact of the Teacher Reach Model of blended learning on student academic achievement growth on the American History II North Carolina Final Exam; student interaction levels with content, peers, and teacher; and student perceptions of their online readiness levels. Univariate Analysis of Variance (ANCOVA) was used to determine whether statistically significant differences existed between the EVAAS growth scores of students enrolled in a blended section of American History II and students enrolled in a traditional section of American History II. A two-way mixed analysis of variance (ANOVA) was utilized to compare student interaction levels, as measured by the Student Interaction Survey, between the blended and traditional classes. An Independent Samples T-test and a Chi-Square were also employed to compare the change in student perceptions of online readiness skills between the blended and regular American History II classes. The purpose of this study was to provide data about the effectiveness of the teacher-reach model of blended learning in the high school social studies classroom, as it relates to academic achievement growth, student interaction levels, and development of student online readiness skills.

The quantitative data gathered during this study showed that students in the blended American History II class achieved comparable levels of EVAAS achievement growth to their peers in the traditional American History II class. Students in the blended class also reported comparable levels of interaction with content, peers, and the teacher to students in the traditional class. Finally, while students in the blended class reported

overall higher levels of perceptions of online readiness skills than students in the traditional class, the difference between the two are not statistically significant. While all of the data indicated no statistical significant difference between the blended and the traditional, the findings can actually be considered positive because of the other implications blended learning can have on students and education in general.

Connections to Previous Literature

Given the increasing challenges to our current educational system including falling achievement data, declines in student motivation, and dramatic variances in student backgrounds and ability levels, the need to personalize students' educational experiences has never been greater (Tomlinson, 2000). Technology and digital learning can be a vehicle for this personalization (Basye, 2016). Blended learning seeks to achieve the same ends as distance learning, including flexibility, student choice and greater access to content. However, realizing that there is a limited number of students, as suggested by collegiate online research, who possess the autonomy and independence necessary to work without the explicit supervision and face-to-face mentoring of an adult, blended learning seeks to fill in the gaps of purely online learning alone (Horne & Staker, 2015, p. 33). In blended learning, students learn partially via online learning, with student control over time, place, path, or pace, and students learn a portion of the time inside the traditional classroom and a portion of the time outside the traditional classroom (Horn & Staker, 2015, p. 34). Multiple models and varieties of blended learning exist in order to optimize student opportunity. This study focuses on the teacher-reach model which in this case means that in a 90-day semester, students have face-to-face contact with the

teacher 45 days and work digitally, either from home or a designated lab space, for 45 days. This study demonstrated that this blended model, though a departure from the norm, is as effective in academic achievement growth, interaction levels, and development of online readiness skills, as traditional learning.

Because online and blended learning are drastically different from traditional models of learning, which are fully teacher directed and teacher supervised, one of the biggest concerns is with the level of student interaction. Therefore, one way to evaluate the effectiveness of an online learning experience would be to consider it through the lens of Michael G. Moore's Transactional Distance Theory. "Distance education is not simply a geographic separation of learners and teachers, but, more importantly, is a pedagogical concept. It is a concept describing the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/ or by time" (Moore, 1997). According to this theory, which Moore began developing in the 1970's and which was elaborated by Saba and Shearer in 1994, "learning happens through mutual sharing and negotiations of meaning between teacher and learner in such a manner that the locus of control shifts from one to the other constantly through the feedback process" (as cited in Gokool-Ramdoo, 2008, p. 7). Moore's use of the term 'distance' in this theory does not refer to the geographical distance between the teacher and the student. Rather, it refers to the development (or not) of a transaction, or the development of a particular form of interaction between teacher and learner because of their geographical separation (Giossos et al., 2009). Because the success of this transaction between teacher and learner is essential and often correlated with the student's success in the course, Moore elaborated his theory to focus on three levels of interaction: learner-to-content, learner-to-learner,

and learner-to-teacher (Swan, 2001). This study illustrated that despite the reduction in face-to face time that blended students had with their peers and their teacher, they still experienced comparable levels of interaction as students who had twice as much face-to-face time. This outcome supports Moore's premise that geographical distance can be reduced or nullified by the development and implementation of strategic transactions between student and content, student and peer, and student and teacher.

Allen and Seaman's 2016 Online Report Card shows that collegiate student enrollment in online courses continues to increase at a healthy 7% rate each year with 87% of undergraduate students enrolled in some online courses. Because of this significant increase in the number of students taking fully online classes in college, another benefit of blended learning is that it can provide the scaffolding to help students develop online readiness skills to be successful in a future completely online environment. Barbour and Reeves (2009) asserted that most successful online students are "independent learners with high intrinsic motivation and solid time management, reading, and technology skills" (as cited in Harris-Packer & Segol, 2015, p. 9). "By its very nature, the blended environment requires that learners display more independence, autonomy, and self-regulated learning in order to be successful" (Futch et al., 2016, p.142). High school students have to learn how to communicate in an online learning environment and often need different kinds of supports than traditional students (Beese, 2014). Research shows that students who have previously taken blended or online courses encounter fewer barriers in online classes than students who have no online experience (Futch et al., 2016). In addition, students who have previously taken more than one online or blended course tend to experience more social, cognitive and teaching

presence than learners new to the online environment (Futch et al., 2016). The results of this study, which show that students in the blended class did experience an increase in their online readiness skills, also support this notion. Therefore, blended learning can help advance students' online readiness skills.

Limitations

Key factors, including individual student IQ levels and teacher effectiveness, were controlled within this study by using student EVAAS growth scores rather than student proficiency scores and by focusing the study on two sections taught by the same teacher. Using the same teacher controlled for the additional variance in students' academic growth as well as their survey responses and perceptions with regard to interaction levels and online readiness levels which could have been inherent with different teachers. However, other limitations exist within the study. One limitation of this study is that it was conducted with two particular classes of students in one suburban high school in a suburban school district in North Carolina. The sampling size decreased the ability to generalize the findings of this study because it was limited to one traditional high school in Cabarrus County Schools, with approximately 1300 students. Many participant factors could not be controlled, such as parental education level, involvement of parents, student absences from school, transience of the family, and financial levels of families. Controlling for these factors would result in a more complete analysis.

Also, the fact that this study was conducted on archived data which already existed limited the researcher's ability to focus survey and test questions or test the validity of survey and test questions. Likewise, this study also relies on EVAAS growth

data to provide data to answer one of its research questions for two main reasons. First, this archived data already exists and because, in the state of North Carolina, EVAAS growth scores are recognized as a key data point and are included as part of school report card grades as well as teacher and administrator effectiveness grades, and as of fall 2018, are one component of the principal salary formula. While the published information about the reliability and validity of the North Carolina Final Exam for American History II is non-existent and personal communication with North Carolina Department of Public Instruction indicates 0.87 internal consistency reliability average, which is lower than the NCEOC average which is greater than 0.92, finding and using a test with greater confidence levels would make this study stronger. Hence, this study also utilized the American History II Essential Skills Test administered in a pre- and post-course format to substantiate the data for research question one.

Likewise, the archived nature of this data also prevented the researcher from being able to identify individual students or to be able to match test and survey data to specific students. Therefore, no breakdowns in demographics for results such as race, gender, etc. were pursued.

An additional limitation of this study is the fact that the students within the blended and traditional sections did have easy access to communicate with each other. Therefore, information shared between the two groups could have impacted the results.

Finally, this study also has limitations in that it compared blended to traditional but did not also include a comparison of both blended and traditional to a total online American History II class. The researcher believed the need to control for instructor variation was paramount. Because there was not a teacher in this pilot implementation

who taught a traditional, blended and online version of the same course, this study was focused on comparisons between traditional and blended.

Generalizability

This study cannot be generalized beyond a suburban high school in North Carolina. Due to the parameters of the study, the researcher cannot generalize the findings to urban high schools, rural schools, or significantly larger or smaller schools. The North Carolina Final Exam for American History II is specific to North Carolina, and its specifications may not produce similar results using a different test or criterion for the test. While the teacher-reach model of blended learning may be an effective model in any school district, these specific results cannot be generalized to other schools in other states.

Implications for Practice

As a result of the findings of this study, which indicate that students in the blended section performed as well and perceived having comparable levels of interaction with content, peers, and the teacher, multiple recommendations for practice emerge:

1. The teacher-reach model can be an effective means for schools to extend the reach of their best and most effective teachers. In this study, during the fall 2016 semester, Mr. Lee taught two traditional sections (32 students in one and 28 students in another) and one blended section (41 students= 19-A day students and 22-B day students). He taught 101 students compared to most of his peers in the social studies department at Jay High School who taught 80-90 students that semester. Figure 2 shows

Mr. Lee's 2017 composite EVAAS data (which includes data from all classes in fall 2016 and spring 2017).

Figure 2 EVAAS Growth Composite

This EVASS data composite shows that out of the three available categories: Does Not Meet Expected Growth, Meets Expected Growth, and Exceeds Expected Growth, Mr. Lee Exceeds Expected Growth. Figure 2 defines Exceeds Expected Growth as "significant evidence that the teacher's students made more progress than the growth standard." It also shows the breakdown of teachers in NC for American History II achieving each growth category, and shows that Mr. Lee's high growth levels were achieved by less than 18% of American History Teachers in NC. In addition to comparisons with other American History II teachers in NC, the bar graph in Figure 2 also shows that Mr. Lee achieved higher growth than his counterparts in the same school and school system. The goal of every school administrator is to have a teacher in every classroom who can effectively help students meet or exceed their growth targets.

Therefore, administrators need to understand that an option to extend the reach of a highly effective teacher like Mr. Lee to 20, 30, 40 more students per semester is available through the teacher-reach model of blended learning.

2. Policymakers have reasoned that "if online instruction is no worse than traditional instruction in terms of student outcomes, then online and blended education initiatives could be justified on the basis of cost-efficiency" (Means, B., et al., 2009, p. xi). In this era when schools and school systems never seem to have sufficient funding and in which administrators are always searching for ways to "do more with less," this model of blended learning provides options. In this study and the example of Mr. Lee, he was able to teach an additional class of students in this semester, and if he was able to do this both semesters and even blend an additional section one semester, he has now taught three extra sections of students over the course of a school year. At Jay High School, which operates on a 4 x 4 block schedule, a full-time teaching load or one teaching allotment equals three sections for each semester equaling six sections per year. A 0.5 teaching allotment equals teaching three sections over the course of a year. In this situation, Mr. Lee has essentially fulfilled the teaching responsibilities of 1.5 teachers. While his high school does have a process in place in which Mr. Lee is payed additional salary based on each blended section, the school and/or school system still save money by using this model. First, the amount that Mr. Lee is being paid is less than the salary which would be paid to a 0.5 allotted teacher. Second, the school system does not have to pay additional benefits, such as medical insurance, retirement, sick days, etc. to Mr. Lee, as they would to an additional employee, since he is already an employee receiving these benefits. Likewise, the school's ability and willingness to pay its most-effective teachers,

like Mr. Lee, who are willing to be innovative and to take on the additional responsibility of teaching more students, empowers these teachers and enables them to make a more competitive salary, which hopefully keeps them teaching rather than pursuing administrative positions or leaving the educational field altogether.

In addition to the cost-efficiency inherent with teacher allotments, blended learning also increases the potential to increase and vary course offerings at a school (Johnson, 2015). With teachers able to teach more students within a single period, due to A and B day sections, the potential to offer and teach courses not typically available emerges. Likewise, research suggests that digital resources are often less expensive to purchase and maintain than more traditional resources (Johnson, 2015). Also, research by Howley, Rhodes and Beall (2009) suggests that blended and online learning is a "low-cost method for accelerating and offering more course options for high-ability students" (as cited in Balentyne & Varga, 2016, p. 202).

3. Multiple studies affirm that "the United States is continuously faced with the threat of teacher shortages, resulting from a combination of retiring teachers, increasing student enrollment, and teachers who leave to pursue other careers" (Larkin et al., 2016, p. 27). Nationally, new teachers leave the classroom to pursue other careers at a rate of 30-50% within their first three to five years, and in some schools, faculty attrition outpaces retention (Larkin et al., 2016). Specifically, in North Carolina, where teacher pay ranks 42nd in the nation, state teacher turnover rates average 15%, and the University of North Carolina System announced a 30% decline in students enrolling in teacher preparation programs since 2010, NC school administrators need solutions for staffing classrooms that do not involve hiring additional teachers (Public Schools First NC, 2017).

As evidenced by Mr. Lee's example above, the teacher-reach model can offer alternatives to staffing that do not include new hires, which may not always be available.

4. Closely connected to cost-efficiency, the logistical issue that many school administrators face about simply not having enough classrooms for all of their students and/or teachers can also be eased by the teacher-reach model of blended learning. Utilizing a schedule like the one in this study, in which the classes selected were comprised of upper classmen who can drive and strategically-scheduled to be the first period of the day, so those driving A-day students could come to school later on their B days and vice versa enabled twice as many students to be served in the same classroom space. Considering this model of blended learning can exist and be effective at multiple levels, from one course/ one section in one academic department per semester to multiple courses and sections per semester throughout multiple academic departments in the school, school administrators can use blended courses to help alleviate their specific space needs.

5. Selection of the appropriate teachers for blended classes should be a critical part of the blended implementation. Despite the fact that a significant body of research on blended learning exists, it spans multiple fields and disciplines and, consequently, lacks focus and depth (as cited in Futch et al., 2016). Furthermore, best practices for blended learning exist, but because they are often grounded in "static course design" and not grounded in empirical research, "there is a strong need to find strategies and designs, both before and during the class, that can be generalized in an effort to support student success in blended and online learning" (Futch et al., 2016, p. 143). A plethora of research on blended and online learning attributes most of its success or failure on the teacher and

his/her course design. Due to its new and somewhat nebulous nature, a blended learning course is largely dependent on its classroom teacher. It is critical for each teacher to define his/her vision of blended learning, including course schedule and structure, so students understand what they will be working on during the face-to-face in-class time and what they will be working on during their non-face-to-face digital out-of-class time. "It also includes establishing and communicating the relationship between the face-to-face and online components and the teacher's philosophy of how those modalities are intertwined" (Futch et al., 2016, p. 150). Establishment and ongoing negotiation of the transactional distance is paramount in order for students to achieve appropriate levels of interaction.

In other words, teaching a blended class combines all of the challenging aspects of being an engaging and effective traditional classroom teacher with all of these additional components. Therefore, first and foremost, teachers selected must want to accept this challenge rather than being forced to submit to their new assignment. Also, they must be highly-effective traditional classroom teachers. Next, ideal candidates will be innovators with high comfort and skill levels with technology, who operate within cultures of life-long learning and high-risk. In other words, not only is failure an option—it is a necessity to grow and change. Finally, they will be teachers who are comfortable existing in immediate isolation. In Mr. Lee's situation during this study, he was the only teacher in his entire high school teaching a blended course. He did not have access to immediate resources, so he had to seek them from other places.

6. According to research by Moskal, Dziuban, and Hartman (2013), blended learning is a relatively new field; therefore, there is no single definition or unified

approach (as cited in Futch et al., 2016). In order to achieve successful blended implantation, the school must develop a central understanding of blended learning. This understanding or blended concept must be successfully communicated to all the faculty, administrators, students, and parents. As previous literature in this study indicates, many people are fearful, doubtful, and critical of online and blended learning because it's different from the norm and because it seems to reduce the value of and need for teachers. School administration must develop a culture among its staff which realizes the benefits of blended learning with the teacher as the key component. This culture will assuage and hopefully eliminate the fear of job security for the faculty. Consistent school-wide communication about blended learning can help alleviate the concerns until the students, teachers, and results can speak for themselves.

7. Across the nation, states are grappling with how existing policies aligning with traditional educational apply to online and blended learning (Archambault, Kennedy, & Friedhoff, 2016). In the beginning, most states embraced online and blended learning primarily because of the equity and the increase in course access they offer. For example, only 50% of high schools offer calculus and 63% offer physics, but thanks to online and blended offerings, all students can have access to courses for college and career readiness, regardless of students' socioeconomic status, ethnic group, or locale (Archambault et al., 2016). As of 2014, Michigan, Utah, Oklahoma, Texas, Louisiana, Minnesota, Wisconsin, Virginia, Georgia, and Florida all have online/blended programs authorized by state law (Archambault et al., 2016). A recent concern, which is now affecting policy and law development, is accountability. In Michigan, a statewide study for 2014-2015 indicating that students who participated in online learning tended to "fare

worse -18%" in their face-to-face classes than non-online learners and their performance in their virtual classes was -13% worse than their performance in face-to-face classes, has prompted the need for additional research as well as policies focusing on the accountability of online and blended courses (Archambault et al., 2016). As principals and district leaders implement blended learning, they should be cognizant of legislation within their own states as well as the trends in other states, particularly ones who tend to be leaders in education.

8. Much of the research around online and blended learning focuses on attributes and characteristics of students who have been successful in these courses. Barbour and Reeves (2009) asserted that most successful online students are "independent learners with high intrinsic motivation and solid time management, reading, and technology skills" (as cited in Harris-Packer & Segol, 2015, p. 9). "By its very nature, the blended environment requires that learners display more independence, autonomy, and self-regulated learning in order to be successful (Futch et al., 2016, p.142). While this study focused on a general-level course which is a graduation requirement for all students, and the students in the blended section were randomly assigned, it did not really account for these student factors. However, the final question of the online readiness skill survey was an open-ended question. While these answers were not considered as part of the data for the statistical calculations to determine whether being a blended class increased students' online readiness skills, they can be included as part of this discussion of student attributes. The survey question asked, "What are your biggest concerns with blended learning?" Out of the 26 post responses from blended students, these are the four responses which speak directly to the traits and attributes cited in the previous research:

- "Online learning will be very difficult for students who have the inability to force themselves to do work on time and the students that procrastinate without end."
- "You don't have a teacher to help you understand something so you have to try harder to understand it yourself."
- "People can be lazy or sometimes forget to do the work."
- "That I don't submit assignments on time."

These comments suggest that these students support the notion that students who lack autonomy, self-regulation, intrinsic motivation, and time management may not be successful in blended courses. Therefore, school administrators must also consider these student factors when making decisions about which courses, which grade levels, and/or which ability levels to blend.

Recommendations for Further Research

Research on blended learning in K12 settings is much more limited than research on completely online learning and blended learning in community college and university settings. Because of the aforementioned foundational problems with US public school systems in educating students with significant variations, including socioeconomic levels, language acquisition, family involvement, motivation, IQ levels, and educational readiness levels, the teacher-reach model of blended learning, which can help personalize learning for students, is a very important topic for investigation. In order to create a body of research on K12 blended learning, with more specific focus and depth which can really

influence and drive implementation and practice, additional research on the following topics is needed.

1. This study focused on general level students. It should be replicated for Honors and Advanced Placement level students to see if the results would still be comparable or whether the factors of student ability and the characteristics of independence, autonomy, intrinsic motivation, which are often associated with these groups of learners, could produce blended results that are statistically significantly higher than the Honors traditional students. Could having the benefits of more personalization, including pacing and student choice, cause Honors and AP level students to perform better with 45 days of face-to-face instruction with the teacher than traditional Honors and AP students who have 90 days of face-to-face instruction with their teacher?

2. The archival nature of this study prohibited analysis of performance of subgroups, including race, gender, language proficiency, socioeconomic status. Replicating this study with the opportunity and intention to analyze between-group interactions could be helpful to administrators in deciding which students benefit most from blended courses and/or how to change existing blended courses to be more responsive to specific student needs.

3. This study, as well as the bulk of existing research, focuses on comparison between two groups: either blended and traditional or blended and online. Future research should compare all three models: traditional, blended, and online to each other. It is unlikely that most schools have teachers in their building who teach a totally online version of a course that they also teach in a blended model and in a traditional model, the researcher will have to find a school and teacher willing to apply this unique design or

he/she will have to decide that controlling for teacher effect variability is not that crucial to the results.

4. The final research question of this study: “Do students’ online readiness skills improve after taking a blended class?” was only answered based on student perceptions via responses to a survey. Perhaps, a more effective and objective means of determining whether these skills truly improve would be to extend the study to track these students and their success or failure in a subsequent online high school or college online course.

5. Although there was no statistically significant difference in the Interaction Survey Data between the traditional and blended students, many students in both groups reported low levels on the learner to teacher interaction section, and specifically the lowest responses of all questions on the survey on the frequency of: 1- Individual conversations and messages? 2- Written feedback on comments and/or comments on assignments? Therefore, it would be helpful to pursue this issue further, perhaps through qualitative interviews with students and teachers as well as observational data from the researcher. Finally, it would be helpful to provide resources to the teacher on different strategies/methods to achieve these types of feedback and observe for change.

6. Qualitative research should also be conducted to gain a better understanding about the role of the teacher in blended learning and how blended learning and increased teaching loads affect individual teachers and the teaching profession.

7. Most of the implications for education of this study were directed toward school administrators. Further research should be conducted on the role of the administrator and teacher selection for blended learning, which would help guide

principals on how to make the best choices for students with regard to selections of teachers, courses, levels, time of day, etc.

Conclusion

The findings of this study contribute to the expanding knowledge of ways to help educators meet the varying needs of students through personalization. The teacher-reach model of blended learning was designed to help teachers meet the large variety and range of needs within a single class in the only viable means possible--technology and a change in schedule. The study revealed that students in the blended section of American History II achieved comparable EVASS growth scores as their peers in the traditional section of American History II. The study also illustrated that students in the blended section of American History II experienced comparable levels of student-to-content interaction; student-to-student interaction; and student-to-teacher interaction as their peers in the traditional section of American History II. Finally, the study indicated that students in the blended American History II class did not perceive a statistically significant increased level of online readiness skills after taking the blended course. Overall, the teacher-reach model of blended learning has been effective at Jay High School and should be continued and possibly expanded in that setting. A 2012 report from the US Department of Education, which indicates a much more positive future than "A Nation at Risk," explains the following hopes for blended learning:

> It continues to grow rapidly and has expanded beyond a strategy for extended learning time to a popular strategy for turning around low-performing schools due to its flexible nature providing access to content and instruction for all students, assembling and disseminating instructional content more efficiently, and

> increasing student-teacher ratios while achieving learning outcomes equal to those of traditional classroom instructions. (p.11)

In addition to the equal outcomes achieved by research by the US Department of Education as well as equal outcomes results provided by this study, blended learning offers other benefits /solutions to the current educational system. Blended learning can increase the reach of the best teachers, offer sustainable alternatives to teacher shortages, increase equity of course offerings, reduce overcrowding in schools, and ensure students are ready for the surging number of online college courses by improving their online readiness skills. Perhaps, blended learning really is, as Horn and Staker (2011) believe, "a model with the potential to revolutionize K12 education."

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Appendix A:
American History II Essential Standards Test

Question1 pts

Edit this Question *Delete this Question*

These young people . . . have been shut off from the common labor . . . which is a great source of moral and physical health. They feel a fatal want of harmony between their theory and their lives, a lack of coordination between thought and action. I think it is hard for us to realize how seriously many of them are taking to the notion of human brotherhood, how eagerly they long to give tangible expression to the democratic ideal. These young men and women, longing to socialize their democracy, are animated by certain hopes . . . that if in a democratic country nothing can be permanently achieved save through the masses of the people, it will be impossible to establish a higher political life than the people themselves crave; . . . that the blessings which we associate with a life of refinement and cultivation can be made universal and must be made universal if they are to be permanent; that the good we secure for ourselves is precarious and uncertain, is floating in midair, until it is secured for all of us. . . . There is something primordial about these motives. . . . Nothing so deadens the sympathies and shrivels the power of enjoyment as the persistent keeping away from the great opportunities for helpfulness and a continual ignoring of the starvation struggle which makes up the life of at least half the race. To shut one's self away from that half of the race life is to shut one's self away from the most vital part of it; it is to live out but half the humanity to which we have been born heir and to use but half our faculties. We have all had longings for a fuller life which should include the use of these faculties.

Jane Addams, Twenty Years at Hull House, 1910

Which statement expresses Jane Addams′s stated motive for founding Hull House in the late 1800s?

Move To...

Question1 pts

Edit this Question *Delete this Question*

What was the primary cause of the trends shown on the graph?

Move To...

Question1 pts

Edit this Question *Delete this Question*

The organized working men and women, the producers of the wealth of the world, declare that men, women and children, with human brains and hearts, should have a better consideration than inanimate and dormant things, usually known under the euphonious title of “Property.”...

We demand a reduction of the hours of labor, which would give a due share of work and wages to the reserve army of labor and eliminate many of the worst abuses of the industrial system now filling our poor houses and jails. ...

Labor ... insists upon the exercise of the right to organize for self and mutual protection. ... That the lives and limbs of the wage-workers shall be regarded as sacred as those of all others of our fellow human beings; that an injury or destruction of either by reason of negligence or maliciousness of another, shall not leave him without redress simply because he is a wage-worker. ...

And by no means the least demand of the Trade Unions is for adequate wages.

--Samuel Gompers, What Does Labor Want?, an address before the International Labor Congress in Chicago, August 28, 1893.

As a result of their working conditions, many laborers

Move To...

Question1 pts

Edit this Question *Delete this Question*

The political cartoon above and similar propaganda would help lead to

Move To...

Question1 pts

Edit this Question *Delete this Question*

Roosevelt Corollary

If these self-evident truths are kept before us, and only if they are so kept before us, we shall have a clear idea of what our foreign policy in its larger aspects should be. It is our duty to remember that a nation has no more right to do injustice to another nation, strong or weak, than an individual has to do injustice to another individual; that the same moral law applies in one case as in the other. But we must also remember that it is as much the duty of the Nation to guard its own rights and its own interests as it is the duty of the individual so to do.

What new role for the United States in the world is Teddy Roosevelt establishing?

Move To...

Question1 pts

Edit this Question *Delete this Question*

Movement has been its dominant fact, and, unless this training has no effect upon a people, the American energy will continually demand a wider field for its exercise. But never again will such gifts of free land offer themselves. . . . And now, four centuries from the discovery of America, at the end of a hundred years of life under the Constitution, the frontier has gone, and with its going has closed the first period of American history.

Frederick Jackson Turner, The Significance of the Frontier in American History, 1893

Which kind of foreign policy does Turner′s thesis suggest as a result of the closing of the American frontier?

Move To...

Question1 pts

Edit this Question *Delete this Question*

Steffens Takes on Corruption

The first to strike was Lincoln Steffens. In 1902, he published an article in *McClure's* magazine called "Tweed Days in St. Louis." Steffens exposed how city officials worked in league with big business to maintain power while corrupting the public treasury.

More and more articles followed, and soon Steffens published the collection as a book entitled *The Shame of the Cities.* Soon public outcry demanded reform of city government and gave strength to the progressive ideas of a city commission or city manager system.

--ushistory.org

Lincoln Steffens was one of many to expose corruption and scandal around the turn of the century. These journalists were referred to as

Move To...

Question1 pts

Edit this Question *Delete this Question*

What was the purpose of states adopting initiative, referendum, and recall and the ratification of the 17th amendment during the Progressive Era?

Move To...

Question1 pts

Edit this Question *Delete this Question*

In the 1890s, the number of African Americans moving to the Northeast and the Midwest was double that of the previous decade. In 1910, it doubled again, then again in 1920. In the 1920s, more than 750,000 African Americans left the South, a greater movement of people than had occurred in the Irish potato famine of the 1840s.

Immigration: Africans, a presentation of Library of Congress

How did the Great Migration during the World War I era shape cities and society?

Move To...

Question1 pts

Edit this Question *Delete this Question*

"I stand before you tonight under indictment for the alleged crime of having voted at the last presidential election, without having a lawful right to vote. It shall be my work this evening to prove to you that in thus voting, I not only committed no crime, but, instead, simply exercised my citizen's rights, guaranteed to me and all United States citizens by the National Constitution, beyond the power of any state to deny...Are women persons? And I hardly believe any of our opponents will have the hardihood to say they are not. Being persons, then women are citizens; and no state has a right to make any law, or to enforce any old law, that shall abridge their privileges or immunities. Hence every discrimination against women in the constitutions and laws of the several states is today null and void, precisely as is every one against Negroes."

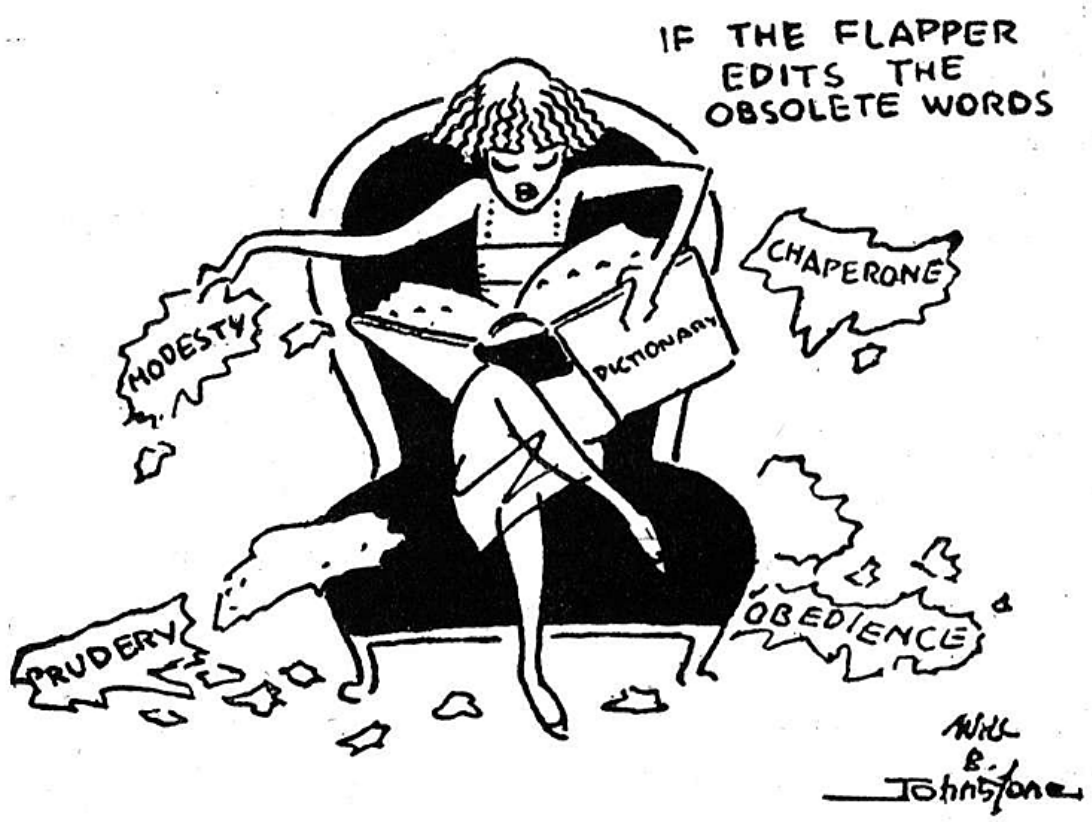
-Susan B. Anthony, "Is It a Crime for a Citizen of the United States to Vote?" (1873)

In the excerpt above Susan B Anthony explains how she fought for women's rights by

Move To...

Question1 pts

Edit this Question *Delete this Question*



The cartoon above suggests that women in the 1920s

Move To...

Question1 pts

Edit this Question *Delete this Question*

"…Values have shrunken to fantastic levels; taxes have risen; our ability to pay has fallen; government of all kinds is faced by serious curtailment of income; the means of exchange are frozen in the currents of trade; the withered leaves of industrial enterprise lie on every side; farmers find no markets for their produce; the savings of many years in thousands of families are gone…

Our greatest primary task is to put people to work. This is no unsolvable problem if we face it wisely … It can be accomplished in part by direct recruiting by the government itself … but at the same time, through this employment, accomplishing greatly needed projects to stimulate and reorganize the use of our natural resources."

--President Franklin D. Roosevelt, First Inaugural Address, 1933

FDR's first priority after taking office was to

Move To...

Question 1 pts

Edit this Question *Delete this Question*

How did the outbreak of war in Europe in the late 1930s affect politics within the United States?

Move To...

Question 1 pts

Edit this Question *Delete this Question*

This political cartoon is criticizing the US for

Move To...

Question1 pts

Edit this Question *Delete this Question*

What is this cartoon suggesting about President Eisenhower?

Move To...

Question1 pts

Edit this Question *Delete this Question*

Little Boxes on the hillside, little boxes made of ticky tacky,
Little Boxes on the hillside, little boxes all the same,
There's a green one and a pink one and a blue one and a yellow one
And they're all made out of ticky tacky and they all look just the same.
And the people in the houses all went to the university,
Where they were put into boxes and they all came out the same;
And there's doctors, and there's lawyers, and there's business executives
And they're all made out of ticky tacky and they all look just the same
And they all play on the golf course and drink their martini dry
And they all have pretty children and the children go to school
And the children go to summer camp and then to the university
Where they are all put in boxes and they all come out the same

--Lyrics from the *Little Boxes*, Malvina Reynolds, 1962

What does this song suggest about life in the 1950s/1960s?

Move To...

Question1 pts

Edit this Question *Delete this Question*

“It seems now more certain than ever that the bloody experience of Vietnam is to end in a stalemate... for every means we have to escalate, the enemy can match us, and that applies to invasion of the North, the use of nuclear weapons, or the mere commitment of one hundred, or two hundred, or three hundred thousand more American troops to the battle. And with each escalation, the world comes closer to the brink of cosmic disaster.

To say that we are closer to victory today is to believe, in the face of the evidence, the optimists who have been wrong in the past. To suggest we are on the edge of defeat is to yield to unreasonable pessimism. To say that we are mired in stalemate seems the only realistic, yet unsatisfactory, conclusion. On the off chance that military and political analysts are right, in the next few months we must test the enemy's intentions, in case this is indeed his last big gasp before negotiations. But it is increasingly clear to this reporter that the only rational way out then will be to negotiate, not as victors, but as an honorable people who lived up to their pledge to defend democracy, and did the best they could.”

--Walter Cronkite, CBS Evening News, 1968

How was the Vietnam War different from previous wars?

Move To...

Question **1 pts**

Edit this Question *Delete this Question*

We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too.

President John F. Kennedy, September 12, 1962

Why did President Kennedy decide to focus U.S. resources on going to the moon?

Move To...

Question **1 pts**

Edit this Question *Delete this Question*

What effect did Nixon's Watergate scandal have on the public and American politics?

Move To...

Question **1 pts**

Edit this Question *Delete this Question*

1980 Republican Party Platform.

Overseas, our goal is . . . to preserve a world at peace by keeping America strong. This philosophy once occupied a hallowed place in American diplomacy, but it was casually... dismissed at the outset by the Carter Administration—and the results have been shattering. Never before in modern history has the United States endured as many humiliations, insults, and defeats as it has during the past four years: our ambassadors murdered, our embassies burned, our warnings ignored, our diplomacy scorned, our diplomats kidnapped. The Carter Administration has shown that it neither understands totalitarianism nor appreciates the way tyrants take advantage of weakness. The brutal invasion of Afghanistan promises to be only the forerunner of much more serious threats to the West—and to world peace—should the Carter Administration somehow cling to power.

In 1980, Republicans were most critical of?

Appendix B:
Learner Interaction Survey

Learner - Content Interaction

How frequently did you access American History II content through:

Textbooks	Never	Rarely	Sometimes	Often
Online Textbooks or Websites	Never	Rarely	Sometimes	Often
Primary Documents or Images	Never	Rarely	Sometimes	Often
Videos/Podcasts	Never	Rarely	Sometimes	Often

What was the frequency you accessed the content for American History II?

At school during American History class	Never	Rarely	Sometimes	Often
At school (not during American History Class)	Never	Rarely	Sometimes	Often
At home	Never	Rarely	Sometimes	Often

How helpful was it that all content resources in this course were digital?	Extremely Unhelpful	Unhelpful	Helpful	Extremely Helpful
How do you compare your access to American History II content resources to access to content resources in other classes?	Significantly Less	Less	More	Significantly More

Learner to Learner Interaction

In American History II, how frequently did you participate in the following tasks working with other students:

Reviewing or evaluating another student's work	Never	Rarely	Sometimes	Often
Completing an assignment	Never	Rarely	Sometimes	Often
Whole class discussion (verbally or on-line discussion board)	Never	Rarely	Sometimes	Often

How frequently did you work with other students in American History II class?	Never	Rarely	Sometimes	Often

To what degree, was working with other students helpful in learning the skills and concepts in American History II?	Extremely Unhelpful	Unhelpful	Helpful	Extremely Helpful

How do you rate your comfort in working with other students in American History II?	Extremely Uncomfortable	Uncomfortable	Comfortable	Extremely Comfortable
How helpful was working with other students in American History II compared to other high school classes?	Significantly Less	Less	More	Significantly More

Learner to Teacher Interaction

How frequently did you interact with your American History II teacher in the following ways:

Whole class instruction	Never	Rarely	Sometimes	Often
Individual conversations/messages	Never	Rarely	Sometimes	Often
Written feedback on rubrics and/or comments on assignments	Never	Rarely	Sometimes	Often

What was the extent you received teacher feedback in American History II?

During class	Never	Rarely	Sometimes	Often
Outside of class	Never	Rarely	Sometimes	Often

How would you compare the level of interaction you had with your American History II teacher to interactions in other high school classes?	Significantly less	Less	More	Significantly more

To what degree do you feel you had an understanding of your progress in American History II and what you could do to improve?	None	Little	Some	Significant

How do you rate your overall growth in your understanding of concepts and ideas of American History II?	None	Little	Some	Significant

Appendix C:
Online Readiness Skills Survey

Directions: Answer the following questions on a scale of 1-4, with 1 being the least and 4 being the most.

1. How important is student choice and flexibilities of what you learn, in your learning?
2. What is your comfort level with digital or online learning?
3. How important is timely and regular feedback in your learning?
4. How important is flexibility in the pace that you complete tasks and move through a course in your learning?
5. How important is your environment and where you are, in your learning?
6. How effective do you think digital or online learning is?
7. How confident would you be taking an entirely online class?
8. How easy is it for you to "learn on your own?"
9. Can online/digital learning be as effective as traditional learning?

Appendix D:
Online Course Readiness Quiz

U of A **ONLINE**
Flexible options from a top-tier public research university
(/index.php)

Search this site

Online Course Readiness Quiz

Use this self-assessment to gauge your readiness for online learning.

The following four characteristics are common for successful online students:

- Basic technical and academic skills
- Ability to study independently
- Good organizational skills
- Willing to devote the same amount of time and effort as a face-to-face course

To get a good idea of your chances for success as an online student, rate how well each item below describes you.

Directions: The following items measure your ability to perform different tasks. There are no right or wrong answers, so your first reaction is usually best. Please do not omit any items. Rate how well each item describes you by selecting the button in the correct column for each item.

COMPUTER SKILLS	*Not at all like me*			*Extremely like me*
I am capable of attaching image files to an email message.	○	○	○	○
I am worried my assignments might get lost if I have to submit them online.	○	○	○	○
I can use common software, like MS Word and PowerPoint.	○	○	○	○
I know how to install new software on my computer.	○	○	○	○

COMPUTER SKILLS	*Not at all like me*			*Extremely like me*
I can use a camera or phone-camera, and upload the photos to my computer.	○	○	○	○

LEARNING STYLE	*Not at all like me*			*Extremely like me*
I like to use the web to explore new topics I am interested in.	○	○	○	○
A lot of my social connections depend on writing/texting/email/social media.	○	○	○	○
Much of my leisure time is spent on a computer.	○	○	○	○
I am comfortable learning new computer skills.	○	○	○	○
I get tired or overwhelmed if I have to read a lot of text on the computer.	○	○	○	○

ONLINE LEARNING	*Not at all like me*			*Extremely like me*
I need online courses because of my personal/work schedule.	○	○	○	○
It is difficult for me to go to campus every day to attend classes.	○	○	○	○
My home environment has ample quiet time when I could complete my coursework.	○	○	○	○
I have access to a private computer where I can take quizzes and exams.	○	○	○	○
I need online courses because I live far away from the U of A campus.	○	○	○	○

ACADEMIC SKILLS	*Not at all like me*			*Extremely like me*
I am capable of seeking and finding help when I have a problem.	○	○	○	○
I often need reminders about assignment due dates.	○	○	○	○

ACADEMIC SKILLS	*Not at all like me*			*Extremely like me*
Sometimes I overlook details in written instructions.	○	○	○	○
I often complete tasks at the last minute, or I have to ask for time extensions.	○	○	○	○
I enjoy a good written debate when everyone behaves professionally.	○	○	○	○

VIEW RESULTS

This self-assessment test is inspired by the test created by Marcel S. Kerr (https://bowes.edu/academics/natural-and-social-sciences/undergraduate-programs/psychology/faculty-and-staff/marcel-satsiov-kerr/), Kimberly Rynearson, and Marcus C. Kerr; TOOLS: Test of Online Learning Success.

Appendix E:
Online Learning Readiness Questionnaire

Online Learning Readiness Questionnaire

Before enrolling in an online course, you should first assess your readiness for stepping into the online learning environment. Your answers to the following questions will help you determine what you need to do to succeed at online learning. Post-survey feedback will also provide you with information on what you can expect from an online course.

Instructions: *Choose the most accurate response to each statement. Then click the* ***Am I Ready?*** *button.*

QUESTIONS	Agree	Somewhat Agree	Disagree
1. I am good at setting goals and deadlines for myself.	○	○	○
2. I have a really good reason for taking an online course.	○	○	○
3. I finish the projects I start.	○	○	○
4. I do not quit just because things get difficult.	○	○	○
5. I can keep myself on track and on time.	○	○	○
6. I learn fairly easily.	○	○	○
7. I can learn from things I hear, like lectures, audio recordings, or podcasts.	○	○	○
8. I have to read something to learn it best.	○	○	○
9. I have developed good ways to solve problems I run into.	○	○	○
10. I learn best when I figure things out for myself.	○	○	○
11. I like to learn in a group, but I can learn on my own as well.	○	○	○
12. I am willing to send e-mail to or have discussions with people I might never see.	○	○	○
13. I usually study in a place where I can read and work on assignments without distractions.	○	○	○
14. I can ignore distractions around me when I study.	○	○	○
15. I am willing to spend 10-20 hours each week on an online course.	○	○	○
16. I keep a record of what my assignments are and when they are due.	○	○	○
17. I plan my work in advance so that I can turn in my assignments on time.	○	○	○
18. When I study, people around me will help me work and not try to distract me.	○	○	○
19. I am willing to use e-mail and other online tools to ask my classmates and instructors questions.	○	○	○
20. I am fairly good at using the computer.	○	○	○
21. I am comfortable surfing the Internet.	○	○	○
22. I am comfortable conducting searches, setting bookmarks, and downloading files.	○	○	○

23. I am comfortable installing software and changing configuration settings on my computer.	○	○	○
24. I know someone who can help me if I have computer problems.	○	○	○
25. My computer runs reliably on Windows XP/ 7 or on Mac OS 10.6 or higher.	○	○	○
26. I have a printer.	○	○	○
27. I am connected to the Internet with a fairly fast, reliable connection such as DSL or cable modem.	○	○	○
28. I have virus protection software running on my computer.	○	○	○
29. I have headphones or speakers and a microphone to use if a class has a videoconference.	○	○	○
30. My browser will play several common multimedia (video and audio) formats.	○	○	○

After responding to all of the statements, click the **Am I Ready?** button. Your results will display.

Am I Ready?

The results of your survey will appear here.