THE EFFECT OF THE 1:1 INITIATIVE ON SCHOOL-WIDE PERFORMANCE LEVEL PERCENTAGES IN SECONDARY U.S. HISTORY

by

Samuel Joshua Kassinger

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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APPROVED BY:

Michelle J. Barthlow, Ed.D, Committee Chair

Renee Compton, Ph.D, Committee Member

Travis H. Bradshaw, Ph.D, Committee Member

ABSTRACT

The purpose of this study was to examine the effect of the 1:1 initiative on school-wide performance level percentages among secondary school students in the social sciences. The 1:1 initiative, where every student has a laptop, tablet, or portable electronic device, is a part of the 21st-century learning model. Twenty-first century learning is a model that teaches students to thrive in today's society with critical thinking skills and digital literacy. The dependent variable of school-wide performance level percentages in social sciences was monitored using a longitudinal, descriptive design. The population sample for this study consisted of mostly Caucasian students in secondary schools, with very low cultural diversity. Three schools had implemented a 1:1 initiative program in their social sciences departments, and three schools had not. The study used secondary data collected from these high schools over a time frame of three years, 2013-14 through 2015-16, consisting of standardized testing data in U.S. History. The results from the application of the 1:1 initiative were compared with the results from the previous years over a period of three years, starting with a baseline of the year prior to the 1:1 initiative. Results from comparative non-1:1 schools were then analyzed alongside the 1:1 schools. Academic performance among U.S. History students in the 1:1 initiative did not show that the 1:1 initiative had a positive effect on school-wide performance level percentages in social sciences. The results were inclusive. Suggestions for future research include expanding the number of years in the longitudinal study, investigating schools in other regions of the country, and studying schools with more diverse populations.

Keywords: 1:1 initiative, 21st-century learning, analytical thinking, differentiated instruction, flipped classroom, technology, zone of proximal development.

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List of Abbreviations

American College Testing (ACT)

Analysis of Variance (ANOVA)

Department of Defense Education Activity (DoDEA)

Differentiated Instruction (DI)

End-of-Course (EOC)

Kentucky Department of Education (KDE)

Kentucky Performance Rating for Educational Progress (K-PREP)

North Carolina 1:1 Learning Technology Initiative (NCLTI)

Science, Technology, Engineering, Mathematics (STEM)

Science, Technology, Engineering, Arts, Mathematics (STEAM)

Special Education (SPED)

Zone of Proximal Development (ZPD)

CHAPTER ONE: OVERVIEW

This chapter contains the research questions as well as a discussion of the significance of the study. Furthermore, this chapter includes an analysis of educational theories that align with the need for a 1:1 initiative and definitions of key educational terms that support 21st-century classroom skills. Finally, it includes background on the fundamentals of the educational concepts that aid in the building and support of an effective 21st-century classroom where a 1:1 initiative is utilized; an outline of current questioning of 1:1 initiatives; and a justification for the empirical testing of academic performance levels.

Introduction

This study was conducted to determine whether the 1:1 initiative on academic performance resulted in positive school-wide performance level percentages among secondary school U.S. History students. The 1:1 initiative is a program where each student has access to a laptop, tablet, or other portable device at all times during the course of instruction and at home. The 1:1 initiative consists of a variety of instructional delivery methods, including webcasts, podcasts, flipped classrooms, teacher created videos, interactive lessons, and instructions. While this type of information delivery previously occurred in classrooms, in the 1:1 initiative, content is now accessed by students at home (Tucker, 2012). Armstrong (2014) reported that the use of laptops and tablets has been effective in improving class participation. In the current study, the effectiveness of a 1:1 initiative in terms of school-wide performance levels was evaluated using standardized testing in social science. The purpose of this study was to investigate whether 21st-century classroom skills produce more school-wide performance level percentages, as measured by standardized testing, within the social sciences curriculum.

Background

Increasingly diverse student populations and larger class sizes can negatively affect student performance. To best meet students' diverse needs, teachers must differentiate their instruction (Frey & Fisher, 2017). One method, differentiated instruction (DI), started by Carol Tomlinson (2014), involves tailoring or adjusting instruction to meet individual needs and to be applicable to all levels of education. When utilized effectively, it helps all students reach their full academic potential (Dixon, Yssel, McConnell, & Hardin, 2014). With proper utilization, the 1:1 initiative, a component of a 21st-century classroom, allows for DI. The 1:1 initiative provides students with an opportunity to progress from one lesson to the next after they have gained the necessary skills and understanding of the previous step in the learning process. The teacher plays the role of facilitator and thus creates a purposeful environment that supports purposeful learning (Watts-Taffe et al., 2014).

The Department of Defense Education Activity (DoDEA) school system provides an example of the effectiveness of teaching to the needs of diverse learners (Fugate, 2014). The DoDEA school systems have produced some of the highest standardized test scores in the country (Fugate, 2014). Fugate further reports that DoDEA African American and Hispanic students have shown the best academic results in the nation.

The disciplines of mathematics and science have benefited from the introduction of 21st-century classrooms (Hew & Cheng, 2016). The discipline of social sciences combines the humanities to enhance students' competence in interacting with society. The importance of the arts has only recently been emphasized, as evidenced by the transition from the acronym STEM (Science, Technology, Engineering, Mathematics) to STEAM (Science, Technology, Engineering, Arts, Mathematics), which still fails to include the social sciences. Today, many

students and some educators view social sciences as being the least important of the core classes (Fitchett, Heafner, & Lambert, 2014). Therefore, it may be the case that 1:1 principles need to be directed more to social science disciplines. There has not yet been a primary focus in education on the integration of 1:1 principles and social sciences regarding the benefits of technology being incorporated within the curriculum.

The 21st-century classroom places the pacing of a lesson's fundamental concepts in students' control (Weller, 2017). Through technology-based resources, students are allowed to watch, rewind, slow down, and re-watch the core lessons; the goal of this technique is that students return to class the following day with a better understanding of the material (Morgan, 2014). Technology also allows the teacher to group students according to their comprehension levels—enabling students to work on tasks that provide the most educational benefit—and creates new avenues for students to participate in their own learning. Teachers who use technology in their classrooms can make social sciences course content relevant in terms of students' needs, objectives, and goals. This goal may be accomplished with the 1:1 initiative. Teachers utilizing 1:1 classrooms hope to provide an effective learning environment for teaching the social sciences.

Problem Statement

The problem identified in this study is that extant literature has not addressed whether 1:1 initiative classrooms are effective for school-wide performance level percentages in U.S. History. Social sciences help students understand the world in which they live, and that world is technologically-based (Anderson & Cook, 2014). The widespread use of digital technologies over the past 30 years has led to new advances in learning methods (Brown & Luterbach, 2011). One such method, DI, is now possible because of new technology and has been shown

to benefit the 21st-century classroom environment (Weller, 2017). Using the 1:1 initiative to differentiate instruction may increase students' academic performance (Watts-Taffe et al., 2014).

The 1:1 initiative uses new technologies, DI, and flipped classrooms to avoid the limitations of the "one-size-fits-all" teaching method (Merz, 2017). The 2014 National Assessment of Educational Progress (NAEP) results showed that civics, history, and geography are the lowest-performing of the core subject areas (National Center for Educational Statistics, 2015). That may be because of exclusive attention paid to science and mathematics as a measure of success in 1:1 programs. The 1:1 initiative was developed not only out of technological advances, but also out of a need to individualize instruction for students. Prior to this initiative, students were taught using a traditional approach, in an environment using the same methods in a group setting.

This type of traditional approach, however, does not account for the learning environment, unique factors influencing learning abilities, or circumstances in the classroom that can impact students' ability to acquire knowledge (Tomlinson, 2017). Within this context, the 1:1 initiative in learning was developed with the goal of improving experiences for students, resulting in improved academic outcomes. Teaching every student in a "one-size-fits-all" manner is counterproductive and ineffective (Tomlinson, 2017). The problem identified in this study is that the literature has not addressed a need for quantitative data on this topic; most extant research on 1:1 education in the social sciences is based on qualitative data and in the form of opinion papers (Kilinç et al., 2016). Therefore, there is a gap in the literature as to whether or not 1:1 initiative classrooms are effective for school-wide performance level percentages in U.S. History, or any of the social sciences.

Purpose Statement

The purpose of this study was to examine the effect of the 1:1 initiative on secondary school social science students' school-wide performance level percentages. Each of these schools have implemented a 1:1 initiative program in their social sciences departments and have used combinations of flipped classrooms, interactive white boards, or online versions of their physical classrooms through websites such as Blackboard, Google Classroom, and Schoology.

The measure of students' performance levels employed in this study was the Kentucky Department of Education (KDE) End-of-Course (EOC) U.S. History Exam school-wide performance level percentages, which were tracked and analyzed over the course of a three-year period. It corresponded with the first year of implementation. The selected schools for participation were chosen randomly by researching 1:1 initiative schools in various locations across the Commonwealth of Kentucky's rural and urban districts. Within this study, the independent variable was the testing years, 2013-14 through 2015-16, and the dependent variable was the school-wide performance percentages.

The exam results for students were reported by the State of Kentucky for schools as the percentage of students whose scores fell in each for four categories. The categories are novice, apprentice, proficient, and distinguished based on students' results in comparison to state standards for their grade level (11th grade). A student scoring 143 or below is classified as a novice (N), 144-146 as apprentice (A), 147-153 as proficient (P), and 154 and above as distinguished (D) (Dickinson & Thacker, 2014). Students at the apprentice level have potential to succeed in college or a career with some support or remedial education (Dickinson & Thacker, 2014). The designation "proficient" indicates that students are ready for college level

courses (Dickinson & Thacker, 2014). Students who are classified as "distinguished" have the possibility of qualifying for academic scholarships to college (Dickinson & Thacker, 2014).

The only EOC performance level percentages that were tracked and analyzed were the percentages that fall under U.S. History in the social sciences. I retrieved performance data from the KDE EOC U.S. History Exam performance level percentages, which is a publicly accessible database. Using the data provided I then analyzed the data to first study the longitudinal effect of the 1:1 initiative, and then to determine whether there is better academic performance with the 1:1 initiative or not in comparison to schools not implementing a 1:1 initiative. The data included begins with a baseline from the year prior to initiating the 1:1 initiative.

Significance of the Study

The 1:1 initiative has benefits for the school climate (Ottmar, Rimm-Kaufman, Larsen, & Berry, 2015). However very little research has addressed its ability to improve school-wide performance level percentages in other content, such as the social sciences. This study adds to the existing body of knowledge, providing information about the 1:1 initiative's effect on learning social science content. According to Anderson and Cook (2014), social sciences help students understand their technologically-based world.

Minimal extant scholarship on the effectiveness of the 1:1 initiative in social sciences constitutes a gap in the literature. Quantitative data is most notably absent, as previous studies have been qualitative, and presented in the structure of opinion papers (Kilinç et al., 2016). The results from this dissertation provide additional quantitative data in order to substantiate extant findings on the necessity of implementing 21st-century classroom instructional strategies, such as the 1:1 initiative, to increase school-wide performance level percentages.

The rapid growth in technologies, and the expectation that students be equipped with 21st-century skills, has led to an escalation in technology-based classrooms and learning (Watson et al., 2015). There is an abundance of research specifying the growth in educational programs' use of technology, but research has not shown steady results in social sciences.

The 1:1 learning initiative is deliberated among all stakeholders, considered by some to be indispensable in revolutionizing aspects of classroom instruction and enhancing students' academic performance (Swallow, 2015). Technology enables educators to "personalize learning, engage the disengaged, complement what happens in the classroom, extend education outside the classroom, and provide access to learning to students who otherwise might not have sufficient educational opportunities" (World Economic Forum, 2016, p. 11). Nontraditional classrooms are necessary to guarantee student success (Reigeluth & Watson, S. L., 2013).

Research Questions

RQ1: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years?

RQ2: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between year two and year three of a 1:1 technology initiative, compared to schools that do not utilize 1:1 technology?

RQ3: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years compared to schools that do not utilize 1:1 technology?

Definitions

1. *1:1 initiative* - An educational initiative in which students use laptops or tablets, which requires a shift from a mostly static, wired environment to a mobile environment supporting a very diverse set of clients (Ullman, 2014).
2. *21st-century learning* - Learning that takes place in an educational setting in which technological resources are utilized regularly and frequently to aid and differentiate instruction (Oudeweetering & Voogt, 2018).
3. *Analytical thinking* - Breaking down concepts and problems into parts in order to discover how they work or for classification (Robinson, 2014).
4. *Differentiated instruction* - A philosophy of teaching in which teachers accommodate students based on their particular interests and learning styles (Tomlinson, 2014).
5. *Flipped classroom* - An innovative pedagogical approach that focuses on learner-centered instruction in which students receive their initial learning outside the traditional classroom setting, such as on their 1:1 tablet or laptop (Gilboy, Pazzaglia, & Heinerichs, 2015).
6. *Learning styles* - Gardner (1991) developed what is now known as *multiple intelligences* to understand the variety of ways a learner comprehends and retains information. These intelligences are learning styles that individuals possess that enhance their comprehension of a particular task or concept (Freedman, 2015; Sternberg, 2015).
7. *Sociocultural* - An adjective describing a psychological framework that emphasizes both social and cultural factors in learning (Bates, Kahlke, & Nimmon, 2019). According to sociocultural learning theory, caregivers transmit cultural knowledge and meaning to children as the children develop their cognitive abilities. Teachers serve as

mediators who coach and encourage students to identify their levels of understanding, on which students can work and increase by practicing what they know well and adding to it (Orilch et al., 2016). Children learn from and explore, or exploit, opportunities offered by the culture during active participation (Martin-Beltrán, Guzman, & Chen, 2017).

8. *Technology* - Advanced mechanical devices such as computers, laptops, smartphones, tablets, and interactive white boards used to enhance the quality of education (Benjamin, 2014).
9. *Tiered instruction* - In tiered instruction, the type of material does not change the integrity of the content but builds on previous knowledge or expertise to group the students prior to the delivery of the content. This approach enables students to master skills by which they had been challenged and to produce novel products from their newly acquired skills (Shapiro, 2014).
10. *Zone of proximal development* - The ZPD is defined as the difference between what a student is capable of doing independently, and what the student can do with some help from a more capable other. Within the ZPD, students are able to accomplish tasks that would elude them when working independently, and through this process are able to learn new concepts and awaken new levels of development (Andrade, Bryan, Danish, & Saleh, 2017).

CHAPTER TWO: LITERATURE REVIEW

Overview

This chapter provides a literature review of the 1:1 initiative as a differentiation tool for increasing students' performance level percentages, including debate on the measure's effect on school-wide performance level percentages in secondary school social sciences and a comparison between 1:1 instruction and instruction practices of the traditional classroom.

Theoretical Framework

This study is grounded in sociocultural learning theory, which was developed and used to study children's zones of proximal development (ZPD). ZPD is defined as the difference between a student's current ability and the level at which the student could grasp the content if given guidance by the educator (Channa & Nordin, 2015). According to this theory, the mind develops in relation to how the individual interacts with society, considering learning and development are not mutually independent processes.

According to sociocultural learning theory, the independent variable (the year of testing with the 1:1 initiative) is expected to influence the dependent variable (the students' performance level percentages on the K-PREP EOC). The 1:1 initiative gives students the ability to work from the point of their understanding and to grasp the content at their own pace in a way they can understand (Watts-Taffe et al., 2012). Thus, the 1:1 initiative, when incorporated correctly into the curriculum, mirrors Vygotsky's sociocultural learning theory and the ZPD (Watts-Taffe et al., 2012). According to Watts-Taffe et al. (2012), DI has its basis in sociocultural learning theory.

Sociocultural learning theory is central to the instructional enhancement of the 1:1 initiative, and integrating technology into the curricula will simultaneously increase critical

thinking, logic, and reasoning skills in all areas of learning (Van Compernolle, 2014). Sociocultural learning theory is grounded in the belief that, within a particular social and cultural context, higher cognitive functions can be acquired and cultivated following social collaboration (Swain, Kinnear, & Steinman, 2015).

Sociocultural Learning Theory

According to Watts-Taffe et al. (2012), DI is based on the sociocultural learning theory introduced in 1962 by Vygotsky, a Russian psychologist. Sociocultural learning theory is central to the instructional enhancement of the 1:1 initiative and has significant implications for teaching and education. Supporters of sociocultural learning theory believe that, within a particular social and cultural context, higher cognitive functions can be acquired and cultivated following social collaboration. DI provides many learning styles and a variety of instructional delivery methods to meet all learners' needs regardless of their ZPD, or schema. The ZPD is the difference between a student's current ability and the level at which the student could grasp the content if guided by the educator (Wass & Golding, 2014). These instructional deliveries may include intra- and interpersonal activities, various choices of how to demonstrate comprehension of learned material, and work performed in various-sized groups, all of which are examples of sociocultural learning theory and how it supports the 1:1 initiative. Figure 1 shows the ZPD.

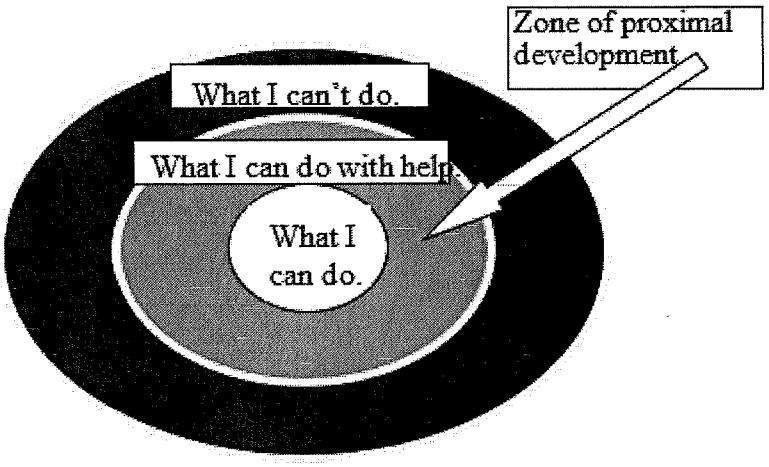

Figure 1. Zone of proximal development.

Watts-Taffe et al. (2012) stated that the working definition of DI reflects sociocultural learning theory in that DI focuses on how students interact with their teachers. DI uses approaches that are unique to each learner, reflecting the individual's background, readiness, languages, and interest (Benjamin, 2014). In the DI approach, teachers apply these teaching methods, which enable the students to acquire basic knowledge of skills when they are ready and allow the students to go deeper into the content at their own, individual pace to grasp more complex material (Watts-Taffe et al., 2012). The practice of DI uses the students' differing capabilities to inspire different ways of delivering content, and enables teachers to see when their students' academic needs are not being met. The goal of DI is to teach the knowledge required by school standards; however, with DI, teachers seek to deliver that same content in ways that work for each student (Weller, 2017). The single most important aspect of supporting DI with the 1:1 initiative is that it provides educators with the opportunity to reach students where they are academically within their ZPDs (Martin-Beltrán et al., 2017).

In order to reach students at their academic levels, sociocultural learning theory relies heavily on the dialogic process between teachers and students, and once teachers understand

students' current and emerging capabilities, they can then target instruction more effectively (Andrade et al., 2017). Language is not only a cultural and psychological tool, but it also allows students to gain knowledge and generate new ways of thinking. This not only occurs through the dissemination of information through language, but in language acquisition itself; when students gain knowledge, they gain the ability to develop their own ideas and to use language to share those ideas. It is important to note that dialogue is more than simply the dissemination of information from teacher to student. Instead, dialogue consists of a back-and-forth exchange between teacher and student. Teachers give knowledge and students ask questions to gain deeper insights or to show they have acquired the knowledge disseminated. There is also a growing consensus among educators that the development of argumentation and deep understanding of complex questions is best supported by dialogue-intensive approaches to instruction (Resnick, Asterhan, & Clarke, 2015). Through this dialogue, the communication between the teacher and student is a one-on-one event and is used to facilitate the evolution of ideas as students gain a deeper understanding of the knowledge gained from teachers (Reznitskaya & Wilkinson, 2017). Dialogue has a long history in the classroom and is viewed as beneficial in the dissemination of knowledge to students (Reznitskaya & Wilkinson, 2017). Dialogue is not only used to disseminate information; students can also use dialogue to demonstrate their understanding of the information they have learned from the conversation with the teacher. However, research indicates that more is known about the effects of dialogue in education than the strategies used to develop that dialogue, greatly improving the quality of teacher and student interactions (Wilkinson et al., 2016). This is an area that may require further research in order to develop best practices for use in cooperation with sociocultural learning theory in the classroom.

Vygotsky's ZPD supports the notion that effective education facilitates development by assisting students' progression to each stage through student-teacher interactions and opportunities to discuss and share ideas. Differentiation is both driven and monitored by continuous informal and formal assessment, as instruction is aimed at students' needs, directly but temporarily. This allows the process to be developmental and flexible. The classroom instructor differentiates the instruction based on the students' levels of comprehension and the initial learning in the 1:1 initiative learning environment.

One example of this teaching practice is tiered instruction. Tiered instruction should begin with high-quality, whole-group instruction followed by differentiated small-group instruction and then intensive intervention if needed (Cabus, Haelermans, & Franken, 2017). The focus is not on the adjustment of students, but rather on the adjustment of teaching and instructional strategies familiarizing teachers with their students' abilities and learning styles (Cabus et al., 2017), thus making the process about learning. The teacher develops a tiered activity by first focusing on a curricular concept that must be understood by all students. In a typical mixed-ability classroom, two to three instructional levels or tiers should address most students' levels for each instructional concept (Shapiro, 2014). In each tier, teachers should consider the students' challenge level in order to enhance understanding of the curriculum content, the process of application, and the product to be differentiated (Dixon et al., 2014).

DI should focus on changing how particular content is taught, rather than altering the integrity of the content (Benjamin, 2014). The same standards of education remain in the DI framework. However, teachers should adapt the method by which they educate students on those standards based on the students' abilities and readiness levels. The burden is on the teacher to ensure that the method of instruction meets the students' diverse needs in order to

facilitate positive academic outcomes and that the material is learned effectively so that students can apply what they learn in real-world settings. DI is necessary for the development of higher-order functions, and Vygotsky argued that the ZPD is essential to the understanding of school life and that such functions can only be acquired and cultivated following social interaction (Wass & Golding, 2014). Therefore, by incorporating the 1:1 initiative, students can gain the initial learning at their own pace and teachers can develop an educational plan that will strengthen student critical thinking skills and abilities, as well as increase student motivation upon entering the classroom (Siddiq, Scherer, & Tondeur, 2016).

The 1:1 initiative provides students with the opportunity to take ownership of their learning and encourages their own thinking (Erikson, 2017). The introductory material is delivered in a format that allows each student the time necessary to grasp the concept and then to build upon that understanding. Such approaches provide opportunities for students to participate in discussions to construct personally meaningful understandings about the world and each other (Reznitskaya & Wilkinson, 2017). Further, the 1:1 instruction delivery method aids students in the development and understanding of the 1:1 initiative community and the importance and benefits of technology.

These 21st-century classrooms with their critical thinking pedagogies are also a prelude to global communications (Kadir, 2017). In such 21st-century classrooms, students learn that technology can assist them in college and the workforce, as well as in their personal lives, as students born in the last two decades of the twentieth century and later are growing up in a world built on networks of information and connectivity.

Classrooms should be reconstructed as communities of inquiry, a learning environment where students are inquisitive, curious about their lessons, and ask questions (Janks, 2014).

Teachers need to be aware of students' levels of understanding and at what stages students are prepared to progress to more complex material and discern the appropriate techniques and strategies to use in evaluating that material (Morgan, 2014).

The 1:1 initiative integrates sociocultural learning with the influence of a learner's ZPD (Andrade et al., 2017). Scholars have understood sociocultural learning theory as fundamental for constructivism because constructivist theory (Bruner, 1966; Vygotsky, 1962) inspired different methods in which students are encouraged to apply prior knowledge and experience to newly presented information. Dewey (1916) stated that native activities from the social environment should be selected and coordinated for the formation of constructivism. Dewey stressed the idea that the child's own lived experience must be acknowledged as the heart of both the content and the education process (Schcolnik, Kol, & Abarbanel, 2016). With DI, children can be given a task of self-exploration using technology or other means in order to create an advanced organizer that serves them in scaffolding and building knowledge, which is essential for academic achievement. The difficulty of the skills should be in relation to the child's learning ability levels (Watts-Taffe et al., 2012).

In keeping with sociocultural learning theory, the 1:1 initiative supports instruction that is designed so that students successfully interact within the classroom and construct their own understanding (Dolmans et al., 2019). Differentiating instruction by infusing technology, like the 1:1 initiative, promotes academic achievement by allowing students to move to more multifaceted material after mastering the skill in the previous material (Bondie, Dahnke, & Zusho, 2019). This creates a purposeful environment for learning (Watts-Taffe et al., 2012). The rationale for implementing DI has been driven by increasingly diverse populations and larger class sizes that can negatively affect student achievement. Because of student diversity,

teachers have incorporated DI as an approach to teaching and learning (Tomlinson, 2014). This diversity complements the idea of the ZPD, suggesting that educators explore alternatives to the traditional classroom (Freedman, 2015), which is greatly expanded with a 1:1 initiative.

Teachers at all levels of education need to understand and recognize the various backgrounds of the students they teach, as well as the schemas each student holds, in order to make connections that will improve learning outcomes and shift students' ZPD to the next achievable developmental level (Waas & Golding, 2014). In this context, a relevant technical definition of education is as follows: education builds on experience to expand the meaning of that experience and develops the ability to determine subsequent experiences. Students should be able to know where they are cognitively and, with the collaboration of their teachers, they should be able to determine where they are going. Similarly, workers should possess several of the soft kills mentioned previously: critical thinking and problem solving, collaboration and leadership, agility and adaptability, initiative and entrepreneurialism, effective oral and written communication, accessing and analyzing information, and curiosity and imagination. These skills can be acquired through innovative teaching and the use of technology. Problem-solving and critical-thinking skills are important attributes of 21st-century global citizens (Benjamin, 2014). Technology can provide an active learning experience in global diversity.

While DI takes many forms beyond just the 1:1 initiative, sociocultural learning theory is at the core of the influences within the instruction. Vygotsky (1962) recognized and argued that children learn best when they are allowed to progress at their own readiness level with the guidance of peers or adults. Students' readiness levels are scaffolded upon their ZPDs, and their ZPDs can be effective in shifting them to a higher readiness level through traditionally utilized techniques such as grouping and through more modern methods, such as the 1:1 initiative

(Sternberg, 2015). Today's diverse classrooms are a microcosm of the diversity present in secondary schools' social science curricula: a diversified example of a society that is more global than local. This diversity requires implementing broader trends in digital learning within social sciences education in the United States' public education system (National Council for the Social Studies, 2016).

Howard Gardner's Multiple Intelligences

Howard Gardner developed the idea that all human beings have multiple intelligences (Blue, 2015). Multiple intelligences, according to Gardner, constitute a variety of learning styles that ignite cognitive processes at a greater rate than do other methods of instructional delivery. For example, today's educational setting caters to students' multiple intelligences: musical, naturalist, spatial, linguistic, kinesthetic, intrapersonal, interpersonal, and logical (Gardner, 1993). According to Oudeweetering and Voogt (2018) educating students for the 21st century means students must be taught to learn independently.

To accomplish this, teachers must help students understand how to learn. Theorists such as Gardner have explained that this can be accomplished through the multiple intelligence learning models. Gardner theorized (Leshkovska & Spaseva, 2016) that every individual has a specific way of learning that facilitates greater academic success and cognitive retention than using the "one-size-fits-all" method. In other words, Gardner's theory, which takes into account students' different learning abilities, strengths, and weaknesses, creates a broader vision of education for students, which facilitates stronger student engagement and, as a result, improved academic outcomes.

Even the best schools can fail to produce students who understand the course content because teachers test students only on what they have been directly taught, rather than asking

them to stretch their mental muscles in new and appropriate ways. Gardner argued that students should focus on a limited number of important topics, explore them in depth, and come to understand them well (Leshkovska & Spaseva, 2016). Regarding academic achievement, Gardner believed the concept of analytical thinking could only be fostered by DI, which is not used in the traditional classroom (Sternberg, 2015). Students with a high level of interpersonal intelligence do not learn as well when placed in an intrapersonal learning situation. Likewise, students who are visual learners are placed at a disadvantage when given an auditory lesson, such as a traditional lecture. Therefore, teachers need to differentiate their instruction in order for students to comprehend the concepts in their assignments (Martin-Beltrán et al., 2017). Further, students' beliefs about the nature of intelligence can affect their assessment of their own capabilities and thus influence their actual performance.

By promoting positive learning environments and student motivation, teachers foster resilience that enables students to recover from academic failures and to persevere toward academic success. Gardner's theory on multiple intelligences fosters such learning environments (Blue, 2015). For those with strength in the logical linguistic domains, school often provides appropriate and rich educational experiences; however, schools have an equal duty to help those students with other kinds of strengths to recognize and develop them. Through Gardner's theory, teachers can not only capitalize on students' strengths but use strategies to overcome their weaknesses, building on the theory as a way to understand those strengths and weaknesses as they apply to education. This facilitates a more individualized approach as opposed to the "one-size-fits-all" approach that is frequently unsuccessful in a wide range of educational settings.

In order to understand the concepts, theories, and philosophies of Vygotsky (1962), Tomlinson (2014), and Gardner (1993), it is necessary to examine all three theories in relation to

their collaborative natures. While Vygotsky's (1962) sociocultural learning theory encourages students to learn within a social context and start at the point at which they understand the knowledge (the ZPD), building knowledge from there, Gardner's multiple intelligences model shows that the only way students can grow within their ZPD is by learning in the manner that best matches their cognitive abilities. Ultimately, if these actions are implemented in the learning environment of each child, then DI has occurred, according to Tomlinson's (2017) educational best practice. If students understand that their own views and understandings have a genuine place in the ongoing construction of the discipline, then they are likely to see themselves as authentic participants in that discipline (Tomlinson, 2014). They will be engaged learners, not passive recipients of expert knowledge (Morgan, 2014). In this way, Gardner's theory can be used cooperatively with DI and sociocultural learning theory, which utilize individualization based on factors that influence students' academic outcomes. In other words, the theories can build on one another when applied in the classroom, which results in more individualized instruction for students.

In the years since the first publication of Gardner's (1993) work, the cognitive revolution has continued to unfold. The 1:1 initiative's effectiveness draws from each of these educational models and practices. Every student is given the ability before class to formulate a foundation of knowledge, enter the classroom, and engage in DI based on their ZPD and their multiple intelligences. The purpose of teaching social sciences is to encourage social and civic participation. According to Blue (2015), these qualities can be found in Gardner's multiple intelligences theory.

Social sciences are considered an integral aspect of public education, and high school teachers in the social sciences have the responsibility to prepare students adequately to be

productive members of society, mirroring the focus of the social sciences curricula. Vygotsky's sociocultural learning theory shows that students learn best during the transmission of knowledge within the cultural setting, which involves a fundamental understanding of the social sciences. Roth (2012) found that effective long-term learning took place when technology was used appropriately: for example, when teachers use DI in the form of the 1:1 initiative as a means to accomplish the goals of Vygotsky's learning theory. This delivery of instruction can be the catalyst for creating an effective and best practice learning environment within secondary schools.

Related Literature

Teams of teachers design and align curricula and determine varying approaches for struggling students within academically heterogeneous groupings. High schools are traditionally a learning environment where the skills and information provided to students—according to the National Council for the Social Studies (2016)—become the foundation upon which those students build their college education, making informed decisions and participating as citizens who can shape democracy. However, according to Jackson and Kurlaender (2014) there is a significant difference between what the high school teachers teach and what postsecondary instructors require of students during first-year, credit-bearing courses in college. Regardless of how culturally, socially, and academically diverse student populations may become, educators must also value diversity of learning and implement various instructional designs and assessments to ensure that students' needs are met (Tomlinson, 2017).

Higher education must progress in the presence of multifaceted societal problems involving social, economic, scientific, and cultural dimensions (Pedraja-Rejas & Rodríguez-Ponce, 2014). The purpose of higher education is to promote meaningful and engaging learning

to help students prepare for future careers (Morgan, 2014). Social sciences play a vital role in high school students' lives as they transition into adulthood, a process that involves carrying out civic duties and responsibilities such as voting, enlisting in the Armed Forces, getting married, taking on jobs, entering into careers, and moving away from home (Ross, 2014). Most crucially of all, identity is shaped by students' cultures, by groups, and by institutional influences such as schools, churches, families, and government systems (Deal & Peterson, 2016). In order to develop and instill civic values in students' long-term memories, and to help students turn the curriculum into actual knowledge, the 1:1 initiative learner needs to be readily available and easily understood by secondary school leaders and teachers (Beeson, Journell, & Ayers, 2014; Journell, Beeson, & Ayers, 2015).

Differentiated instruction (DI), an instructional education theory popularized by Tomlinson (2014; 2017), places an emphasis on student readiness (Morgan, 2014). DI, a product of Vygotsky's sociocultural learning theory, has been shown to benefit the classroom environment. Currently, the practice of DI is not widely used by a majority of U.S. secondary school systems. Any delivery of instruction, according to Cicconi (2014), which values creating, evaluating, applying, and analyzing, and which inspires a greater enthusiasm for learning and enables students to be actively involved in their education should be utilized beyond the primary and elementary grades. When there are desirable changes in students' learning, DI can be considered effective (Morgan, 2014). However, it is important to note that DI does not mean adapting learning methods to students' learning styles (Morgan, 2014). There is a lack of credible evidence to support the use of the learning styles theory in the classroom. Instead, the DI approach focuses on moving to the next level of knowledge when the student is ready, regardless of the student's learning style.

Each student has different and unique learning abilities, different background knowledge, and varying degrees of intelligence (Tomlinson, 2014). According to Merz (2017) the 1989 National Board for Professional Teaching Standards recommended differentiating to target students' learning strengths as a means to heighten their knowledge. The 1:1 initiative learning model is an effective DI tool at the secondary level since technology has a strong influence on everyday life. However, the use of differentiated learning in the classroom environment, when used in cooperation with student sorting to match students with their peers in terms of the instruction they receive, can lead to the exposure of minorities or disadvantaged students and, perhaps, the perpetuation of inequality in the classroom (Card & Giuliano, 2016). That being said, the use of DI can be an effective strategy to strengthen engagement of students in the learning process through the ways content is offered.

DI is based on two primary components: planning and adapting. Planning includes a wide range of strategies to plan for student readiness, by shaping the lessons using a combination of knowledge of students' abilities and needs as well as the standards of education required by the school, district, and state. Adapting is the process of implementing those strategies developed in the planning phase in order to teach students based on their readiness. Since students have different and unique learning abilities, it is necessary for teachers to be adaptive when they disseminate knowledge. Not only does this adaptive approach ensure that the unique needs of students can be met in the classroom, it also enables teachers to adjust their instruction to more effectively accommodate students as their knowledge and readiness levels change.

School systems such as the DoDEA have been known to produce some of the highest standardized scores in the country, meaning that their scores are well above the national standard and above or at the percentile as the other top performing schools in the nation. The performance

of students in DoDEA schools is high, according to the ongoing assessment by the National Assessment of Education Progress on students' performance (Fugate, 2014). The DoDEA student body is diverse in race, ethnicity, religion, and nationality, and also includes English as a second language (ESL) and special education (SPED) students (Fugate, 2014). DoDEA teachers have to make accommodations and adjustments to teach their students successfully (Fugate, 2014). Differentiated classroom teachers make vigorous attempts to meet students where they are in the learning process and move them along quickly and as far as possible in the context of a mixed-ability classroom (Tomlinson, 2017). DoDEA is one example of how differentiation has proven effective. Customizing teaching by increasing the level of DI through the incorporation of a 1:1 initiative classroom enables teachers to vary instruction in accordance with students' strengths and weakness (Sternberg et al., 2015).

Members of the National Council for the Social Studies (2016) have explained that teaching and learning should be meaningful, integrative, value-based, challenging, and active. These qualities are foundational to the development of students' knowledge, skills, and dispositions as participating citizens (Tannebaum, 2015). Because differentiation uses many educational delivery methods to address every intelligence style and ability, it makes sense that teachers must create a clear vision for technology being used in a 21st-century classroom and instill a convincing sense of why DI is important to successful implementation of new educational programs (Tomlinson, 2014). Digital tools—such as mobile phones, networks, and structures—are augmenting the nature of learning (Hofer & Swan, 2014).
Technology allows the teacher to deliver the curriculum based on each student's learning abilities (Sprague & Shaklee, 2015).

The traditional classroom is difficult because it utilizes the "one-size-fits-all" strategy that does not allow the teacher to promote services for students who have different learning abilities (Siegle, 2014). Though this approach is frequently used in classrooms all over the world, it does not take students' unique traits and abilities into consideration in either the planning or the execution of dissemination of knowledge to the students (Hofer & Swan, 2014). Instead, this approach focuses on the learning material, assuming that students should be at approximately the same level in a given classroom. When this does not occur, students do not achieve the academic outcomes expected or desired by the teacher. Students learn best when teachers instruct through different learning modalities that appeal to varied interests; therefore, all levels of learning must be addressed with modifications to increase students' academic achievement. While this type of differentiation produces creative and engaging activities, the objective of these activities must be linked to what the children should or are able to know. Traditional classroom environments often ignore this component of the learning process. DI, on the other hand, keeps the focus of the learning process on the students, their abilities, and their readiness to move to the next topic, lesson, or level of instruction. In this way, DI moves beyond traditional "one-size-fits-all" teaching styles, facilitating more beneficial and desired outcomes among students.

Gardner (1993) has stated that every student has a learning style. In a differentiated classroom, students work at their own level and are therefore less likely to tune out or become frustrated. DI must be utilized effectively in order for academic success to take place (Siegle, 2014). A teacher aiming to tailor instruction to diverse students must take time to design lessons that reach the interests and cognitive abilities of every student (Merz, 2017). Planning an effective differentiated lesson may take more time in the beginning, but DI is a dynamic and student-centered approach to teaching and learning; it enables teachers to create a classroom that

facilitates the best outcome for learners' academic growth (Tomlinson, 2014). Social studies teachers, community members, and students should participate in developing curricula, approaches, and evaluations to be used in the classrooms (Parkay, Anctil, & Hass, 2014). No matter how the lessons are designed, all lessons reach the same destination, but by taking alternative paths.

All lessons in the social sciences must lead to the one goal of students reaching the ability to think critically and analytically, regardless of how they come to their conclusions (Journell et al., 2015). This involves creating an environment of contradictions and inconsistencies to challenge existing preconceptions and motivate learning (Farris, 2015). By applying differentiated learning opportunities, schools foster self-determination, which is conductive to maintaining and developing intrinsic and autonomous types of motivation (Ratelle et al. 2007).

A high-quality curriculum that is very precise in terms of what students should know is necessary. Knowing exactly what students need in the curriculum requires a knowledge of their academic levels and the ways in which various factors influence students' abilities to acquire and apply knowledge in a classroom setting. Effective differentiation is likely to come from coherent, consistent, and reflective efforts to address students' interest and readiness, as well as their learning profiles, in presentation of information, student practice or sense making, and student expression of learning (Tomlinson, 2017). This instruction model also allows students to think critically and reflect on their thoughts to promote academic engagement in the classroom.

Implementing DI results in an enjoyable teaching experience in which students are actively engaged in the learning process. Tomlinson (2017) has argued that, although students find it difficult to pay attention while they are just supposed to listen, DI enables them to get involved in the learning process, especially in social experiments. High school social science

teachers need to be informed as to what constitutes the best practice for disseminating their content; more specifically, it is important to recognize and utilize effective DI in the 21st-century classroom. Students will acquire ways of thinking and behaving in a 21st-century classroom culture by interacting with more knowledgeable people, either the teacher or their peers (Kopish, 2016).

21st-Century Learning

Twenty-first century learning methods have a positive bearing on education because many students are passionate about the use of technology. Therefore, teachers must utilize technology and master using it as an effective tool for DI in secondary schools (Siddiq et al., 2016). It is essential for schools to effectively use technology because of the importance of students' technology skills as they begin to transition toward college and the workforce and the major role technology plays in global society. Technology plays a role in most areas and aspects of students' lives born in the last two decades, causing schools to recognize the importance of incorporating technology into the classrooms. Since the majority of students in today's classrooms have grown up with technology as an integral component of society, they must be prepared to navigate that technology in their daily lives outside of the classroom (Sprague & Shaklee, 2015).

As a result, teachers must include the instruction of technological applications in their classrooms, regardless of the subjects being taught. Society is currently shifting away from traditional forms of mass communication toward user-generated content (Hofer & Swan, 2014). As a result, students must be prepared to participate in this user-generated content either through its creation or its consumption. Incorporating technological components in the classroom and in

instruction will assist students' preparation for navigating a 21st-century society, complete with the fully integrated use of technology.

Students learn at different rates and possess different background knowledge (Benjamin, 2014), which is relevant to the use of technology as well as other learning content. Despite the prevalence of technology today, not all students have the same access to technological resources or utilize them equally. Therefore, the education students receive, even within a technological context, also requires differentiation. While this concept is generally accepted in DI approaches, it must also be applied to the use of technology in the classroom. For example, some students may not exhibit readiness to use scholarly article databases to obtain source material for a research paper.

The traditional classroom has been understood as a learning environment in which the teacher delivers instruction through lectures, and in which textbooks are the primary resource (Mauch & Tarman, 2016). However, in the 21st-century, even these source materials are predominantly outdated. Most information is obtained online. In fact, even books that have been long-used as seminal works are being uploaded for online access from anywhere in the world, making technology the most significant source of information in the world. The traditional classroom model can no longer suffice as the primary teaching strategy in today's technologically advanced society. Further, students today are more exposed to technology than are any other generation (Sprague & Shaklee, 2015).

In addition, technological exposure permeates every aspect of life, particularly in adulthood. This technological expansion has caused irrevocable changes in the economy, society, and politics. Globalization, for example, requires students to learn how to communicate and acquire problem-solving skills that can be applied globally (Saavedra & Opfer, 2012). Economic

necessity and low civic engagement require that students improve their critical thinking skills for learning with technology; social science teachers have a vital role to play in facilitating this (Waters & Russell, 2016). As a result of the role of technology in modern society, there is no question that students must be equipped with knowledge and skills that include the ability to navigate technological resources to access information and communicate with others. This requires the significant incorporation of technology in the modern classroom.

Although the traditional classroom methodology is still relevant to the learning process, an effective teacher must provide lessons with DI learning activities that address a variety of intelligences. Siddiq et al. (2016) noted that the 21st-century learner must be able to collaborate, negotiate, and be well versed in a variety of learning and working scenarios and situations. Twenty-first century students must have the ability to not only receive and give instruction themselves directly, as the traditional classroom setting teaches them to do, but also to employ a more facilitative approach to learning, which incorporates some form of technology (Boyce, Mishra, Halverson & Thomas, 2014). The availability and rapid evolution of technology drives how and when information is delivered (Kirsch, Leonhirth, Lownes, Marlow, & Pingley, 2016).

Due to the need to adapt quickly and effectively as technology advances, differentiated learning is an effective framework for education. This framework requires a strong emphasis on planning and adaptation, which increases the likelihood that technology, regardless of what that technology is, can be used effectively in the classroom setting. However, there has been a notable lack of standardized competencies for technology in curriculum and assessment (Boyce et al., 2014). Instead, educators have found ways to incorporate technology on a case-by-case basis, using lessons or units to guide the ways in which technology is incorporated. However, the formalization of the use of technology—such as through a framework of DI or another

approach—would ensure that students have the requisite knowledge in technology in order to be successful in the 21st-century. From this perspective, programs like the 1:1 initiative can be effectively used to bridge the gap in knowledge for the 21st-century learner (Lowther, Inan, Strahl, & Ross, 2012).

According to Saavedra and Opfer (2012), students can usually acquire information, convert it into knowledge, and apply that knowledge to content that is new to them, which allows them to be creative. In addition to creativity, this ability to acquire, convert, and apply knowledge has significant benefits in the 21st century. The resources for the 21st-century learner can make the educational process quicker and more engaging. Technology's near-instantaneous delivery of instruction and acquisition of fundamentals allows the learner more time to increase critical thinking, logic, and reasoning skills in all areas of learning, rather than prolonging the delivery of the curriculum's basic fundamentals (Beeson et al., 2014). In addition, the increasing use of user-generated content in society gives students a greater opportunity to express their creativity as 21st-century learners.

Technology provides teachers and students the opportunity to engage in different levels of complexity and challenges, which benefits academic achievement. It is easier to plan and adapt for students' various levels of readiness through the use of technological solutions and innovations. Differentiation is a best practice (Sprague & Shaklee, 2015). Today's educators are faced with the challenge of delivering effective instruction to students whose diversities include multiple ethnicities, multiple talent levels, cognitive processing abilities above and below average norms, and varied experiences and skill levels with computers (Martin-Beltrán et al., 2017).

An effective tool for the 21st-century classroom is a classroom website. Classroom websites can be found in a variety of formats, from actual web pages to blogs, and can even use higher-level scholastic settings, such as BlackBoard. The Internet itself also provides a forum for developing students' 21st-century skills and knowledge (Kirsch et al., 2016). Many studies of 1:1 programs stress improvement in 21st-century skills as a reason for heavy investment in this area. For example, Orlich, Harder, Trevisan, Brown, and Miller (2016) argued that, by making learning a social event, teachers could help to keep students engaged with course material.

The effectiveness of technology in education is evident. Technology serves as a means of delivering DI and promotes the development of analytical thinking skills. Various content-specific educators have been preparing students to be 21st-century learners by using computer software, electronic organizers, and a wide range of technological educational tools to assist students with special needs in improving their academic understanding and retention of knowledge. Every lesson in the social studies reflects some emphasis on skills, making skill development critical in good social studies teaching.

The goal of technology in social studies education is to provide a means for all students to practice 21st-century skills, and thus develop their abilities to solve problems, communicate, and think critically (Anderson & Cook, 2014). Educational institutes and instructors should incorporate new technology such as mobile devices, 3D virtual classrooms, 21st-century classrooms, require DI, increase development of analytical thinking skills, flipped classrooms, and 1:1 initiative implementation to create a more modern environment for effective learning (Jenkins et al. 2005).

Flipped Classrooms

In the 21st-century classroom, teachers face more than just the challenge of incorporating technology and the fast-paced dissemination of information. The real issue educators face today is time management, which has consistently been an issue in the classroom (Brown, Harder, Miller, Orlich, & Trevisan, 2016). Not only must teachers deal with the traditional challenge of not having adequate time to cover the requisite content, but they must also cover that content in a manner that incorporates DI, facilitates the development of analytical thinking, and promotes student learning in alignment with the demands of the global 21st-century society. In order to transform social studies teaching, teachers need to implement experiential learning in classrooms using lessons that involve more hands-on and real-world learning.

The flipped classroom is an instructional delivery method teachers can use to gain more time for one-on-one learning with students (Crouch, 2014). One notable benefit of the flipped classroom model in 21st-century learning is the ability for teachers to engage millennial students through strategies that facilitate active learning among students (Siegle, 2014). The need for engagement is a significant challenge in educating 21st-century students, and the flipped classroom can address that problem effectively. Since the flipped classroom does not allow for lectures and reading during classroom time, the time spent with the teacher is intended to discuss the material and apply the knowledge that was gained during homework. This reduces time that students would ordinarily find boring and can help minimize the risk of distractions in the classroom, such as smartphone use. Since this approach increases the time students spend engaging with teachers, teachers have the increased ability to work with students on an individual basis, which results in the accommodation of students' needs based

on their individual learning levels (McLaughlin, 2018). This can help strengthen students' knowledge and skills, resulting in improved academic outcomes.

A standardized flipped classroom method does not exist; the efficiency of a flipped classroom is determined by the nature of the class, which is dependent on each student's capability (Crouch, 2014). The flipped classroom permits the teacher to move from the conventional role of instructor toward becoming a coach, motivating each student by providing support or guidance as needed (Das et al., 2019). In accordance with most DI classroom models and in keeping with Vygotsky's ZPD, the teacher becomes more of a facilitator rather than a direct instructor or disseminator of knowledge. This shift in roles helps students achieve self-guidance throughout their lives as they independently search for and find responses to their questions and inquiries.

The opportunities a flipped classroom provides for both the teacher and the students are evident. Rather than spending the majority or often the entirety of the class lecturing to disseminate the core of the content, students watch lectures at home via podcasts, freeing up precious class time for more active learning experiences (Siegle, 2014). Students spend less time listening to lectures and more time doing activities in class (Hennick, 2014). Studies have shown that this arrangement is often preferred by students, who prefer in-person interaction to facilitate learning rather than simply reading a book or listening to a lecture (Das et al., 2019). The flipped classroom model permits the teacher to have more one-to-one time with students in lessons, thus consolidating their learning and allowing them to progress to more challenging tasks more quickly (Crouch, 2014). The classroom becomes a time for exploration of topics, group work, debates, and Socratic seminars, all to gain a richer understanding of the content (Siegle, 2014). Teachers facilitate the learning process, serving as a guide for inquiry,

challenging students' analytical thinking, broadening students' cognitive processes, and encouraging students to become agents of their own learning (Brown, 2016).

Deeper learning can be achieved in the flipped classroom model due to its learner-centered classroom environment (Das et al., 2019). The concept of the flipped classroom is based on the idea that students learn differently, and although it may work well for most students, some students cannot be ignored in their own ZPD. The components of the flipped classroom model must be explored equally to gain a full understanding.

For example, Das et al. (2019) noted that flipped learning might be appropriate in specific settings, such as lower elementary grades or individual units and lessons. However, this model may not be appropriate for entire class periods. The rationale behind this challenge is rooted in the idea that different students learn differently and have differing abilities that impact their abilities to acquire and apply knowledge. While many strategies focus on creating an environment that facilitates one-on-one learning and a dynamic environment that adapts to students' abilities, there are limits as to how flexible a classroom can be in order to accommodate students' diverse needs. Within this context, the flipped classroom has limitations and may pose challenges for specific learners in the classroom environment.

The majority of social sciences teachers enjoy teaching (Fitchett et al., 2014); however, a significant turnover rate exists. Secondary social science teachers could experience the same benefits of the flipped classroom that have been found in subject areas such as math and science (Hennick, 2014). Tomlinson (2017) stated that DI is an important consideration in inclusive secondary content learning. By implementing the flipped classroom model as a way to utilize differentiation, secondary social sciences teachers meet the future needs of their diverse student populations. This curriculum and instruction presents an appropriate and

powerful opportunity to address the 21st-century classroom, whereas the traditional model of instruction does not (Ross, 2014).

In the flipped classroom, as previously mentioned, work that the students typically would do at home is done during class time, and work that is usually performed in class is done at home (Siegle, 2014). There is in addition an enormous amount of classroom support available with as simple a technical tool as a laptop on every desk. Hennick (2014) has noted that at

> ...a growing number of K-12 schools, the use of 1-to-1 computing devices, including iPads, laptops, and Chromebooks, is becoming a central part of instruction...For teachers making the digital leap, one of the greatest hurdles can be figuring out how to manage the tech-infused classroom. How do you keep kids, who suddenly have the Internet at their fingertips, on task? (p.40)

Since the flipped classroom is a student-focused approach that facilitates increased and more effective one-on-one time, students are more likely to be engaged and remain engaged in the classroom. This will help combat the negative utilization of technology in the classroom that commonly occurs, which will help result in improved academic outcomes for students.

This flipped approach makes access to technology easier for students (Crouch, 2014). Since students are typically comfortable with technology, this increased access can be more effectively utilized to build on existing abilities and skills to achieve academic goals and objectives. Further, the flipped approach encourages inter-class communication. Three quarters of students specifically stated that they learned from their classmates during the increased time devoted to problem solving, and students performed equally as well or better than did students in previous years (Hennick, 2014). Internet sources on almost any subject are now readily

available to students. This access to material has enhanced the effectiveness of the flipped-classroom approach (Brown, 2016).

Heterogeneous classrooms have three fundamental flaws that the flipped-classroom can mitigate: (a) struggling students are left on their own to catch up; (b) advanced students are denied genuine growth; and (c) heterogeneous classrooms generally only address typical learning and learners. However, Brown (2016) contended that teachers who incorporate a flipped classroom model for learning feel re-energized by their heightened interaction with students. Class becomes more exciting for students and teachers alike in an environment in which students are engaged in hands-on activities such as making PowerPoint presentations of poems (Hennick, 2014). In an ideal flipped classroom, before coming to class, all students will have taken the time at home to engage with the material and process the content to the best of their ability; they will then bring their remaining questions to class (Brown, 2016). The class time will be utilized for analyzing rather than disseminating information. The growth in understanding and participation in the flipped experience are evident once the analytical thinking tasks begin through higher-level questioning; this is the foundation for the differentiated levels of learning (Das et al., 2019).

1:1 Initiative

Schools are increasingly implementing 1:1 programs to increase student achievement and performance (Beeson et al., 2014). The use of 1:1 programs within schools are growing as technological advances in education grows. However, school systems must provide the necessary technology to ensure success with the 1:1 initiative. In a survey of 364 leaders of large districts with 1:1 initiatives, researchers found that 33% believe the laptops were having a significant effect on student achievement, and another 45% believed they were having a

moderate effect. This somewhat troubling statistic indicates that 55% do not believe that there is a worthwhile effect of the initiative within the school system (Beeson et al., 2014).

The North Carolina State Board of Education gave an award to the Friday Institute of Educational Innovation. According to a study done by Corn, Tagsold, and Argueta (2012), the Institute was required to conduct an evaluation of North Carolina 1:1 Learning Technology Initiative (NCLTI) pilot schools for a period of three years (Gourneau, Holen, & Hung, 2017). This initiative ensured that every teacher and student received a Wi-Fi-enabled laptop computer. According to Corn et al., as referenced by Gourneau et al. (2017), when taken as a whole, the 1:1 initiative showed how technology could improve teaching methods and practices, leading to increases in student achievement scores. The use of technology helped prepare students for working, interacting, and communicating with people globally in the 21st century. The implementation of 1:1 initiatives can expose a lack of availability to lower socioeconomic students, especially if the students do not all have internet accessibility at their homes. It is important to note, however, that the overall purpose of the initiative was not to claim that a laptop or tablet had been given to all students, but that all students were academically ready to produce products that reflected their academic abilities, and no student was hindered because of his or her socioeconomic status (Gourneau et al., 2017).

Schools with effective and consistent use of technology have shifted to project-based learning and inquiry-based learning. Students are led to create their own learning methods in a learner-centered classroom, as opposed to the teacher-based model found in traditional schools (Hennick, 2014). Twenty-first century classrooms involve a vigorous culture of learning in which communities and technology combine to create innovative school environments for students and teachers. Within this context, the 1:1 initiative, when paired with technological

components, can be an effective approach to ensuring that students gain the knowledge necessary to achieve desired academic outcomes established by the teacher, school, or district (Beeson et al., 2014). In addition, the 1:1 initiative can be used to ensure that educators adapt to the advancements in technology used in the classroom (Ullman, 2014), making them more effective at ensuring that students are prepared for the use of technology in the 21st century.

Corn et al. (2012) continued to state that carefully implemented 1:1 programs can increase students' general learning outcomes, lead to increases in students' math and writing skills, improve attendance and engagement, and decrease disciplinary problems (Gourneau et al., 2017). The benefits of a 1:1 program are also evident in the at-risk population and among special education students, regardless of their racial, ethnic, or socioeconomic backgrounds (Anderson, Beaverson, Hahn, Hedenstrom, & Schwartz, 2015). However, it remains imperative to determine whether at-risk and special education students can, by this means, retain their leadership qualities through researching information and using technology as a tool to aid them in content comprehension. They may become more productive with group work, producing work similar to that of their not at-risk and general education peers, and improve their self-esteem as a result (Anderson et al., 2015). Many students have technical devices at their disposal in every other aspect of their lives, requiring educators to keep up with the possibilities of technology (Herreid & Schiller, 2013). In the 1:1 initiative, teachers are no longer the central resource for information in the classroom; instead, teachers act as guides toward knowledge and information (Anderson et al., 2015).

Gourneau et al. (2017) cited that in the NCLTI pilot schools, teachers were able to provide extra resources to support classroom learning through the laptop initiative. Special-needs populations, similar to traditional students, experienced higher quality note taking when

they had access to laptops (Ullman, 2014). Some teachers e-mailed students notes so the students could receive missing information. Thus, students were assured that they had accurate notes of topics discussed in class. Given the scale of investment in this area, there are indications that need firmer evidence. Use of the Internet with 1:1 programs has been shown to increase students' desire for learning, academic achievement, leadership roles, and especially civic participation by increasing the degree of political knowledge they possess. Beeson et al. (2014) emphasized that both students and teachers believe that the 1:1 initiative allows students to do their work more quickly and with improved quality. The 1:1 initiative's overall goals are not only to increase student engagement, but also to increase students' technical skills and access to curricular materials and digital information (Journell et al., 2015).

Measures including finding Wi-Fi enabled locations in the community—such as libraries and restaurants—and extending school media center hours (Kirsch et al., 2016) must be considered to support students without Internet at home. Course content can be downloaded at school for homework assignments prior to dismissal that day. Most schools offer after-school tutoring or homework labs, and many bookstores, coffee shops, shopping centers, and community facilities provide free Wi-Fi. Schools across the country are reporting improvement in day-to-day student outcomes (Kirsch et al., 2016). However, even with these considerations, the implementation of technology in classrooms may inhibit the ability of some students to effectively engage with and participate in the learning process. This may further deepen disparities in learning abilities, rather than bridge gaps through the use of technology, a problem that must be addressed before 21st-century classrooms can be successful.

Some students, especially those who are underprivileged, lack access to electronic devices, which are crucial for students to become competitive in work, in postsecondary

education, and in today's globally interdependent society. There is no question that technology is an integral component of modern society. Therefore, if students do not have a strong foundation on which to build their technological knowledge and skills, they will be unable to navigate society effectively. These varying levels of knowledge and skills must be taken into consideration when educators implement technology in the classroom; such factors must be accounted for effectively in frameworks such as 1:1 initiatives, particularly in social sciences. The Internet and other telecommunications options can contribute directly to transforming the process of teaching social sciences. The effective integration of technology will not only aid students in becoming outstanding academic scholars with the possibility of reaching their full potential but will also help teachers become more proficient at utilizing technological resources to transform social sciences teaching.

Analytical Thinking

Analytical thinking is the ability to break down multifaceted problems into single and controllable components. Teachers must ask questions that invite discussion rather than asking simple recall questions that are used to check if a student read a chapter. Learning how to develop such questions must become an aspect of the social studies curriculum (National Council for the Social Studies, 2016). Effective teachers give students the required learning material according to students' learning abilities and preferences (Jang, Kim, & Reeve, 2012). To engage the students, the material should offer relevant knowledge in both the negative and positive cases in accordance with the Socratic method. Experience with higher-level questioning serves as a platform for students to become analytical thinkers.

These thought-provoking questions represent higher levels of comprehension-based taxonomies, according to Kadir (2017) and require more thought and preparation. The 1:1

initiative incorporates the characteristics of a DI learning environment, in which a wide variety of instructional delivery methods are fostered to develop these analytical thinking skills (Robinson, 2014). The 1:1 initiative connects both knowledge and skills to avoid scenarios where the initiative becomes irrelevant or ineffective, which could be a drawback in creating successful schools (Bond, Nichols, & Zawacki-Richter, 2019). The development of analytical thinking skills using DI requires teachers to address many learning styles and to use a variety of instructional delivery methods to meet all learners' needs (Robinson, 2014). Students should ask each other higher-level questions in small groups to increase interactions and improve content understanding (Kadir, 2017). Social science education should provide experiential learning to students. A constructivist approach that empowers students to ask their own questions and seek their own answers fits well into the social studies curriculum.

Summary

Bond et al. (2019) identified an overall lack of methodological precision and validity regarding educational technology in general. They argued that decision makers contemplating the merits of educational technology are often forced to make decisions about the expenditure of millions of dollars with only weak and limited evidence. The 1:1 initiative allows a fully operational flipped classroom where DI can be provided. To investigate this phenomenon further, this dissertation consisted of an examination of the effect of the 1:1 initiative on students' school-wide performance level percentages among 11th grade U.S. History students. The study facilitated an analysis of school-wide performance level percentages among students over a linear time period of three years, further examining the presence or absence of an increase in performance level percentages in each subsequent year, beginning with the year prior to the implementation of the 1:1 initiative.

CHAPTER THREE: METHODS

Overview

This chapter provides an explanation of the methods of the research that was conducted to examine the effect of the 1:1 initiative on school-wide performance level percentages on secondary level U.S. History students, as compared to students in schools that have not implemented the 1:1 initiative. In this chapter, the procedures of the study are described, along with the details of the research design, data collection procedures, and the data analysis processes. It also includes a discussion of the ethical considerations involved in the study and details about the participant selection process. The purpose of this quantitative study was to investigate academic growth among secondary students in the social sciences engaged in the 1:1 initiative over a period of three years, compared to students who were not engaged in the 1:1 initiative.

Design

The purpose of this quantitative, longitudinal, descriptive study was to determine the impact of the 1:1 initiative on students' academic performance in social science classes. A longitudinal study design was selected in order to examine the long-term implications, over a time span of three years, of the 1:1 initiative on students' academic outcomes through the use of technological implementation by teachers. I chose a quantitative study design to determine the relationship between the independent variable and the dependent variable within the population. Quantitative research designs are used for descriptive research to establish only associations between variables (Graber, Kern, Killian, & Richards, 2018). Quantitative research deals in numbers, logic, and an objective stance.

Benade and Callaghan (2015) have noted that longitudinal studies employ continuous or repeated measures that involve the repeated collection of at least one data source at three or more points in time: in the present study, these measures included students' school-wide performance level percentages over three years after implementing the 1:1 initiative. Descriptive studies have an important role in educational research, greatly increasing educators' knowledge about what happens in schools. Descriptive research involves gathering data that describe events, then organizing, tabulating, depicting, and describing the data collection process (Grimes & Schultz, 2002). I employed a descriptive study design in order to involve the collection of quantitative information, which I then tabulated along a continuum in numerical form.

Common tenets associated with the implementation of a 21st-century classroom are as follows. Students are active in their learning process, learning should be in context, students build on prior knowledge to apply new knowledge, and student reflection should occur (Benjamin, 2014). An educator can use educational tools to support student-centered learning with all the resources of the Internet; therefore, no other digital devices are required within a 1:1 initiative. Within this study, the independent variable in the study was the 1:1 initiative; the dependent variable was the students' school-wide performance level percentages from the End-of-Course Exam of the secondary U.S. History students.

Research Questions

RQ1: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years?

RQ2: How does school-wide performance on the Kentucky End-of-Course U.S. History

exam change over time in secondary schools that utilize 1:1 technology initiatives between year two and year three of a 1:1 technology initiative, compared to schools that do not utilize 1:1 technology?

RQ3: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years compared to schools that do not utilize 1:1 technology?

Participants and Setting

The six schools sampled included three that implemented a 1:1 initiative and three schools that did not implement a 1:1 initiative. The three that did take part in the 1:1 initiative reported approximately 603 students' school-wide performance level percentages that were compared over a period of three years. The three schools sampled that did not take part in the 1:1 initiative produced approximately 638 students' school-wide performance level percentages, which I also compared over a period of three years. Thus, the participants in this study include all the secondary U.S. History students in attendance at the six chosen high schools during the period examined.

The same set of six selected schools was used for the three years of the study and included all students' school-wide performance level percentages from the EOC Exam for U.S. History in the KDE, irrespective of students' ethnicities, genders, or socioeconomic backgrounds. The study data only included the U.S. History EOC Exam student school-wide performance level percentages from the selected high schools.

The research setting for the current study was six total secondary schools. Each school is located within the United States, in the Commonwealth of Kentucky. The data collected was

of a secondary nature, designed to compare K-PREP U.S. History EOC data across three years of student school-wide performance level percentages starting the year before a 1:1 technology initiative was implemented and during the two subsequent years. The EOC academic performance level percentages were retrieved online from a public database. The results for the 1:1 schools included performance level percentages from 358 males and 333 females. The race/ethnicity mean of the sample included 450 Caucasian participants, 30 African American participants, 48 Hispanic participants, and 332 students entitled to free and reduced lunch. The school-wide performance data for the 1:1 schools consisted of 348 males, 350 females, and 316 students entitled to free and reduced lunch. The school-wide performance data for both sets consisted of students between the ages of 16 and 17 who were first-time U.S. History EOC test takers. Table 1 describes the demographics of the three secondary schools in the Commonwealth of Kentucky, based on their implementation of the 1:1 initiative, and Table 2 describes the demographics of the three non-1:1 secondary schools in the Commonwealth of Kentucky, also randomly chosen.

Table 1

1:1 Participant Demographics

	Male	Female	Caucasian	African American	Hispanic	Free/ Reduced Lunch
School A	84	70	151	6	6	87
School B	124	114	170	20	36	93
School C	150	149	282	4	6	152
Total Participants	358	333	603	30	48	332

Table 2

Non-1:1 Participant Demographics

	Male	Female	Caucasian	African American	Hispanic	Free/ Reduced Lunch
School D	155	154	297	3	6	158
School E	83	82	153	13	6	82
School F	110	114	188	8	4	76
Total Participants	348	350	638	24	16	316

Instrumentation

The instrument used in this study was the KDE EOC exam that the KDE uses to conduct standardized testing annually in order to measure academic performance. Every year, Kentucky secondary students enrolled in U. S. History courses are required to sit for the EOC exam. The purpose of this exam is to assess students' knowledge after completion of the U.S. History course in alignment with state standards of education (Mueller & Colley, 2015).

This exam was developed out of Senate Bill 1, enacted in 2009, requiring public school assessment programs beginning in the 2011-12 school year. The exam was developed by ACT, Inc. The exam results are calculated and categorized as novice, apprentice, proficient, and distinguished based on students' results in comparison to state standards for their grade level, 11th grade. A student scoring 143 or below is classified as a novice (N), 144-146 as apprentice (A), 147-153 as proficient (P), and 154 and above as distinguished (D) (Dickinson & Thacker, 2014). Students at the apprentice level have potential to succeed in college or a career with some support or remedial education (Dickinson & Thacker, 2014). The designation "proficient" indicates that students are ready for college level courses (Dickinson & Thacker, 2014). Students

who are classified as "distinguished" have the possibility of qualifying for academic scholarships to college (Dickinson & Thacker, 2014). The KDE, like most states, chooses to only test 11th graders in U.S. History, therefore limiting this study to 11th grade U.S. History EOC scores.

The data assessed in this research was collected using ACT, Inc.'s Quality Core EOC exam in U.S. History. The purpose of this instrument is to measure students' progress towards becoming college and career-ready in compliance with Kentucky's state law (Mueller & Colley, 2015). The purpose of the change in testing was to improve public school students' education to ensure that students gain the skills and knowledge necessary to enter college or a career when they finish high school. The state board of education chose to use ACT, Inc.'s Quality Core program for EOC exams. The state school board recommends that the EOCs should comprise up to 20% of students' final grades in the course, though they leave it up to individual school districts to determine how much the exam factors into the cumulative grade (Ferrara & Way, 2016).

The EOC exam in U.S. History is one testing instrument in ACT's Quality Core collection of assessment tools, which were developed to measure students' progress towards meeting Common Core learning goals nationwide. All of the tests were developed "based on research in high-performing classrooms that focus on the essential standards for college and career readiness" (KDE, 2017, para 5). ACT, Inc. states that it abides by the "Code of Fair Testing Practices in Education," which requires that companies use fair standards in practices in four areas: "Developing and selecting appropriate tests, administering and scoring tests, reporting and interpreting test results, and informing test takers" (ACT, 2014, p. 1). These standards are intended to prevent bias in testing instruments based on race/ethnicity, gender,

socio-economic status, and any other distinguishing factor that could result in one group unfairly scoring higher than another group.

McCoach, Rambo, and Welsh (2013) acknowledged three advantages of models that evaluate performance of student learning: (1) performance models are more equitable than are other measurement models, because schools vary greatly in terms of students' initial levels of achievement; (2) performance is less strongly related to socioeconomic status than is overall achievement; and (3) performance models allow schools to be recognized for improvements in student learning, acknowledging that the overall measured academic performance of the students in a given school is separate from growth in performance. Assessments of academic achievement enable assessment of students' explicit knowledge and skills in a particular content area.

Standardized assessments are used to estimate the effects of schools on student performance. The use of standardized assessments of student learning is commonplace in the United States and across many nations, particularly across the European continent (Education, Audiovisual, & Culture Executive Agency, 2009). Using data from one state in the U.S. demonstrated that, in both literacy and mathematics, performance was greater in students with initially low scores than in students with higher scores (Ready, 2013).

The state of Kentucky implemented EOCs as part of its statewide program, called "Unbridled Learning: College/ Career Readiness for All" (Fayette Country Schools, 2013). While these tests assess student performance, they are also believed to reflect on the efficacy of the educator to a large degree. However, Anderman, Gimbert, O'Connell, and Riegel (2015) have cautioned that student performance should not be too closely linked to teacher effectiveness due to a high potential for statistical errors that could skew the relationship between the teachers' effectiveness and student performance.

EOC tests are developed through a rigorous process that involves expert educators and analysts at each step of research and development. The ACT's Quality Core EOC assessments were originally developed based on a study the company conducted in collaboration with the Education Trust beginning in 2003 (ACT, 2014). The purpose of that study was to identify the instructional practices, courses, and degree of rigor that are most beneficial to students in their efforts to reach college readiness (ACT, 2014). The study resulted in a compilation of course standards, which were then reviewed by 300 teachers working at the highest-performing schools in the country.

The EOC assessment is modular and consists of either two multiple choice components with 35-38 items each, or one multiple-choice component with 35-38 items combined with a constructed-response component (ACT, 2014). The test is scored from 125, the lowest possible score, to 175, the highest possible score. On the multiple-choice section of the exam, the student's raw score is the total number of correct responses. The raw score is then scaled using statistical scaling models to ensure consistency of score (ACT, 2014).

Each multiple-choice item in the pool of possible items on the test is also coded according to the depth of knowledge (DOK) necessary for an accurate response. Level 1 items require the student to recall information learned, such as facts, terminology, and definitions of simple procedures. The point of these items is to have the student demonstrate his or her facility with rote response or the ability to perform a simple procedure (ACT, 2014). Level 2 items are more complex and require deeper mental processing than Level 1 items. Students must make decisions on how to solve a given problem. Level 3 items are the most complex and require students to demonstrate skill with strategic thinking, including planning, explaining, justifying, postulating, and using evidence (ACT, 2014).

The two constructed-response questions on the U.S. History EOC exam are scored based on a four-point scale (analysis item where a primary or secondary source document is used) and three-point scale (visual item where a graph, chart, or diagram is used). The responses are assessed based on how thoroughly the student addresses all parts of the task, the degree of insight into history principles and concepts demonstrated, the degree to which logical conclusions are supported by evidence and reason, and the degree to which the student communicates effectively and clearly (ACT, 2014). The raw score is multiplied by three, meaning that there are 21 total points possible on the constructed response section of the test. Each section takes 45 minutes to complete and can be completed using computer or paper and pencil. The test is scored by a group of professionals trained specifically in how to score the exams (ACT, 2014).

In addition, the state reports that the reliability estimates of the Cronbach coefficient alpha are provided for the overall testing population as well as by 50 gender, ethnicity, and other student breakout groups. According to the KDE, Cronbach's coefficient alphas are calculated as estimates of the internal consistency reliability. When individual items relate to the same concept (i.e., typically used as an indication of scale unidimensionality), then the scale will be more reliable. Generally, reliability estimates of .90 and higher are considered excellent, reliability estimates between .80 and .89 are considered good, and reliability estimates between .70 and .79 are considered adequate. The results in Table 3 show that the coefficient alphas for all scales are between .73 - .89, indicating adequate to good internal consistency reliability (Pearson, 2012).

Table 3

KDE Coefficient Alphas

Scale	# Items	*M*	*SD*	α
Curriculum & Instruction	13	2.26	0.36	.89
Formative & Summative Assessment	4	2.17	0.44	.78
Professional Learning	4	2.18	0.42	.73
Administrative / Leadership Support & Monitoring	7	2.21	0.43	.85

Note. Adapted from Pearson, 2012

Discussing the reliability and validity of the EOC tests, Dickinson and Thacker (2014) determined that the exam for U.S. History was 79.39% accurate in classifying students as novice, apprentice, proficient, or distinguished. In other words, in just over 20% of cases, the exam results will classify the student either higher or lower than his or her actual proficiency in the subject. In 2016, the KDE hired a firm to examine the validity of the EOC scores ranging from the 2012 through 2015 school years (Kentucky Department of Education, 2017). The analysts determined that EOC assessment scores have remained stable, supporting the validity of the EOC scores and resulting classifications.

The data for this research was drawn from Kentucky's data set on student school-wide performance level percentages on EOC exams in U.S. History. Since this study did not require using the instrument directly, there was no need to obtain permission from ACT, Inc. The dataset containing student academic performance on the Quality Core EOC exam in U.S. History is readily available on the KDE's website (Pearson, 2012). Since this information is free and open to the public, there was no need to gain permission to use this data.

Procedures

The purpose of this longitudinal descriptive study was to examine the effect of the 1:1 initiative on secondary social sciences student school-wide performance level percentages. Because the study involves information about a student population, I submitted a proposal to the Internal Review Board (IRB) for approval to ensure that the research procedures adhered to all the required codes and conducts of research. After approval of IRB Application 3609 (see Appendix A), I conducted the study with the approved procedures.

The ethical guidelines for using human participants, or any information about them, require participants to sign a form consenting to their participation in a research study (Armstrong, 2014). However, because all of the data collected in this study was gathered from the public database Kentucky Performance Rating for Educational Progress (K-PREP), this study did not include an ethical requirement to obtain participants' permission. No participants involved in the study were identified by name, only by demographics.

The study procedure consisted of collecting data from the K-PREP database in the form of 11th grade U.S. History EOC exam student school-wide performance level percentages from six high schools in the state of Kentucky that shared some similar demographics. This data was collected by the KDE and administered at the district level by public school districts across the Commonwealth of Kentucky. The data enables the KDE to compare student achievements across districts (NCES, 2015). This allows for the identification of problem areas and assists in determining which districts, based on collected data, showed improvements (NCES, 2015). While social science classes include a variety of students, I compared the sampling to ensure that there was a comparable number of students per class per dataset selected. The schools' data was gathered from K-PREP within the content specific U.S. History course and compiled

over three years, starting with a baseline the year prior to the 1:1 initiative. I also gathered a sampling of three other schools across the same years and with similar demographics, that have not implemented the 1:1 initiative, in order to further address the research questions and compare academic performance.

I did not collect any personal information about students during the course of this study. The student data collected from the K-PREP scores are already kept confidential. This ethical consideration is important because, otherwise, the data provided by the source of information would be biased and not accurate (Ritchie, Lewis, Nicholls, & Ormston, 2013).

Data Analysis

The data for RQ1 was analyzed by summing the Proficient and Distinguished percentages and comparing the baseline Proficient and Distinguished sum to year one of 1:1, and year two of 1:1. I carried out the data analysis in the present study using quantitative analysis procedures. I analyzed and compared the secondary data collected, consisting of the U.S. History EOC academic performance from six Kentucky high schools, beginning with the baseline year, during which no 1:1 initiative took place, to each subsequent year for the next two years. I also analyzed this data in comparison with the secondary schools not involved in the 1:1 initiative. This data analysis process facilitated the use of secondary data for the completion of this study. I compared student school-wide performance level percentages for each school for each year using the year prior to the 1:1 initiative as baseline data. Then I compared the same set to that of the non-1:1 schools. I also compared each school involved to itself before and after the implementation of the 1:1 initiative, and across the school years for the non-1:1 initiative schools. School-wide performance level percentages are calculated and categorized as novice, apprentice, proficient, and distinguished based on students' results in comparison to state standards for their grade

level, 11th grade. A student scoring 143 or below is classified as a novice (N), 144-146 as apprentice (A), 147-153 as proficient (P), and 154 and above as distinguished (D) (Dickinson & Thacker, 2014).

For RQ2, I completed comparisons between the school-wide performance level percentages for each school for each year conducted initially. In order to obtain these values, I pulled data, readily available on KDE, from the Excel program. Thus, I conducted the data analysis procedures in alignment with the study's research design and the methods finalized for the study. The data is provided by K-PREP testing.

For RQ3, I completed comparisons of the data for schools that participated in the 1:1 instruction program (data concerning RQ1) and schools that did not implement the 1:1 initiative (data concerning RQ2). I used the data provided by K-PREP testing to compare exam scores between the baseline year and the next two subsequent years to schools that do not utilize 1:1 technology.

CHAPTER FOUR: FINDINGS

Overview

This chapter provides the results of the investigation of the 1:1 initiative on student performance level percentages among secondary education U.S. History students engaged in the 1:1 initiative over a period of three years, providing for two points of comparison after the implementation of the initiative. This investigation compared the U.S. History EOC school-wide performance level percentages with those of schools that have not implemented the 1:1 initiative. In the first section, the results are provided at the school level, followed by analysis of the data based on gender, race/ethnicity, and free or reduced lunch status. Comparative analysis follows with a summary of results that responds to the research questions based on the findings from this primary research. The chapter concludes with a discussion of the results.

Research Questions

RQ1: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years?

RQ2: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between year two and year three of a 1:1 technology initiative, compared to schools that do not utilize 1:1 technology?

RQ3: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years compared to schools that do not utilize 1:1 technology?

RQ1: Analysis of Data for Schools Implementing the 1:1 Initiative

RQ1: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years?

Data was provided by the KDE (2015, 2016, 2017). The resulting school-wide performance level percentages included 2,074 responses across three schools and three school years, which were distributed approximately equally between female (1,000) and male (1,074) students. Most of the students, about 85%, were White (non-Hispanic) in their racial identity.

Performance at the School Level

The proportion of students who meet proficient or distinguished criteria represent those students who meet standards; by implication, each statistic also provides an understanding of the proportion that did not meet standards. This provided for simplicity and efficiency in the analysis, while focusing on and communicating findings based on strengths. Table 4 provides a summary for each of the schools (labelled A, B, and C) averaged by Year 1 and Year 2 in relation to the implementation of the 1:1 initiative.

Table 4

Proportion Proficient/Distinguished Results 1:1 by Year

School	Baseline	Year 1	Year 2
A	67.1%	70.4%	42.3%
B	50.9%	56.5%	63.0%
C	50.7%	60.4%	50.2%
Averaged	56.2%	62.4%	51.5%

Table 5 clearly shows that the results of the 1:1 initiative are inconclusive.

Table 5

Sum of Proficient and Distinguished Results: 1:1

School	Baseline	Year 1 and 2 Averaged
A	67.1%	55.8%
B	50.9%	59.7%
C	50.7%	55.3%
Averaged	56.2%	56.9%

In the baseline year, School A showed a higher rate of students meeting proficient and distinguished criteria. This increased by 3.3% in the first year after the implementation of the 1:1 initiative, and then plummeted to the lowest score in the second year after implementation. Just 41.3% of School A students in that year met proficiency and distinguished criteria. School B, on the other hand, showed steady improvement in the proportion of students meeting or exceeding the proficiency level, climbing from 50.9% in the baseline year to 56.5% (a 5.6% gain) the year after 1:1 implementation as seen in Table 4. Year 2 rose by 6.5%, which brought the numbers up to 63%, well above the Year 2 average of 51.5%. School C's baseline rate of 50.7%, climbed nearly 10% to 60.4% in Year 1, and fell backwards to below the initial level to 50.2% in Year 2. Overall, School A had the most dramatic variation in performance level percentages, followed by School B and School C. In all cases, there was considerable variation between years; however, this did not occur in a linear fashion, except in the case of School B. School A and School C showed lower performance level percentages two years after the implementation of the 1:1 initiative, despite great improvements after the first year. This variation is summarized in Table 6.

Table 6

Variation in Proportion of Students Found Proficient or Distinguished: 1:1

School	Variation between Year 1 and Baseline	Variation between Year 2 to Baseline
A	4.9%	-38.5%
B	11.0%	23.8%
C	19.1%	-1.0%

Gender

There were performance level percentages from 1,074 males and 1,000 females distributed across the three schools over three years. This analysis views the combined data set divided on the basis of gender as the independent variable. In the baseline year, the school-wide performance level percentages of the three schools by gender indicate 53% of females to be proficient or distinguished, compared to 59.5% of males. This represented the baseline year prior to the implementation of the 1:1 initiative. In the following year, there was an increase in both the percentage of males and the percentage of females who met the proficiency or distinguished criteria, with females gaining 10% for an averaged performance level percentage of 63% in Year 1 after implementation, and males gaining 2.6%. This brought the proportion of females who had achieved proficiency or distinguished performance to slightly higher than that of males, in contrast to the baseline year. The following year, however, the pattern did not hold. In fact, scores were lower than that of the baseline year, with just 48.6% of females achieving proficient or distinguished status (a loss of 14.4%) and only 53.9% of males (a loss of 8.2%). Table 7 summarizes these combined results of distinguished and proficient achievement from male and female students.

Table 7

Combined Percentage Results by Gender and Year

Gender	Baseline	Year 1	Year 2
Female	53.0	63.0	48.6
Male	59.5	62.1	53.9

While the trend was the same for both genders, female test takers showed a higher degree of variation over the three-year period. Whatever factor had these dramatic impacts in the dichotomous results found females more impacted than males in both the increase and reduction. Figure 2 shows a comparison of results by gender.

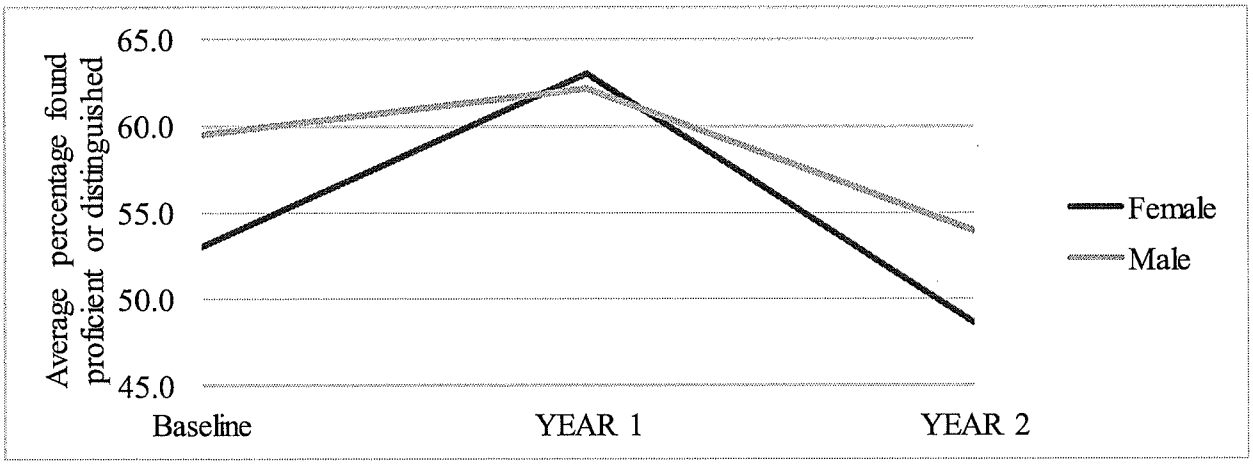

Figure 2. Comparison of results by gender.

Free and Reduced Lunch Status

While the intent in this section was to evaluate categories of students who faced increased risk of lower academic performance due to socioeconomic status or challenges, as was the case with race and ethnicity categories, several groups included too few students to permit calculation. These were: English Learners, Limited English Proficiency, Homeless, and Migrant. Only the Free and Reduced-price Meals group had enough students to report the findings, which are shown in Table 8.

Table 8

Proportion Proficient/Distinguished Free/Reduced-price Meals

School	Baseline	Year 1	Year 2
A	52.8%	61.6%	37.7%
B	30.8%	43.0%	49.5%
C	41.6%	47.0%	38.8%
Averaged	41.7%	50.5%	42.0%

There were performance level percentages from 332 students qualifying for free/reduced-price meals across the three schools over three years. In the baseline year, the school-wide performance level percentages of the three schools indicated 41.7% to be proficient or distinguished. This represented the baseline year prior to the implementation of the 1:1 initiative. In the following year, there was an increase in the number of free/reduced-price meals recipients who met the proficiency or distinguished criteria, gaining 8.8% for an averaged mean of 50.5% in Year 1 after implementation. This brought the proportion significantly higher in contrast to the baseline year. The following year, however, the pattern did not hold. In fact, scores were only 0.3% higher than that of the baseline year, showing an 8.5% drop following the 8.8% gain from Year 1.

Gifted/Talented Students

A related group are students that have been identified as gifted or talented. Of students that have been identified as gifted/talented, there was only a small dataset available based on one school in Year 2 after the implementation of the 1:1 initiative due to small student numbers in school populations. While this information is limited in scope and application, it is worth noting that 100% of students in this category achieved either proficient or distinguished level. Because data is only available aggregated by category and by school, it is not possible to investigate this with more depth and detail.

RQ2: Analysis of Data for Schools not Implementing the 1:1 Initiative

RQ2: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between year two and year three of a 1:1 technology initiative, compared to schools that do not utilize 1:1 technology?

Performance at the School Level

The schools not implementing the 1:1 initiative were chosen based on their similar demographics as Schools A, B, and C. Schools D, E, and F had similar minority populations, free/reduced-priced lunch, and female-to-male ratios as the 1:1 participating schools, and all six schools were located in the Commonwealth of Kentucky, and located in different geographic regions. Table 9 provides this summary for each of the schools (labeled as D, E, and F) and an average of Year 1 and Year 2 to compare the baseline with the change after the implementation.

Table 9

Sum of Proficient and Distinguished: Non-1:1

School	Baseline	Year 1 and Year 2 Averaged
D	59.1%	55.4%
E	58.7%	67.1%
F	70.8%	66.4%
Averaged	62.9%	62.9%

In the baseline year, School F recorded a rate of students meeting proficient and distinguished criteria of 59.1%. This decreased by 4.2% in the first year, and then increased again by 1.1%. The average performance for School D across the two years from baseline was 56.7%. School E showed steady improvement in the percentage of students meeting or exceeding the proficiency level, going from 58.7% in the baseline year to 60.3% in Year 1 (an increase of

1.6%), and 74% in Year 2 (an increase of 13.7%). Figure 3 presents the performance trajectories for the three schools from baseline to Year 2.

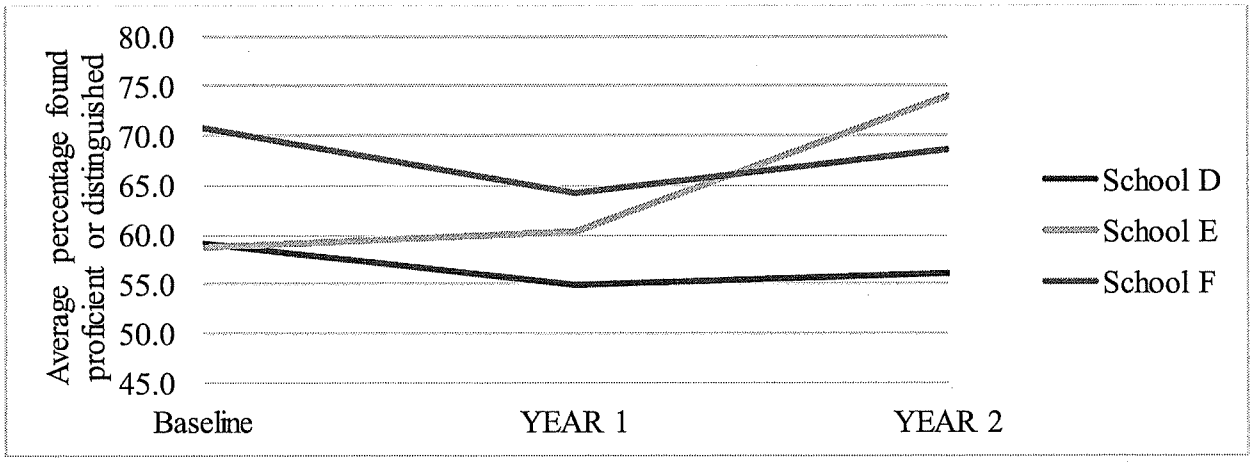

Figure 3. School performance.

The averaged performance for School E across the two years from baseline was 64.3%. School F had a higher performance of 70.8% at baseline, which decreased at Year 1 to 64.2%, and then increased again at Year 2 to 68.6%. The averaged performance for School F was the highest among the three schools at 67.9%. Across the three schools, there is considerable variation in performance between years, without regard to direction except for School E, which maintained a positive trajectory in performance scores. This variation is summarized in Table 10.

Table 10

Variation in Proportion of Students Found Proficient or Distinguished: Non-1:1

School	Variation between Year 1 and Baseline	Variation between Year 2 to Baseline
D	- 4.2%	+1.1%
E	1.6%	13.7%
F	- 6.6%	4.4%

Gender

There were 1,130 males and 1,079 females distributed among the three schools over three years. The results of performance by gender (for the aggregated Schools D-F scores) is presented in Table 11.

Table 11

Results by Gender (Schools D-F)

Gender	Baseline	Year 1	Year 2	Averaged
Male	60.6%	60.3%	69.6%	63.5%
Female	52.6%	60.6%	67.4%	60.2%

In the baseline year, when the school-wide performance level percentages of the three schools are averaged by gender, 52.6% of females and 60.6% of males were proficient or distinguished at baseline. In the following year, there was an increase in the number of females who met the proficiency or distinguished criteria to 60.6%, representing a gain of 8.0%, while the performance level percentage for males decreased very slightly (by 0.3%) to 60.3%. The proportion of females who had achieved proficiency or distinguished performance increased by another 6.8% to 67.4%. Thus, females maintained a trajectory of improvement in their performance across the two years from baseline, with an average performance level percentage of 60.2%. In the second year, the proportion of males who had achieved proficiency or distinguished performance increased by another 8.3% to reach 69.6%. Figure 4 shows the trend in performance for males and females in schools D, E, and F.

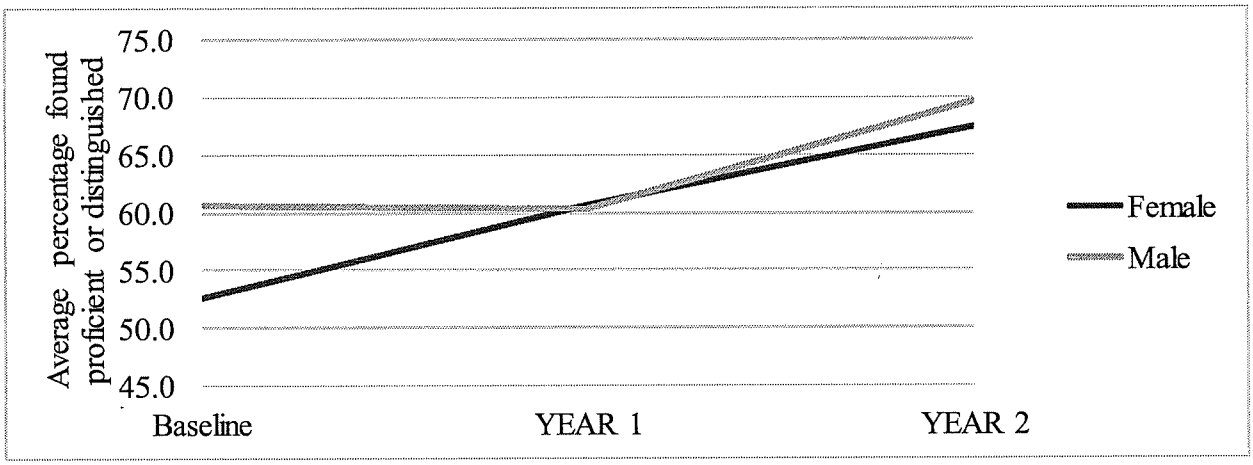

Figure 4. Comparison of results by gender: Non-1:1.

Free and Reduced Lunch

Students who qualify for free and reduced lunch represent a category of students who face socioeconomic challenges and, as a result, an increased risk of lower academic performance. Table 12 shows the proportion of students in this category who met proficient and distinguished criteria.

Table 12

Proportion Proficient/Distinguished Free/Reduced-price Meals

School	Baseline	Year 1	Year 2	Average
School D	52.8%	48.1%	54.1%	51.6%
School E	49.4%	56.1%	48.5%	51.3%
School F	51.6%	63.2%	60.5%	58.4%
Averaged means	51.2%	55.8%	54.4%	53.8%

RQ3: Comparisons

RQ3: How does school-wide performance on the Kentucky End-of-Course U.S. History exam change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years compared to schools that do not utilize 1:1 technology?

This section includes a comparison of data for schools that participate in the 1:1 instruction program (data concerning RQ1) and schools that do not implement the 1:1 initiative (data concerning RQ2). For the purposes of this comparison, schools A, B, and C will be designated as 1:1 schools, while schools D, E, F will be designated as non-1:1 schools.

Comparison by School Level Performance

Table 13 shows a comparison of the performances of the two categories of schools: 1:1 schools and non-1:1 schools.

Table 13

Percent proficient and distinguished, 1:1 Versus Non-1:1 Schools

	Baseline	Year 1 and Year 2 Averages
1:1 Schools	51.5%	60.2%
Non 1:1 Schools	62.9%	63%

The 1:1 schools had a cumulative performance—in terms of proportion of students meeting proficient and distinguished criteria—of 51.5% at baseline. This increased to 62.4% in Year 1, representing an increase of 10.9%. In Year 2, this performance level percentage fell by 6.2% to 56.2%. The non-1:1 schools had a higher level of performance at baseline compared to the 1:1 schools, with a performance level percentage of 62.9%. This performance level percentage fell by 3.1% to 59.8% in Year 1 but increased even more than baseline levels to 66.2% by Year 2. The non-1:1 schools have a stronger performance compared to 1:1 schools at baseline and at the end of Year 2, but not at Year 1. Due to the results from the analysis, the study finds that the 1:1 initiative did not improve student performance, consistently, over time.

Examining Size of Variations

The averages of these performance scores (56.7% for 1:1 schools and 63% for non-1:1 schools) show that the non-1:1 schools exhibit stronger performance cumulatively. Table 14 shows the size of the variations was also higher for 1:1 schools at -4.7 compared to -3.3 for non-1:1 schools, further confirming this finding.

Table 14

Comparison of Variation in Proportion of Students Found Proficient or Distinguished

Category	Variation between Year 1 and Baseline	Variation between Year 2 to Baseline
1:1 Schools	10.9%	- 6.2%
Non-1:1 Schools	-3.1%	6.4%

Performance of Trajectory for the 1:1 School Category

The goal of the 1:1 initiative is to improve the performance of the 1:1 schools. Looking at the levels of performance in the 1:1 schools is an effective way to evaluate that effect. Cumulatively, the 1:1 schools maintained improved scores above the baseline performance level percentage of 51.5%, indicating gains in performance, although this trajectory was not linear. Figure 5 graphs these findings.

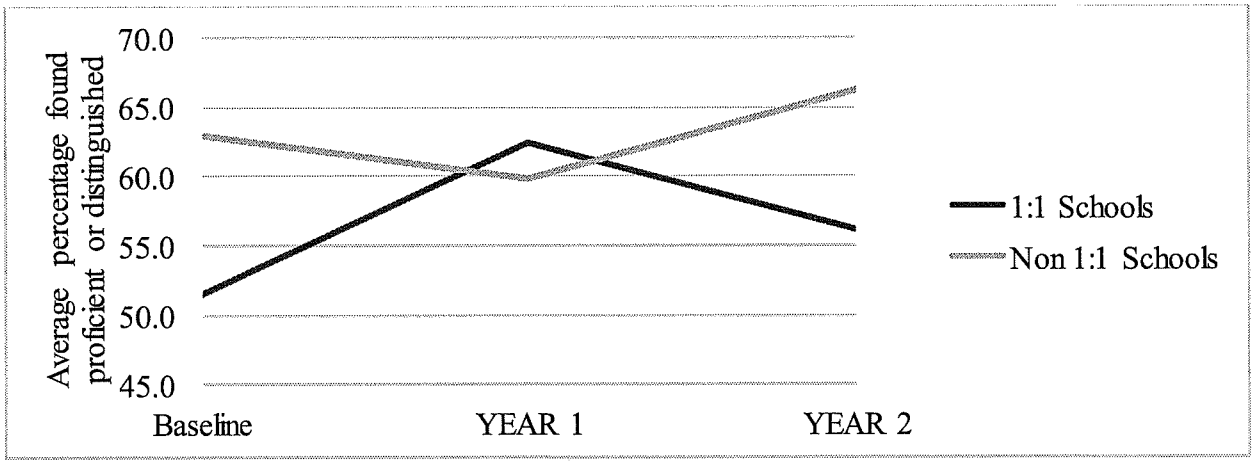

Figure 5. Performance trajectory for 1:1 vs non-1:1 schools.

Performance Trajectory for Respective Schools

Understanding the performance growth trajectory of each school in the 1:1 initiative is very important to understanding whether the initiative is having the desired impact at the respective schools involved. Table 15 presents a comparison of the scores of the six schools across both categories.

Table 15

Comparison of Schools Across 1:1 / Non-1:1 Categories

School	Baseline	Year 1	Year 2
A	67.1%	70.4%	41.3%
B	50.9%	56.5%	63.0%
C	50.7%	60.4%	50.2%
D	59.1%	54.9%	56.0%
E	58.7%	60.3%	74.0%
F	70.8%	64.2%	68.6%

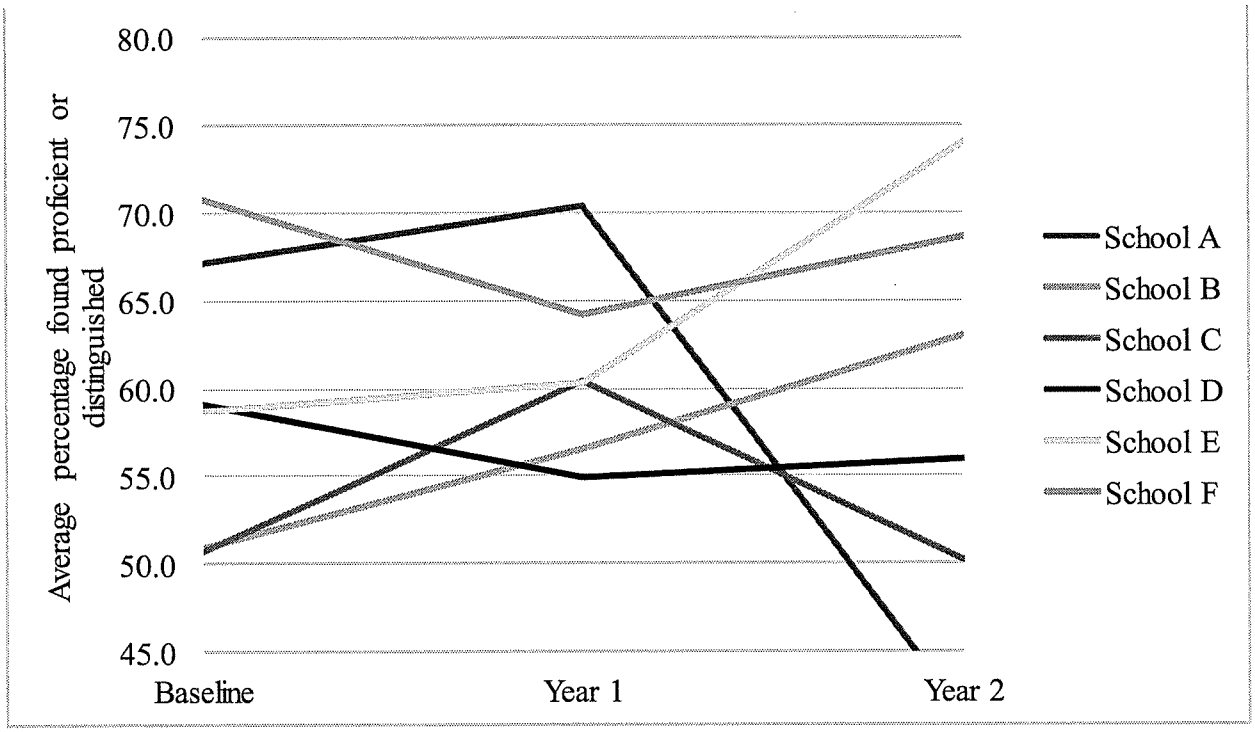

Figure 6. Performance trajectory for respective schools.

Figure 6 shows that School A was the second top performing school at baseline, after school F, but fell to have the lowest performance at Year 2 of 41.3%, representing a decrease in performance by 29.1%. This decrease in performance makes it necessary to identify the parameters of program implementation and consider the factors responsible for this failure to achieve. School B, on the other hand, maintained a consistent improvement in performance, increasing from 50.9% at baseline to 63% at Year 2. This consistency in performance makes it important to use this school as a model to identify what works. School C also recorded inconsistent performance, improving from 50.7% at baseline to 60.4% at Year 1 and then falling to a level of performance slightly lower than baseline at 50.2% in Year 2.

Comparison by Gender

Table 16 provides a comparison of the proportion of students by gender who met the proficient and distinguished criteria.

Table 16

Comparison by Gender Achieving Proficient and Distinguished Year 1-2

	Male	Female
1:1 Schools	53.9%	48.6%
Non-1:1 Schools	63.5%	60.2%

This table shows that a lower proportion of female students (48.6%) in the schools that implement the 1:1 initiative met the criteria for the proficient and distinguished levels of performance, compared to males (53.9%). The proportions of males and females that met the proficient and distinguished criteria for the non-1:1 schools were higher, at 63.5% and 60.2% mean average, respectively. Understanding the trajectory of growth based on gender is important and can be accomplished by examining Figure 7, which shows performance level percentages based on gender at baseline, Year 1, and Year 2.

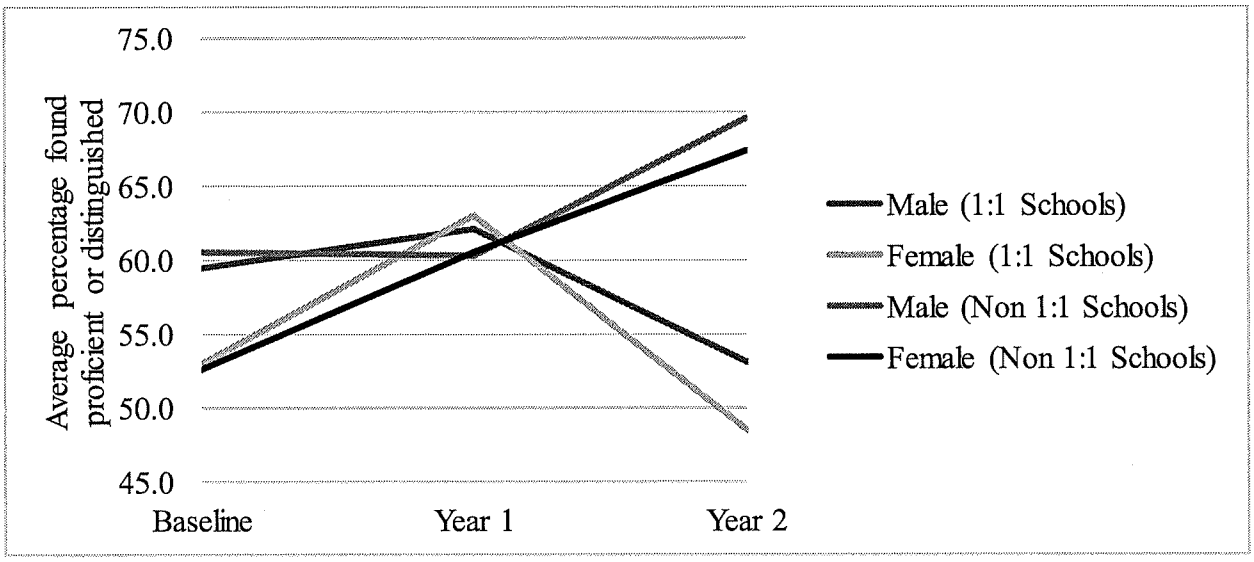

Figure 7. Scores based on gender at baseline, year 1, and year 2.

Figure 7 shows that the proportion of female students meeting proficiency and distinguished criteria for the 1:1 Schools increased from 53.0% at baseline to 63.0%, a noticeable 10.0% increase, and then fell back to below baseline levels: 48.6%. Similarly, the proportion of male students meeting proficiency and distinguished criteria for the 1:1 schools increased from 59.5% to 62.1% and then decreased to a level lower than baseline, 53.9%. By contrast, the trajectories for gender-based performance for females in non-1:1 schools was strong and consistent, rising from 52.6% at baseline to 60.6% at Year 1 and then 67.4% at Year 2. Similarly, the performance for males increased to 69.6% at Year 2 from a baseline 60.6%, with only a very slight dip of 0.3% at Year 1.

Comparison by Free/Reduced Lunch Status

Table 17 provides a comparison of the averaged school-wide performance level percentages of the students who qualify for free and reduced lunch from the 1:1 schools and non-1:1 schools who met proficiency and distinguished criteria.

Table 17

Comparison of Averaged Means Free/Reduced-price Meals

	Baseline	Year 1	Year 2
Free/Reduced-Price Meal 1:1 Schools	41.0%	50.5%	42.0%
Free/Reduced-Price Meal Non-1:1 Schools	51.2%	55.8%	54.4%

Table 17 shows that the percentage of students in this category increased from a baseline of 41.0% by 9.5% to 50.5% in Year 1, but decreased again by 8.5% to 42.0%, slightly above baseline level, for the 1:1 schools. By contrast, the students in the non-1:1 schools achieved an increase of 4.6% from the baseline of 51.2% to 55.8% in Year 1, but only a slight decrease of 1.4% to achieve a performance level percentage of 54.4% at Year 2.

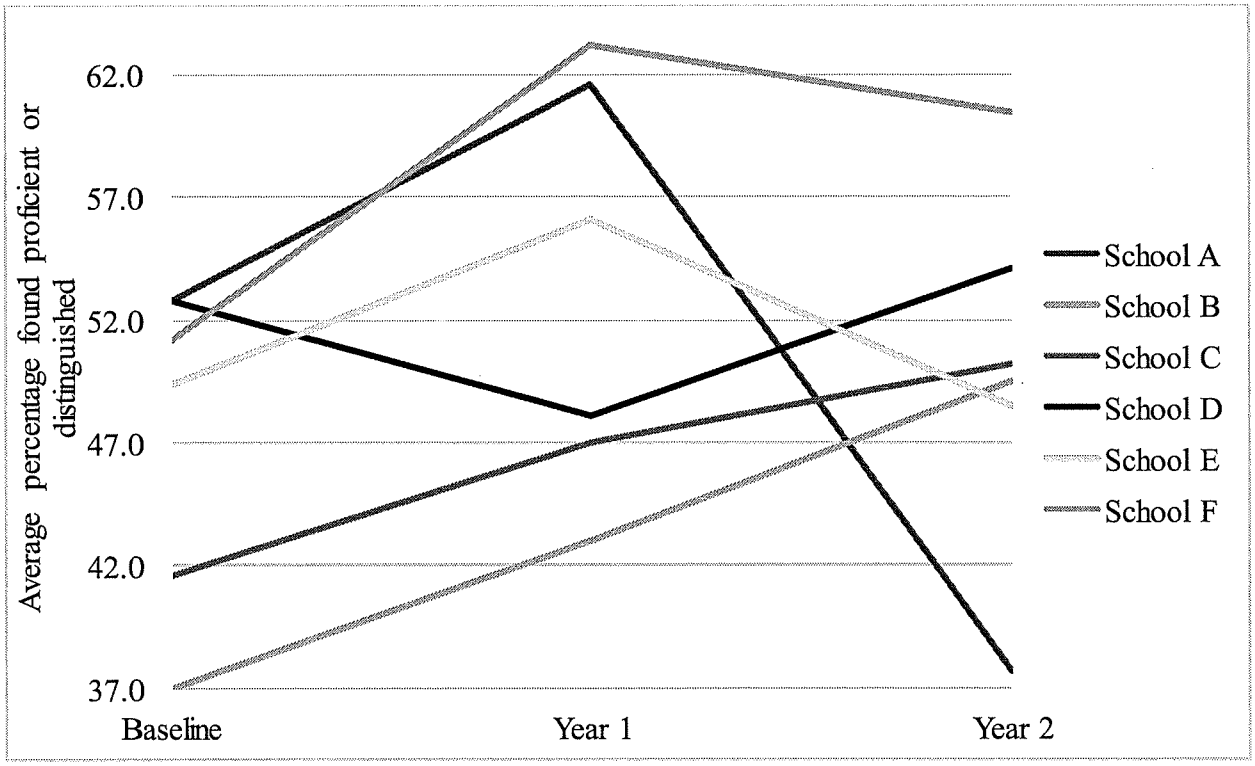

Figure 8. Scores based on free/reduced lunch status at baseline, year 1, and year 2.

Figure 8 shows that performance level percentages for School A rose from 52.8% at baseline to 61.6% at Year 1 but declined to a very low 37.7% among this group of students. The performance level percentages for School B maintained a consistent growth trajectory of 30.8% at baseline, to 43.0% at Year 1 and 49.5% at Year 2. The performance level percentages for School C increased from 41.6% baseline to 47.0% at Year 1 but declined at Year 2 to 38.8%. The performance level percentages for School D declined from 52.8% at baseline to 48.1% at Year 1 but rose again to 54.1% at Year 2. The performance level percentages for School E increased by 6.0% from 49.4% at baseline to 56.1% at Year 1, and thereafter declined to 48.6% at Year 2. The performance level percentages for School F increased by 11.6% from 51.6% at baseline to 63.2% at Year 1, and then declined by 2.7% to 60.5% at Year 2.

Summary and Application

The bidirectional differences do not seem to have a pattern of improvement or reduced performance after the implementation of the 1:1 initiative. Some other variable appears to be more influential in terms of the EOC U.S. History results for this sample; in particular, it appears that there may be a confounding variable which resulted in bidirectional data between Year 1 and Year 2.

Despite inconclusive findings, descriptive statistics did reveal differing shapes to data trends which might have been significant at the level of individual record sets; however, this data was not available. Possible confounding effects may have occurred in the first year after implementation as well. The EOC Exam school-wide performance level percentages and demographics all provide evidence of differences; however, these differences do not follow along a simple conclusive pattern which shows improvement (or regression) over the three-year period.

CHAPTER FIVE: CONCLUSIONS

Overview

This chapter offers a comprehensive discussion regarding the results of the current study in relation to the 1:1 initiative and school-wide performance level percentages among secondary school U.S. History students within the state of Kentucky. The results of the study were produced in Chapter 4. The implications of the findings are discussed as well as the limitations of the current study. Finally, this chapter will conclude with recommendations for future use of 1:1 initiatives.

Discussion

Implementing technology into the public school classroom has been the focus of abundant research. Schools have tried various ways to integrate computers in the classroom in order to prepare students for a technology-rich life after high school graduation with growing trends of online distance classes and technology-based career training (Keppler, Weiler, & Maas, 2014). Currently, a plethora of school districts invest time and resources to integrate technology programs into their practice, but more research is also necessary to measure the impact of technology, such as the implementation of 1:1 initiatives, on student academic performance. The purpose of this investigation was to explore the impact of 1:1 initiative environments on the school-wide performance level percentages among secondary school U.S. History students. The study included six schools, three who implemented a 1:1 initiative and three schools that did not implement a 1:1 initiative. The three that did take part in the 1:1 initiative reported approximately 603 students' school-wide performance level percentages which I compared over a period of three years. The three schools sampled that did not take part in the 1:1 initiative produced approximately 638 students' school-wide performance level percentages, which were

compared over a period of three years. The data gathered for this research project indicates the implementation of the 1:1 initiative at various Kentucky public secondary schools did not produce results on the school-wide performance level percentages among secondary school U.S. History students to support the 1:1 initiative within the U.S. History courses.

The inclusion of 21st-century learning practices in the classroom, such as the 1:1 initiative, is to escalate student engagement, to equip students with 21st-century college and workplace skills, and to proliferate student achievement, which can be measured by testing such as the KDE U.S. History EOC Exam. Technology use in the learning environment, one example of DI for today's diverse learner, has been effective with increasing class participation because students are familiar with technology tools through their use of the Internet, electronic games, cellular phones, tablets, and computers (Armstrong, 2014). Content areas such as mathematics and science have shown positive increases in academic performance and growth with the incorporation of technology, such as 1:1 programs when flipped learning and other 21st- century classroom learning takes place (Hew & Cheng, 2016).

This study was conducted to determine whether the 1:1 initiative resulted in positive school-wide performance level percentages among secondary school U.S. History students, as measured by standardized testing, within the social sciences curriculum. There is limited research exploring learning environments in social science classes and none specifically target school-wide performance level percentages among secondary school students. As such, the current study explored the impact of the 1:1 initiative specifically related to students as it specifically related to students enrolled in U.S. History courses, using KDE U.S. History EOC Exams to measure school-wide performance level percentages. A review of the literature suggests technology is needed in classrooms to prepare students for success in an ever-changing

global society. In addition, when technology was embedded in classroom instruction, student performance and achievement increased (Beeson et al., 2014). The research discussed in the review of the literature regarding 1:1 initiatives both support and conflict with many of the findings in this current study.

A previous study on grades seven through nine, conducted by The Abell Foundation in 2008, reported that 1:1 initiatives did not increase student engagement and academic performance. These findings spoke to the classroom environmental impact of a 1:1 initiative. According to the Abell Foundation's study, there were no statistically significant gains in the state assessment performance of students in two of the three states studied. These findings parallel with the results of the current study. The third state that was part of the study, similarly, reported that social studies scores on the state tests had either no statistically significant effect or any impact was inconclusive. The Abell Study supports the findings of the current study, indicating no statistically significant connection to show that traditional state test assessment increased as a result of a 1:1 initiative. Similarly, Fried (2008) reported that a 1:1 initiative did increase student interest in learning, but did not share a statistically noteworthy link to improving student academic achievement. Furthermore, Fried discussed a concern that the lack of focus on technology integration into the classroom setting is proving to be an obstacle with the adoption of 21st-century learning and academic achievement. Some studies have found no differences in student engagement and achievement attributable to 1:1 laptop initiatives (Hu, 2007; Shapley Sheehan, Maloney, & Caranikas-Walker, 2011). This is further discussed in future recommendations.

Findings for Research Question One

To date, no research has been conducted specific to 1:1 initiatives and school-wide performance level percentages among secondary school in the social sciences curriculum. Studies have been done on other content areas and the impact of a 1:1 initiative, but not in social sciences. Previous research suggests that one-to-one laptop programs tend to have a positive effect on science achievement (Dunleavy & Heinecke, 2008; Hur & Oh, 2012) and mathematics achievement (Grimes & Warschauer, 2008; Rosen & Manny-Ikan, 2011). Some studies suggested either no effect or a negative effect on mathematics achievement (Dunleavy & Heinecke, 2008).

In this study, the results of the first research question was inconclusive at best. While the 1:1 initiative schools' performance percentages showed large gains from the baseline year to Year 1 of implementation compared to the non-1:1 initiative schools in the percentage of students, the percentages showed not only no further increase with Year 2, but also a regression in Year 2 among the 1:1 initiative schools. While the first year of the 1:1 initiative was marked by sustained preparation and immediate favorable outcomes, the start of the second year manifested initial challenges in line with Swallow's (2015) findings.

The results provide an understanding on what might be happening in relation to the 1:1 initiative and suggest that school-wide performance level percentages among secondary school U.S. History students are statistically unaffected by the 1:1 initiative. Research suggested the second year of 1:1 initiative programs manifested difficulties and struggles which significantly contrasted with the first year of implementation. According to Alberta Education (2010), a limited number of studies suggested that the experiences of a 1:1 initiative are not continuously positive and highlighted the second year as a particular struggle. As a result, the visualization of

a linear, positive experience transforms to include a decline during the second year of a 1:1 technology initiative (Swallow, 2015).

Although the overall school-wide performance level percentages were higher for the 1:1 initiative schools in Year 1, this increase was not sustained in Year 2. Overall school-wide performance level percentages among secondary school U.S. History students did not change over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years compared to schools that do not utilize 1:1 technology. The difference in performance was improved at the start for the 1:1 initiative schools but the improvement was not considerable after Year 1. The gains reported for RQ1 initially showed a positive impact of percentages increasing by 3.3% in the first year after the implementation of the 1:1 initiative in School A, 5.6% the year after 1:1 implementation in School B, and nearly 10% in School C. Therefore, according to this analysis, the use of a 1:1 initiative for the purpose of increasing school-wide performance level percentages among secondary school U.S. History students did initially have an effect on student academic performance as indicated by school-wide performance level percentages on KDE U.S. History EOC standardized tests. However, between the Baseline year and Year 2, there was not any increase in school-wide performance level percentages.

Findings for Research Question Two

Research Question Two explored how school-wide performance on the Kentucky EOC U.S. History exam changes over time in secondary schools that utilize 1:1 technology initiatives between Year 2 and Year 3 of a 1:1 technology initiative, compared to schools that do not utilize 1:1 technology. The theoretical framework of this study suggests that there would be an increase over time with the implementation of the 1:1 initiative, specifically due to routine use

and understanding of technology among students. The theoretical framework is based off Vygotsky's sociocultural learning theory where all students' academic performance and achievement will increase as they utilize technology to build upon their ZPD. The interaction with the 1:1 initiative is expected to influence the students' performance level percentages on the K-PREP EOC, giving students the ability to work from the point of their understanding and to grasp the content at their own pace in a way they can understand (Watts-Taffe et al., 2012).

Contrary to the theoretical framework of this study, the school-wide performance level percentages among secondary school U.S. History students between Year 2 and Year 3 displayed a decrease in performance level percentages among the implemented 1:1 initiative schools after a noticeable increase had been achieved between the Baseline Year and Year 1. The reasons for the differences in Year 1 and Year 2 are inconclusive. The non-1:1 schools showed no such decline in school-wide performance level percentages among secondary school U.S. History students, leaving to reason that after Year 1 implementation, school-wide performance level percentages among secondary school U.S. History students showed parallel school-wide performance level percentages between both 1:1 initiative schools and non-1:1 schools.

According to a study done by Corn, Tagsold, and Argueta (2012), the North Carolina State Board of Education conducted an evaluation of North Carolina 1:1 Learning Technology Initiative (NCLTI) pilot schools for a period of three years (Gourneau et al., 2017). This initiative ensured that every teacher and student received a Wi-Fi-enabled laptop computer. According to Corn et al., the 1:1 initiative showed how technology could be used to increase student achievement scores. 1:1 initiatives, particularly when paired with technological components, can be an effective approach to ensuring that students gain the knowledge

necessary to achieve desired academic outcomes established by the teacher, school, or district (Beeson et al., 2014). Corn et al. continued to state that carefully implemented 1:1 programs can increase students' general learning outcomes, compared to non-1:1 schools, leading to increases in students' math and writing skills (Gourneau et al., 2017).

Gulek and Demirtas (2005) analyzed the data from grade point averages (GPAs), end-of-course grades, writing test scores, and state-mandated norm- and criterion-referenced standardized test scores in ELA, mathematics, and writing for students with and without 1:1 laptops in the same middle school. Using *t*-tests and longitudinal linear mixed-modeling, they found that students who participated in the 1:1 laptop program attained significantly higher test scores and grades for writing, ELA, mathematics, and overall GPAs. However, results from a study done by Dunleavy and Heinecke (2008) found that 1:1 laptop instruction improved student science achievement, but there was no significant effect observed in mathematics attainment. The reasons for these results were inconclusive.

Bebell and Kay (2010) compared the students and teachers of five schools participating in the 1:1 laptop Berkshire Wireless Learning Initiative with two comparison schools. Comparing student and teacher survey results with test scores, Bebell and Kay performed bivariate correlation analyses. They also developed linear regression models to determine the overall program effect on student performance in the state standardized tests for English language arts (ELA) and mathematics. The 1:1 laptop student score increases were found to be statistically greater than those in the non-1:1 setting in ELA, but not mathematics. The Berkshire Wireless Institute findings were also inclusive with the theoretical framework of this study.

North Carolina State University conducted a study concerning 1:1 technology program initiative across multiple states that produced authentic feedback from educators who were

involved in the 1:1 technology program. Participants from the study reported generally positive relationships between the 1:1 technology program's learning environment and the teaching and learning process. The findings also indicated a shift from traditional, teacher-centered instruction to a more student-focused learning environment, which led to a more positive learning experience from the students. The overall findings of the study indicated increased student motivation and engagement due to the 1:1 technology program initiative and resulted in subsequent increases in achievement (Argueta, Huff, Tingen, & Corn, 2011).

According to Balanskat, Bannister, Hertz, Sigillò, and Vuorikari (2013), the European Commission analyzed 31 recent 1:1 initiatives that involved 47,000 schools and 17,500,000 students in K-12 education from 19 European countries. Almost all of the initiatives in the European study found that motivation increased in 1:1 classrooms. However, the bulk of studies showed that there were little or no increases in academic achievement associated with the 1:1 initiatives.

Several studies have been conducted to evaluate the influence of 1:1 laptop initiatives on student engagement, but the results of these assessments have been inconsistent (Cassandra, 2017). However, other researchers have found that student achievement and engagement are enhanced in schools that have implemented 1:1 laptop initiatives (Marzano & Waters, 2009).

Findings for Research Question Three

Question three explored how school-wide performance on the Kentucky EOC U.S. History exam changes over time in secondary schools that utilize 1:1 technology initiatives between the baseline year and the next two subsequent years compared to schools that do not utilize 1:1 technology. The theoretical framework for this study would suggest that each year, especially among the schools implementing a 1:1 initiative, there would be a continual growth

with school-wide performance level percentages. According to Rosen & Manny-Ikan (2011) throughout the past decade, aligning with Vygotsky's sociocultural learning theory (the basis of this study's theoretical framework) schools and classrooms throughout the United States have touted the ability of 1:1 technology initiatives to be tailored to individuals' needs through their ZPD with personalized learning. Personalized learning, a concept that aims to tailor instruction to individuals' learning needs, has been widely embraced by both schools and the lay public (Rosen & Manny-Ikan, 2011).

The United States reports on 1:1 technology initiatives emphasize overall favorable results throughout (Swallow, 2015). In their recent study into laptop use and standardized test scores, Kposowa and Valdez (2013) used bivariate and multiple regression analyses plus independent sample *t*-tests to examine data from an elementary school. Their results overall indicated that students with 1:1 laptops performed considerably better than those without in ELA, mathematics, and science. Individual schools and whole school districts are currently investigating the concept of 1:1 initiatives, particularly in STEM education (Miller, Krockover, & Doughty, 2013).

However, social sciences are still lacking in research, the area in which this study was designed to help fill the gap in literature. The social science scores did not show a meaningful overall change among school-wide performance level percentages. Research on the topic of 1:1 initiatives and school-wide performance level percentages among secondary school U.S. History students is insufficient at best. There is no circumstantial evidence available to supplement this research study to help explain why school-wide performance level percentages among secondary school U.S. History students in the 1:1 initiative stayed unaffected, such as teacher proficiency

and instructional practices, daily use of the 1:1 initiative, or student attitudes with the 1:1 initiative implementation.

Implications

Earlier research studies exploring the impact of 1:1 initiatives on student performance and achievement have produced varied results, specifically in courses such as the sciences and mathematics. The findings of this study suggest that the 1:1 initiative does not increase student performance nor create an achievement gap between schools implementing the 1:1 initiative and those schools who have not implemented the 1:1 initiative, specifically when it pertains to performance on KDE U.S. History EOC Exams, with the exception of the implementation year. Prior research involving 1:1 initiatives within various content areas suggests that technology is an essential component of learning in 21st-century classrooms, specifically in ELA and science. Further research must be conducted to explore variables beyond accessibility and explore the most effective ways to go further than accessibility placing a stronger concentration on the most effective ways to implement technology to transform learning in a way that gets students ready to meet the demands of a 21st-century learning environment.

Even though this study found no increases in achievement for students who were educated by the means of a 1:1 initiative learning environment as compared to those who were not, the results do contribute to the current knowledge of 1:1 initiatives by providing information regarding the 1:1 initiative and its impact on U.S. History EOC exams. There are factors unknown to account for the high increase between the Baseline year and Year 1 which could have played a role in the academic school-wide percentages with Year 2. A quantitative study by Donovan, Green, and Hartley (2010) explored configurations of technology use in a 1:1 learning environment, showing a range of off-task behaviors as a result of technology use. They

concluded that increased access to technology does not always equate to increased student engagement (Donovan et al., 2010). It is understandable that at the start of a new technology initiative there are technical or logistical challenges with the integration of a new learning tool (Drayton, Falk, Stroud, Hobbs, & Hammerman, 2010) and research across initiatives cited common barriers such as time, professional development, and access (Daniels, Jacobsen, Varnhagen, & Friesen, 2014; Storz & Hoffman, 2013).

The potential for a 1:1 initiative program to improve academic school-wide percentage performances in schools is evident from both previous research and the findings of the schools implementing the 1:1 initiative between the baseline year and Year 1. Reports that some districts and schools have abandoned 1:1 computing illustrate the necessity to understand the experiences of technology initiatives on an incremental scale (Swallow, 2015). High schools and colleges with teacher preparation programs should focus on 21st-century learning and teaching skills to prepare students for learning around teaching with technology, as well as professional development for teachers already in the classroom. Teacher preparation programs need to teach how to integrate technology in the classroom effectively to prepare students to be digital citizens in a global environment.

Limitations

The ability to generalize the findings of this study were hindered due to various reasons. KDE only provided school level percentage data. No statistical testing could be performed, so no statements can be made about statistically significant findings. Findings were partially limited due to the participants. The data was not disaggregated in such a way as to look for trends in student groups. Racial/ethnic differences could not be examined since the subgroup sizes were too small for the state to report those percentages. The participants were dominantly

Caucasian and lacked diversity beyond socioeconomic status and gender. The study would provide more findings and a greater level of data if the population reflected ESL learners and various minority groups with respect to race, religion, and ethnic differences.

The findings of this study cannot be generalized beyond this population. All of the participants were from the same geographic region and lacked diversity within the school settings. Therefore, the findings of this study are not a representative reflection of the entire U.S.

The data compiled in the current study were self-reported to KDE based on standardized testing and did not include stakeholders' perspectives and understanding of the 1:1 initiative. Additionally, factors such as how the 1:1 initiative was implemented and utilized within the U.S. History classrooms to provide instruction and learning is necessary for the broader understanding of the students' academic school-wide percentages. Furthermore, there was no direct observations of the teachers integrating technology into their daily instruction.

Based on the limitations of student performance level percentages on the EOC exam and knowledge of each U.S. History teachers' technology integration, the findings of this study regarding the influence on teacher technology integration and student performance level percentages on the EOC exam cannot be generalized. In their analysis of the criticism leveled at 1:1 initiatives, Weston and Bain highlight the fact that most 1:1 initiatives provide little or no sustained and scaled effects on teaching, learning, and achievement is symptomatic of the failure of most educational initiatives period, aimed at change, innovation and reform (Weston & Bain, 2010).

Recommendations for Future Research

This study encompassed a three year period, with the first year being the baseline year, meaning that the 1:1 initiative had not yet been implemented. Therefore, the study only had two years of data for analysis. The following are recommendations for future research.

1. Expand the number of years in the longitudinal study to five years or more, further authenticating or disputing these results through the decisive goal of quantifiable, increased school-wide performance level percentages among secondary school U.S. History students. A study encompassing at least five years of implementing 1:1 initiatives, or longer, would be beneficial, especially one that includes a more detailed and consistent use of the 1:1 initiative within the social sciences classroom.
2. Research 1:1 initiatives throughout various and multiple geographic regions within the U.S. in order to get a more accurate and equal depiction from schools that are considered urban, rural, and suburban in order to encompass as much diversity intercontinentally as feasible.
3. Questionnaires, surveys, or interviews should be implemented in future research to gather from participants suggested factors or processes which could be present in order to better support their learning process and engagement through the 1:1 initiative in the social sciences content area. Designing a study that emphasizes best instructional practices with an implemented 1:1 initiative will help educators and school systems identify the various forms of differentiated instructional strategies and activities that create the most effective 1:1 learning environment.
4. Conduct interviews and surveys concerning student perceptions of the 1:1 programs and how they believe the programs influenced teacher practices and their learning.

Interviews should include the specific teacher practices of integrating the 1:1 initiative in their classrooms. As 21st-century skills endure and are made more readily available, exposure and usage will increase, for students, teachers, and all stakeholders. Therefore, teacher preparedness and willingness should be addressed and investigated as well.

5. Expand the research to include a diverse population of participants among diverse settings for more information about 1:1 initiatives and school-wide performance level percentages among secondary schools in social sciences curriculum. Include a broader demographic and socioeconomic sample of students who participate in a 1:1 initiative. The constricted demographic sample can undoubtedly be expanded and should involve all core social sciences content as well as a broader and more diverse demographic of students.
6. Expand the study including more than just KDE U.S. History EOC exams. Incorporate a broader range of information to include grades on individual classes, scores on other standardized tests aside from KDE U.S. History EOC exams, and include the SAT, PSAT, and teacher feedback on student academic performance.

Research on the topic of 1:1 initiatives in the educational classroom is vital. Society is increasing its use of technology through laptops, tablets, and smartphones in day-to-day lives and in the classrooms, with less usage of textbooks and written materials.

Summary

This study addresses the gap in the literature regarding 1:1 initiatives in secondary social sciences. The current research is a longitudinal study that examined 1:1 initiatives and serves to encourage teachers to improve their practices, schools to invest in teachers' and students'

training with more 21st-century based technology programs, and teacher preparation programs to invest more training into 21st-century classroom preparedness. However, there remains a lack of conclusive data to support that technology, such as 1:1 initiatives, enhances school-wide performance level percentages among secondary school U.S. History students.

Prior research specific to school-wide performance level percentages among secondary school U.S. History students as it relates to 1:1 initiatives is lacking in the literature. The results of this study indicate school-wide performance level percentages among secondary school U.S. History students appear to be positively impacted only in the first year of the 1:1 initiative. In closing, this study sought to identify what relationships exist between school-wide performance level percentages among secondary school U.S. History students and a 1:1 initiative. This research sets the groundwork for further studies that could foster a longitudinal study to better understand the impact of the 1:1 program over time. There is a deficiency in the research within the area of the implementation procedure and also the social sciences, in which much is left to still be studied and discovered about how school-wide performance level percentages among secondary school U.S. History students can be realized with the integration of 1:1 initiatives.

REFERENCES

The Abell Foundation. (2008). *One-to-one computing in public schools: Lessons from "laptops for all" programs*. Retrieved from https://archive.org/stream/ERIC_ED505074/ERIC_ED505074_djvu.txt

ACT. (2014). *ACT quality core: Technical manual.* Retrieved from https://www.act.org/content/dam/act/unsecured/documents/QualityCore-TechnicalManual.pdf

Alberta Education. (2010). *Emerge one-to-one laptop learning initiative: Year two report.* Edmonton, AB, Canada: Alberta Education.

Anderman, E. M., Gimbert, B., O'Connell, A. A., & Riegel, L. (2015). Approaches to academic growth assessment. *British Journal of Educational Psychology*, *85*(2), 138-153.

Anderson, D., & Cook, T. (2014). Committed to differentiation and engagement: A case study of two American secondary social studies teachers. *Journal of Social Studies Education Research*, *5*(1), 1-19. Retrieved from http://jsser.org/article/view/1045000154

Anderson, S., Hahn, D., Hedenstrom, M., Schwartz, T., & Beaverson, S. (2015, March). Three best practices for 1:1. In *Society for Information Technology & Teacher Education International Conference* (pp. 2203-2208). Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/noaccess/150306/

Andrade, A., Bryan, B., Danish, J., &Saleh, A. (2017). Observing complex thinking in the zone of proximal development. *Instructional Service 45*(1), 5-24.

Argueta, R., Huff, D. J., Tingen, J., & Corn, J. O. (2011). *Laptop initiatives: Summary of research across six states*. Raleigh, NC: Friday Institute for Educational Innovation, North Carolina State University.

Armstrong, A. (2014). Technology in the classroom: It's not a matter of 'if,' but 'when' and 'how.' *The Education Digest, 79*(5), 39-46.

Balanskat, A., Bannister, D., Hertz, B., Sigillò, E., & Vuorikari, R. (2013). *Overview and analysis of 1:1 learning initiatives in Europe*. Luxembourg: Institute for Prospective and Technological Studies, Joint Research Centre.

Bates, J., Kahlke, R., & Nimmon, L. (2019). When I say ... sociocultural learning theory. *Medical Education.*, *53*(2), 117–118. https://doi.org/10.1111/medu.13626

Bebell, D., & Kay, R. (2010). One to one computing: A summary of the quantitative results from the Berkshire wireless learning initiative. *Journal of Technology, Learning and Assessment*, *9*(2), 1–59.

Beeson, M. W., Journell, W., & Ayers, C. A. (2014). When using technology isn't enough: A comparison of high school civics teachers' TPCK in one-to-one laptop environments. *The Journal of Social Studies Research*, *38*(3), 117-128. Retrieved from http://libres.uncg.edu/ir/uncg/f/W_Journell_Technology_2014.pdf

Benade, S., & Callaghan, R. (2015). The value of preparation in a system engineering masters module: A longitudinal case study. *Systems Engineering, 18*(2), 131-145.

Benjamin, A. (2014). *Differentiated instruction using technology: A guide for middle & HS teachers*. Washington, D.C.: Routledge.

Blue, T. (2015). A theory of multiple intelligences: Working with the adolescent brain/voice. *The Choral Journal, 55*(9), 57-62.

Bond, M., Nichols, M., & Zawacki-Richter, O. (2019). Revisiting five decades of educational technology research: A content and authorship analysis of the British Journal of Educational Technology. *British Journal of Educational Technology, 50*(1), 12–63.

Bondie, R.S., Dahnke, C., & Zusho, A. (2019). How does changing "One-size-fits-all" to differentiated instruction affect teaching? *Review of Research in Education, 43*(1), 336-362.

Boyce, C., Mishra, C., Halverson, K. K., & Thomas, A. (2014). Getting students outside: Using technology as a way to stimulate engagement. *Journal of Science Education & Technology, 23*(6), 815-826.

Brown, M. G. (2016). Blended instructional practice: A review of the empirical literature on instructors' adoption and use of online tools in face-to-face teaching. *Internet and Higher Education, 31*, 1-10.

Brown, C., & Luterbach, K.J., (2011) Education for the 21st century. *International Journal of Applied Educational Studies.*

Bruner, J. (1966). *Toward a theory of instruction.* Cambridge, MA: Harvard University Press.

Cabus, S. J., Haelermans, C., & Franken, S. (2017). SMART in mathematics? Exploring the effects of in-class-level differentiation using SMARTboard on math proficiency. *British Journal of Educational Technology*, *48*(1), 145-161.

Cassandra, A. (2017). NCEA's Sr. McDonald: School choice a significant factor in helping families access Catholic education. The Cardinal Newman Society. Retrieved from http://cardinalnewmansociety.org

Card, D., & Giuliano, L. (2016). Can tracking raise the test scores of high-ability minority students? *The American Economic Review, 106*(10), 2783-2816.

Channa, M. A., & Nordin, Z. S. (2015). Social cognitive theory and the zone of proximal development in the learning of reading comprehension. *Science International, 27*(1), 581-585.

Cicconi, M. (2014). Vygotsky meets technology: A reinvention of collaboration in the early childhood mathematics classroom. *Early Childhood Education Journal, 42*(1), 57-65. doi:10.1007/s10643-013-0582-9

Corn, J., Tagsold, J. T., & Argueta, R. (2012). Students with special needs and 1:1 computing: A teacher's perspective. *Journal of Research in Special Educational Needs, 12*, 217-223.

Crouch, M. (2014, February). The flipped classroom. *Scholastic Parent & Child, 21*, 59.

Daniels, J. S., Jacobsen, M., Varnhagen, S., & Friesen, S. (2014). Barriers to systemic, effective, and sustainable technology use in high school classrooms/Obstacles à l'utilisation systémique, efficace et durable de la technologie dans les salles de classe des écoles secondaires. *Canadian Journal of Learning and Technology/La Revue Canadienne de L'apprentissage et de La Technologie, 39*(4), 1-14.

Das, A., Lam, T., Thomas, S., Richardson, J., Kam, B., Lau, K. & Nkhoma, M. (2019). Flipped classroom pedagogy. *Education + Training, 61*(6), 756-774.

Deal, T. E., & Peterson, K. D. (2016). *Shaping school culture*. John Wiley & Sons. San Francisco, CA.

Dewey, J. (1916). *Democracy for education.* Retrieved from ILT Columbia University: http://www.ilt.columbia.edu/publications/dewey.html

Dickinson, E. & Thacker, A. A. (2014). *The accuracy of students' novice, apprentice, proficient, and distinguished classifications for the 2013 Kentucky end-of-course tests*. Human Resources Research Organization. Retrieved from https://education.ky.gov/AA/KTS/Documents/HumRRO%202014%20No%20024%202013%20EOC%20Student%20NAPD%20Classifications%20Accuracy.pdf

Dixon, F. A., Yssel, N., McConnell, J. M., & Hardin, T. (2014). Differentiated instruction, professional development, and teacher efficacy. *Journal for the Education of the Gifted, 37*(2), 111-127.

Donovan, L., Green, T., & Hartley, K. (2010). An examination of one-to-one computing in the middle school: Does increased access bring about increased student engagement? *Journal of Educational Computing Research, 42*(4), 423-441.

Doughty, T, Krockover, G. H., & Miller, B. T., (2013). Using iPads to teach inquiry science to students with a moderate to severe intellectual disability: A pilot study. *Journal of Research in Science Teaching*, *50*(8), 887–911.

Drayton, B., Falk, J. K., Stroud, R., Hobbs, K., & Hammerman, J. (2010). After installation: Ubiquitous computing and high school science in three experienced, high-technology schools. *The Journal of Technology, Learning and Assessment*, *9*(3), 1–57.

Dunleavy, M., & Heinecke, W. F. (2008). The impact of 1:1 laptop use on middle school math and science standardized test scores. *Computers in the Schools*, *24*(3–4), 7–22.

Education, Audiovisual, and Culture Executive Agency (2009). *National testing of pupils in Europe: Objectives, organization, and use of results.* Retrieved from http://eacea.ec.europa.eu/education/eurydice/documents/thematic_reports/109EN.pdf

Erikson, L. (2017). *Concept-based curriculum instruction for the thinking classroom* (2nd ed.). Thousand Oaks, CA: Corwin Press.

Farris, P. J. (2015). *Elementary and middle school social studies: An interdisciplinary, multicultural approach*. Long Grove, IL: Waveland Press.

Fayette County Schools, Office of Student Assessment (2013). *Kentucky's high school end-of-course assessments: Answers to parents' most frequently asked questions*. Retrieved from http://www.laurel.kyschools.us/userfiles/2/Assessment/EOC%20FAQs%20for%20Parents.pdf

Ferrara, S., & Way, D. (2016, January). 2 Design and development of end-of-course tests for student assessment and teacher evaluation. In *Meeting the Challenges to Measurement in an Era of Accountability*. Washington, D.C.: Routledge.

Fitchett, Paul & Heafner, Tina. (2014). Examining Elementary Social Studies Marginalization: A Multilevel Model. *Educational Policy, 28*, 40-68.

Freedman, R. (2015). *Enhanced possibilities for teaching and learning: A whole school approach to incorporating multiple intelligences and differentiated instruction* (Master's thesis). University of Toronto, Toronto, Canada. Retrieved from https://tspace.library.utoronto.ca/bitstream/1807/68677/1/Freedman_Rebecca_H_201506_MT_MTRP.pdf

Frey, N., & Fisher, D. (2017). Quality core instruction and differentiation: Dispositions and effective practices. *Perspectives on Language and Literacy, 43*(3), 29-32.

Fried, C. B. (2008). In-class laptop use and its effects on student learning. *Computers & Education, 50*(3), 906-914. doi: 10.1016/j.compedu.2006.09.006

Fugate, M. E. (2014). *Schools that serve military children: A comparison to the standardized test scores in the DoDea school system versus the civilian school system* (Master's thesis). Utah State University, Logan, UT. Retrieved from https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=4334&context=etd

Gardner, H. (1993). *Multiple intelligences: The theory in practice.* New York, NY: Basic Books.

Gilboy, M.B., Pazzaglia, G., & Heinerichs, S. (2015). Enhancing student engagement using the flipped classroom. *Journal of Nutrition Education and Behavior, 47*(1), 109-114.

Gourneau, B., Holen, J.B., & Hung, W. (2017). Does one-to-one technology really work: An evaluation through the lens of activity theory. *Computers in the Schools, 34*(2), 24-44.

Graber, K., Kern, B., Killian, C., Richards, A. (2018). Chapter 4: Studying recruitment and retention in PETE: Qualitative and quantitative research methods. *Journal of Teaching in Physical Education, 38*(1), 22–36.

Grimes, D.A. & Schultz, K.F. (2002) "Descriptive Studies: what they can and cannot do". *The Lancet,* 145-49.

Grimes, D., & Warschauer, M. (2008). Learning with laptops: A multi-method case study. *Journal of Educational Computing Research, 38,* 305–332.

Gulek, J. C., & Demirtas, H. (2005). Learning with technology: The impact of laptop use on student achievement. *Journal of Technology, Learning and Assessment, 3*(2), 1–38.

Hennick, C. (2014, Spring). Flipped. *Scholastic Administrator, 13,* 38-42.

Herreid, C. F., & Schiller, N. A. (2013). Case studies and the flipped classroom. *Journal of College Science Teaching, 42*(5), 62.

Hew, K. F., & Cheng, Y. T. (2016). Predictors of information technology integration in secondary schools: Evidence from a large scale study of more than 30,000 students. *PLoS One, 11*(12). Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5173374/

Hofer, M. J., & Swan, K. (2014). Technology and disciplined inquiry in the social studies. *Contemporary Issues in Technology and Teacher Education, 14*(3), 25-30. Retrieved from http://www.citejournal.org/volume-14/issue-1-14/social-studies/technology-and-disciplined-inquiry-in-the-social-studies/

Hu, W. (2007, May 4). Seeing no progress, some schools drop laptops. *New York Times*. Retrieved from https://www.nytimes.com/2007/05/04/education/04laptop.html

Hur, J. W., & Oh, J. (2012). Learning, engagement, and technology: Middle school students' three-year experience in pervasive technology environments in South Korea. *Journal of Educational Computing Research*, *46*, 295–312.

Jackson, J., & Kurlaender, M. (2014). College readiness and college completion at broad access four-year institutions. *American Behavioral Scientist, 58*(8), 947–971.

Jang, H., Kim, E. J., & Reeve, J. (2012). Longitudinal test of self-determination theory's motivation mediation model in a naturally occurring classroom context. *Journal of Educational Psychology*, *104*(4), 1175.

Janks, H. (2014). Critical literacy's ongoing importance for education. *Journal of Adolescent and Adult Literacy*, *57*(5), 349–356.

Jenkins, M., Browne, T., & Walker, R. (2005). *VLE surveys: A longitudinal perspective between March 2001, March 2003, and March 2005 for higher education in the United Kingdom*. Birmingham: UCISA-TLIG Learning and Teaching subgroup.

Journell, W., Beeson, M., & Ayers, C. (2014). When using technology isn't enough: A comparison of high school civics teachers' TPCK in one-to-one laptop environments. *Journal of Social Studies Research, 38*(3), 117-128.

Kadir, M. (2017). What teacher knowledge matters in effectively developing critical thinkers in the 21st-century classroom? *Thinking Skills and Creativity, 23*, 79-90.

Kentucky Department of Education. (2015). *2015-2016 KPREP EOC data*. Retrieved from http://applications.education.ky.gov/SRC/DataSets.aspx

Kentucky Department of Education. (2016). *2014-2015 KPREP EOC data*. Retrieved from http://applications.education.ky.gov/SRC/DataSets.aspx

Kentucky Department of Education (2017a). *End-of-course*. Retrieved from https://education.ky.gov/AA/Assessments/Pages/EOC.aspx

Kentucky Department of Education. (2017b). *2015-2016 KPREP EOC data*. Retrieved from http://applications.education.ky.gov/SRC/DataSets.aspx

Kentucky Department of Education. (2019). *Glossary*. Retrieved from http://applications.education.ky.gov/SRC/Glossary.aspx

Keppler, M., Weiler, S. C., & Maas, D. (2014). Focused ubiquity: A purposeful approach to providing students with laptops. *Educational Technology & Society, 17*(4), 278-288.

Kilinç, E., Kilinç, S., Kaya, M., Başer, E., Türküresin, H., & Kesten, A. (2016). Teachers' attitudes toward the use of technology in social studies teaching. *Research in Social Sciences and Technology, 1*(1), 59-76.

Kirsch, B., Leonhirth, D., Lownes, S Marlow, D., & Pingley, A. (2016). Improving student engagement with technology tools. *Currents in Teaching & Learning, 8*(2), 50-61.

Kopish, M. (2016). Preparing globally competent teacher candidates through cross cultural experiential learning. *Journal of Social Studies Education Research, 7*(2), 75-108.

Kposowa, A. J., & Valdez, A. D. (2013). Student laptop use and scores on standardized tests. *Journal of Educational Computing Research*, *48*(3), 345–379.

Leshkovska, E. A., & Spaseva, S. M. (2016). John Dewey's educational theory and educational implications of Howard Gardner's multiple intelligences theory. *International Journal of Cognitive Research in Science, Engineering & Education (IJCRSEE), 4*(2), 57-66.

Lowther, D. L., Inan, F. A., Strahl, J. D., & Ross, S. M. (2012). Do one-to-one initiatives bridge the way to 21st century knowledge and skills? *Journal of Educational Computing Research*, *46*(1), 1-30.

Martin-Beltrán, M., Guzman, N. L., & Chen, P. J. J. (2017). "Let's think about it together:" How teachers differentiate discourse to mediate collaboration among linguistically diverse students. *Language Awareness, 26*(1), 41-58. Retrieved from http://www.tandfonline.com/doi/abs/10.1080/09658416.2016.1278221

Marzano, R.J., & Waters, T.J. (2009). *Leadership at the top*. Denver, CO: Midcontinent Research for Education and Learning.

Mauch, J. & Tarman, B. (2016). A historical approach to social studies laboratory method. *Research in Social Sciences and Technology, 1*(2), 55-66.

McCoach, D. B., Rambo, K. E., & Welsh, M. (2013). Assessing the growth of gifted students. *Gifted Child Quarterly*, *57*(1), 56–67.

McLaughlin, J. (2018). Flipped classrooms, by design. *Medical Education.*, *52*(9), 887–888. https://doi.org/10.1111/medu.13654

Merz, J. R. (2017). Addressing quality teaching: An interview with Susan Kuenzel regarding the National Board for Professional Teaching Standards. *Delta Kappa Gamma Bulletin*, *83*(3), 6.

Miller, B. T., Krockover, G. H., & Doughty, T. (2013). Using iPads to teach inquiry science to students with a moderate to severe intellectual disability: A pilot study. *Journal of Research in Science Teaching*, *50*(8), 887-911.

Morgan, H. (2014). Maximizing student success with differentiated learning. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *87*(1), 34-38. Retrieved from http://www.tandfonline.com/doi/abs/10.1080/00098655.2013.832130

Mueller, R. G., & Colley, L. M. (2015). An evaluation of the impact of end-of-course exams and ACT-QualityCore on U.S. History instruction in a Kentucky high school. *The Journal of Social Studies Research*, *39*(2), 95-106. Retrieved from http://www.sciencedirect.com/science/article/pii/S0885985X14000497

National Center for Education Statistics [NCES]. (2015). *The nation's report card: 2014 U.S. History, Geography, and Civics at grade 8*. Washington, DC: Institute of Educational Sciences, Department of Education. Retrieved from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2015112

National Council for the Social Studies. (2016). Media literacy: A position statement of National Council for the Social Studies. *Social Education, 80*(3), 183-185.

Orlich, D. C., Harder, R. J., Trevisan, M. S., Brown, A. H., & Miller, D. E. (2016). *Teaching strategies: A guide to effective instruction*. Boston, MA: Cengage Learning.

Ottmar, E. R., Rimm-Kaufman, S. E., Larsen, R. A., & Berry, R. Q. (2015, August). Mathematical knowledge for teaching, standards-based mathematics teaching practices,

and student achievement in the context of the responsive classroom approach. *American Educational Research Journal, 52*(4), 787-821.

Oudeweetering, K. & Voogt, J. (2018). Teachers' conceptualization and enactment of twenty-first century competences: exploring dimensions for new curricula. *The Curriculum Journal, 29*(1), 116-133.

Parkay, F. W., Anctil, E. J., & Hass, G. (2014). *Curriculum leadership: Readings for developing quality educational programs*. Upper Saddle River, NJ: Prentice Hall.

Pearson. (2012, March 11). *Kentucky Department of Education*. Retrieved from https://education.ky.gov/AA/Assessments/Pages/K-PREP.aspx

Pedraja-Rejas, L., & Rodríguez-Ponce, E. (2014). Challenges and roles for higher education. *Ingenious: Revista Chilena De Ingenieria, 22*(2), 154-155.

Ratelle, C. F., Guay, F., Vallerand, R. J., Larose, S., & Senécal, C. (2007). Autonomous, controlled, and amotivated types of academic motivation: A person-oriented analysis. *Journal of Educational Psychology, 99*(4), 734–746.

Ready, D. D. (2013). Associations between student achievement and student learning: Implications for value-added school accountability models. *Educational Policy*, *27*(1), 92–120.

Reigeluth, C. M. & Watson, S. L., (2013). Living the Vision: A Disadvantaged and Marginalized Alternative School's Perspective on School Culture and Educational Change. *International Journal of Education*, 5(2), 53.

Resnick, L. B., Asterhan, C. S. C., & Clarke, S. N. (2015). *Socializing intelligence through academic talk and dialogue.* Washington, DC: American Educational Research Association.

Reznitskaya, A., & Wilkinson, I. A. G. (2017). Truth matters: Teaching young students to search for the most reasonable answer. *Phi Delta Kappan, 99*(4), 33–38.

Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, R. (Eds.). (2013). Qualitative Research Practice: A Guide for Social Science Students and Researchers. Thousand Oaks, CA: SAGE Publications.

Robinson, D. H. (2014). Thoughts about critical-analytic thinking deficits and antecedents. *Educational Psychology Review, 26*(4), 583-585.

Rosen, Y., & Manny-Ikan, E. (2011). The social promise of the Time to Know Program. *Journal of Interactive Online Learning, 10*, 150–161.

Ross, E. W. (2014). The struggle for the social studies curriculum. In E. W. Ross (Ed.), *The Social Studies Curriculum: Purposes, Problems and Possibilities* (pp. 17-32). Albany, NY: State University of New York Press.

Roth, W.M. (2012). Mathematical learning: the unseen and unforeseen. *For the Learning of Mathematics, 32*(3), 15–21.

Saavedra, A. R., & Opfer, V. D. (2012). Learning 21st-century skills requires 21st-century teaching. *Phi Delta Kappan, 94*(2), 8-13.

Schcolnik, M., Kol, S., & Abarbanel, J. (2016). Constructivism in theory and in practice. *English Teaching Forum, 44*(4), 12-20. Retrieved from https://files.eric.ed.gov/fulltext/EJ1107896.pdf

Shapiro, E. S. (2014). *Tiered instruction and intervention in a response-to-intervention model.* RTI Action Network. Retrieved from http://mtss.ncdpi.wikispaces.net/file /view/tiered-instruction-and-intervention-rti-model+(1).pdf

Shapley, K., Sheehan, D., Maloney, C., & Caranikas-Walker, F. (2011). Effects of technology

immersion on middle school students' learning opportunities and achievement. *Journal of Educational Research, 104*, 299–315.

Siddiq, F., Scherer, R., & Tondeur, J. (2016). Teachers' emphasis on developing students' digital information and communication skills (TEDDICS): A new construct in 21st century education. *Computers & Education, 92*, 1-14. Retrieved from https://biblio.ugent.be/publication/7005064/file/7005129.pdf

Siegle, D. (2014). Technology: Differentiating instruction by flipping the classroom. *Gifted Child Today, 37*(1), 51-55. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/1076217513497579

Sprague, D. R., & Shaklee, B. (2015). Differentiating through technology for gifted students. In *Cases on Instructional Technology in Gifted and Talented Education* (pp. 269-286). Hershey, PA: IGI Global.

Sternberg, R. J. (2015). Multiple intelligences in the new age of thinking. In *Handbook of Intelligence* (pp. 229-241). New York, NY: Springer. Retrieved from https://link.springer.com/chapter/10.1007/978-1-4939-1562-0_16

Storz, M. G., & Hoffman, A. R. (2013). Examining response to a one-to-one computer initiative: Student and teacher voices. *RMLE Online: Research in Middle Level Education, 36*(6), 1–18.

Swain, M., Kinnear, P., & Steinman, L. (2015). *Sociocultural theory in second language education: An introduction through narratives*. Bristol, UK: Multilingual Matters.

Swallow, M. (2015) The year-two decline: Exploring the incremental experiences of a 1:1 technology initiative. *Journal of Research on Technology in Education, 47*(2), 122-137.

Tannebaum, R. (2015). Preservice social studies teachers' perspectives and understandings of teaching in the twenty-first century classroom: A meta-ethnography. *Journal of Social Studies Education Research, 6*(2), 154-176.

Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: ASCD.

Tomlinson, C. A. (2017). *How to differentiate instruction in academically diverse classrooms*. Alexandria, VA: ASCD.

Tucker, B. (2012). The flipped classroom. *Education Next, 12*(1), 82-83. Retrieved from http://educationnext.org/files/ednext_20121_BTucker.pdf

Ullman, E. (2014). Making 1:1 work. *Technology & Learning*, *34*(6), 32-50.

Van Compernolle, R. A. (2014). *Sociocultural theory and L2 instructional pragmatics*. Bristol, UK: Multilingual Matters.

Vygotsky, L. (1962). *Thought and language*. Cambridge, MA: Harvard University Press.

Wass, R., & Golding, C. (2014). Sharpening a tool for teaching: The zone of proximal development. *Teaching in Higher Education, 19*(6), 671-84. Retrieved from https://www.researchgate.net/profile/Rob_Wass/publication/280949263_Sharpening_a_tool_for_teaching_the_zone_of_proximal_development/links/55ce70d608aee19936fc5beb.pdf

Waters, S. & Russell, W. (2016). Virtually ready? Pre-service teachers' perceptions of a virtual internship experience. *Research in Social Sciences and Technology, 1*(1), 1-23.

Watts-Taffe, S., Laster, B. P., Broach, L., Marinak, B., Connor, C. M., & Walker-Dalhouse, D. (2014). Differentiated instruction: Making informed teacher decisions. *The Reading Teacher, 66*(4), 303-14.

Weller, K. M. (2017). Shape shifting: The impact of student and teacher choice on differentiation in a detracked, standards-based high school geometry classroom. *Journal of Practitioner Research*, *2*(2), 4. Retrieved from http://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1041&context=jpr

Weston, M. E., & Bain, A. (2010). The end of techno-critique: The naked truth about 1:1 laptop initiatives and educational change. *Journal of Technology, Learning and Assessment*, *9*(6), 1–25.

Wilkinson, I.A.G., Reznitskaya, A., Bourdage, K., Oyler, J., Nelson, K., Glina, M., Kim, M.-Y. (2016). Toward a more dialogic pedagogy: Changing teachers' beliefs and practices through professional development in language arts classrooms. *Language & Education, 31*(1), 65–82.

World Economic Forum: New Vision for Education: Fostering Social and Emotional Learning through Technology (2016). Retrieved from http://www3.weforum.org/docs/WEF_New_Vision_for_Education.pdf

APPENDIX A

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

February 5, 2019

Samuel Joshua Kassinger
IRB Application 3609: The Effect of the 1:1 Initiative on Academic Achievement in Secondary Social Sciences Education

Dear Samuel Joshua Kassinger,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Your study does not classify as human subjects research because it will not involve the collection of identifiable, private information.

Please note that this decision only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued non-human subjects research status. You may report these changes by submitting a new application to the IRB and referencing the above IRB Application number.

If you have any questions about this determination or need assistance in identifying whether possible changes to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

[redacted]

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

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APPENDIX B

Summary of Results

Group	*n*	*% of total*	*Baseline n=*	*Year 1 n=*	*Year 2 n=*	*Base line*	*Year 1*	*Year 2*	*Year 1 variation from 0*	*Year 2 variation from 0*	*Variation Year 1 to Year 2*
						% of total in year found proficient/distinguished					
Overall	2074	100	687	716	671	56.2	62.4	51.5	6.2	-4.7	-10.9
School A	464	22.4	161	199	104	67.1	70.4	41.3	3.3	-25.8	-29.1
School B	713	34.4	234	209	270	50.9	56.5	63	5.6	12.1	6.5
School C	897	43.2	292	308	297	50.7	60.4	50.2	9.7	-0.5	-10.2
Male	1074	51.8	347	364	363	59.5	62.1	53.9	2.6	-5.6	-8.2
Female	1000	48.2	340	352	308	53	63	48.6	10	-4.4	-14.4
Free/Reduced meals	999	48.2	317	366	316	41.7	50.5	42	8.8	0.3	-8.5
Minimum group means						36.1	25.8	41.3	-10.3	5.2	15.5
Maximum group means						67.1	70.4	63	3.3	-4.1	-7.4