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THE MATHEMATICS ACHIEVEMENT GAP IN VIRTUAL EDUCATION

by

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A dissertation submitted in partial fulfillment for the requirements
for the degree of Doctor of Education
in the College of Community Innovation and Education
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ABSTRACT

This phenomenological study examined the lived experiences of online Algebra I teachers as they relate to the instruction of minority students. There is an academic achievement gap that exists between minority students and their non-minority peers in United States public education (Sousa & Armor, 2016). Although national educational policy has sought to narrow the academic achievement gap, it is persistent and must be addressed because public education affects the future of our nation (Fullan & Quinn, 2016). Virtual education is a growing platform for learning, with nearly 300,000 students enrolled across the United States. Achievement data demonstrates the existence of an academic achievement gap in this learning environment as well (Miron, Shank, & Davidson, 2018). Yet, there is not a great deal of high-quality research surrounding aspects of virtual education (Molnar et al., 2017). A phenomenological research method was used to examine the lived experiences of Algebra I teachers in a virtual learning environment. Interviews were conducted with five participants (N = 5). Data analysis resulted in eight overarching themes and twenty-seven tertiary themes. The major themes include: (a) teachers believe that student characteristics are a primary determinant of their success in virtual education; (b) teachers believe they have a strong impact upon student success in a virtual learning environment; (c) teachers believe Algebra I is a challenging content area for student achievement; (d) teachers believe family involvement impacts student learning in virtual education; (e) teachers believe frequent and consistent communication is vital in virtual education; (f) teachers believe there are challenges communicating with English language learners; (g) teachers believe strategies can be implemented to support student success in an online learning environment; and (h)

teachers believe virtual education is a unique learning environment. This study concludes with an examination of each finding and provides implications for virtual education teachers and policy, and recommendations for future research.

This dissertation is dedicated to the second-grade students I taught on the South side of Chicago during my two years as a Teach For America corps member. They forever shaped my heart and developed my passion for education. It is because of them that I work toward every child in this nation having the opportunity to receive a quality education. To Kierra and every single other child in my classroom, I love you and hope you have found safety, education, and joy.

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CHAPTER ONE: INTRODUCTION

The United States education system has a long history of educational inequity and disparity among students of diverse racial and economic backgrounds. Strategies to decrease educational inequity have been used in traditional schools, but current education systems now have provided innovative platforms such as online and web-based learning environments. Virtual education is a more recent phenomenon. Implementation of strategies to address the academic achievement gap for students from diverse backgrounds in the virtual learning environment will require purposive and strategic planning.

Statement of the Problem

The academic achievement gap is defined as persistent differences in achievement among diverse groups of students as indicated by scores on standardized tests, grades, levels of educational attainment, graduation rates, and other data (Ravitch, 2007). It has been noted in subgroups such as English Language Learners (ELLs), students with disabilities, students from poverty, and students with minority backgrounds (Klein, 2016). The difference in the percentage of proficient students from each subgroup has been a focus of national educational policy but has only narrowed slightly as a result of national initiatives aimed at closing the academic achievement gap. The gap leads to less promising college and career opportunities, increases dropout rates for minority students, and continues the cycle of poverty in many communities. Public education drives the future of our country, and consequently we must address the implications of inequity (Fullan & Quinn, 2016).

Virtual schools at the K-12 level began in the early 1990s and have grown significantly since then (DiPietro, Ferdig, Black, & Preston, 2008). The U.S. Department of

Education (2009) defined virtual education as “learning that takes place partially or entirely over the Internet” (p. 9). Virtual education is a growing educational platform for students throughout the country, as it is becoming increasingly accessible to a large population within the United States. Florida Statutes (Florida Legislature, 2013) require that all students entering ninth grade in the 2013-2014 school year or later complete at least one online course as a requirement for high school graduation. According to a study by Miron, Shank, and Davidson (2018), in 2016-17, there were 429 full-time virtual schools with 295,518 students enrolled across the United States. Enrollments in virtual schools increased by 17,000 students between 2015 and 2016 (Miron et al., 2018). Students take online courses for graduation requirements, course recovery, acceleration, flexibility, and an array of other reasons.

Data support the existence of the academic achievement gap in online learning environments (Miron et. al, 2018). Yet there is a lack of high-quality evidence surrounding many aspects of virtual education (Molnar et al., 2017). This study will provide state-reported data on the achievement of subgroups at a virtual school district in Florida. The discrepancies in student achievement data affect student academic outcomes and their trajectories toward college and career readiness. Although this district is a preferred partner for many schools and families, the extent to which unique student needs are met is unclear. Most home school, public, or private school students take courses through the Flex model at this district. Flex allows students to enroll in up to six courses, without making the virtual district the school of record. Within Flex, students with disabilities receive accommodations from their school of record and not the virtual school district. The organization seeks to provide support for student needs, but differentiation does not extend beyond the learning platform, format of instruction, and pace options.

Teachers play a valuable role in the instruction of minority students. Teachers' beliefs greatly influence their instructional decisions (Fives & Gill, 2015). *Beliefs* are broadly defined as mental representations that are essential components of an individual's conscious thought, developed over a lifetime of experiences and interactions with the world and others (Fives & Gill, 2015). A teacher's beliefs will direct their actions in the classroom, and they may hold beliefs regarding content as well as beliefs about individual students. As a result, teachers' mindsets, beliefs, practices, and experiences were a focus of this research study.

Race, socioeconomic status, and disability are factors that undeniably affect student learning (Lynch & Oakford, 2014). Race will be the major factor under consideration in this study as practices at the virtual school district are explored. The researcher will focus this study on the subgroup of race within the Algebra I content area and the implications that practices have upon the academic achievement gap. Because of the significant implications of the achievement gap and that it is notable among students with minority backgrounds as well as the increase in availability of virtual school, this study will address the current practices at a virtual school district in Florida, in relation to supporting minority students.

Significance of the Problem

For decades now, the United States has sought to ensure an equitable education for all children through numerous legislative actions including No Child Left Behind (NCLB) and most recently, the Every Student Succeeds Act (ESSA, 2015; Klein, 2016). The goal of this legislation is to provide a free and equitable public education to all children as part of their rights as citizens of the United States (Huang, 2015). However, inequity related to providing

a free and appropriate public education persists. A child's background can often predict his or her academic achievement on standardized assessments (Strand, 2014). Students in the majority race, mid to upper socioeconomic class, and who live in high-income neighborhoods continue to outperform students of differing demographics. Political and social conversation continues to champion closing the achievement gap, but the gap remains ever-present. Student achievement data demonstrates a discrepancy in the performance of students from diverse demographic groups (Sousa & Armor, 2016). The gap score between White and Black students on the 2015 National Assessment of Educational Progress (NAEP) eighth grade mathematics assessment was 34 scale score points (Dossey, McCrone, & Halvorsen, 2016). After decades of legislative endeavors to narrow the academic achievement gap, test results prove the gap obstinately remains.

There has been considerable discussion regarding the origin and root cause of the academic achievement gap (Skiba et al., 2008). Research has focused on race, poverty, gender, language, ethnicity, and socioeconomic status as the root of the achievement gap, but Skiba and colleagues (2008) argue that the gap has its roots in the historically oppressive and discriminatory culture of the United States. Decades of inequality and a cycle of exclusion have led to a continued achievement gap for students in our nation (Lynch & Oakford, 2014). Students of diverse demographics produce discrepant achievement scores on standardized assessments (Sousa & Armor, 2016). These issues are a concern for the education system as we seek to provide an equitable education to every child.

Purpose of the Study

The purpose of this study is to examine the experiences of teachers within a specified content area at a virtual school district in Florida. Specifically, the researcher is interested in examining the experiences, practices, views, and beliefs of these individuals in regard to their provision of web-based instruction to a diverse student population. “An understanding of what reality is from the viewpoint of people within the role is an essential starting point for constructing a practical theory of the meaning and results of change attempts” (Fullan, 2007, p. 155). The lived experiences of these educators will be gathered and meaning will be assigned. Furthermore, emerging themes will focus on current practices at the virtual school district in Florida and how their meaning might be utilized as mechanisms related to narrowing the academic achievement gap.

Research Question

This study will focus on the following research question: What are the lived experiences of Algebra I virtual education teachers, as they relate to the instruction of minority students?

Research Design

The purpose of this study is to gain understanding of the lived experiences of teachers at a virtual school district in Florida as they provide instruction to a diverse student population. Research focused on making meaning from the perceptions, perspectives, and understandings of virtual teachers in relation to the academic achievement gap. Teacher mindsets, beliefs, practices, and experiences were explored. The most appropriate research

approach and design to investigate the lived experiences of teachers in an online learning environment is a qualitative research study. Understanding the reality from the viewpoint of the individual within the role is a necessary starting point for constructing a theory of the meaning (Fullan, 2007). The researcher focused this study on constructing meaning from the experiences of individuals. As a result, a phenomenological design was used (Ary, Jacobs, & Razavieh, 2002; Merriam, 2002). Phenomenological research is “a type of qualitative research designed to gain an understanding of how participants experience and give meaning to an event, concept or phenomenon” (Ary et al., 2002, p. 565). A phenomenological study describes the shared meaning for several individuals of their lived experiences (Creswell, 2013). The focus of this study is the shared lived experiences of educators supporting Algebra I, as they relate to the instruction of minority students, so phenomenology will be applied.

Definition of Terms

Achievement: “Accomplishment; the mastery of a skill or of knowledge as a consequence of the individual’s effort, training, and practice” (Ravitch, 2007, p. 9).

Achievement gap: Persistent differences in achievement among different groups of students as indicated by scores on standardized tests, grades, levels of educational attainment, graduation rates, and other data; also known as the test-score gap. Many researchers believe that a significant part of the gap may be attributed to poverty, high mobility rates, and low expectations (Ravitch, 2007). The achievement gap is noted in subgroups such as English-language learners, students with disabilities, students from poverty, and students with minority backgrounds (Klein, 2016).

English Language Learners: The term English Language Learner (ELL) as used in this dissertation is described in the Every Student Succeeds Act (ESSA) as students with limited English proficiency. That act defines them as

students aged three through twenty-one, who are enrolled or preparing to enroll in an elementary or secondary school, who was not born in the United States or whose native language is a language other than English, and whose difficulties in speaking, reading, writing, or understanding English may affect their ability to: (a) meet the challenging State academic standards; (b) successfully achieve in classrooms where the language of instruction is English; or (c) the opportunity to participate fully in society. (ESSA, 2015)

Every Student Succeeds Act (ESSA): The most recent reauthorization of the Elementary and Secondary Education Act of 1965 (ESEA). The reauthorized law sets high standards and contains policies that will help prepare all students for success in college and future careers. It prioritizes excellence and equity and recognizes the importance of supporting great educators in our nation's schools (U.S. Department of Education [USDOE], 2018, p. 6).

Flex Model: Part-time educational options through a virtual school district in Florida for students in grades K-12. For students in grades 6-12, it offers over 150 online courses from general education to Honors and Advanced Placement and Career Technical Education (CTE) courses. Public, private, and home education students can take these mastery-based courses year-round with open enrollment, allowing them to learn at “any time, any place, any path, and any pace” (Florida Department of Education, 2018a).

Free appropriate public education (FAPE): Special education and related services provided to students with special needs at no cost to their parents. The federal courts and the U.S.

Congress made FAPE a legal requirement for school districts and other public agencies after a long history in which many children with disabilities were not admitted to public schools and did not have equal opportunities for a free public education (Ravitch, 2007).

Learning Disabilities: Learning Disabilities is a broad definition to describe a set of neurological disorders that make it difficult, over a life time, to acquire a variety of academic skills as well as affect language processing and certain verbal and non-verbal skills which can affect social and emotional academic and non-academic domains. Specific types of learning disabilities are categorized as dyslexia, dyscalculia, dysgraphia, and executive functioning. Although there are effective strategies and interventions that can assist the student with learning disabilities, they are lifelong conditions for which there is no known cure (Harwell, 2001).

Lived experience: Describes experiences and their meaning to an individual or group (Ary, Jacobs, Irvine, & Walker, 2013).

Minority: Minority is a subgroup population classified by the Florida Department of Education. Minority populations include American Indian/Alaska Native; Asian/Asian American/Pacific Islander; African American/Black; Hispanic/Latino (Florida Department of Education, 2014).

No Child Left Behind (NCLB): The reauthorization of ESEA, which was originally passed in 1965 as part of President Lyndon B. Johnson's Great Society program. The NCLB Act was passed in fall 2001 and signed into law in early 2002. It represented a significant change in the federal government's role in public schools throughout the United States, particularly in terms of assessment, accountability, and teacher quality. The law required states to annually

test all students from grades 3 to 8 in reading and mathematics (and in science in 2007–2008) and to disaggregate their scores by race, disability, and other factors (Ravitch, 2007).

Phenomenological research: “A type of qualitative research designed to gain an understanding of how participants experience and give meaning to an event, concept or phenomenon” (Ary et al., 2002, p. 565).

Poverty: The state of living in which families are unable to provide for the basic necessities of life. The U.S. Government Federal Poverty Level in 2018 is an annual income of \$25,100 for a family of four (Department of Health and Human Services, 2018).

Race/Ethnicity: According to the Florida Department of Education (2014), definitions of Black or African American, Hispanic or Latino, and White are as follows:

Black or African American – A person having origins in any of the black racial groups in Africa.

Hispanic or Latino – A person of Cuban, Mexican, Puerto Rican, South or Central America, or other Spanish culture or origin, regardless of race. All students who indicated they are Hispanic or Latino are included only in the Hispanic counts; they are not included in the other racial categories they selected....

White – A person having origins in any of the original peoples of Europe, The Middle East, or North Africa. (p. 1-2).

Limitations

Great care was taken to ensure that this study maintained a high standard for research and procedures were implemented with fidelity. Possible limitations to the study include:

1. The study was conducted in one organization within the state of Florida. Transferability may be a limitation, but through “sufficiently rich, detailed, thick descriptions” (Ary et al., 2013, p. 535), comparisons and judgments are made.
2. A small number of teachers were included in the sample population. These teachers were selected purposefully based upon their instructional experience. Selection effects may have occurred because the constructs are unique to the group of teachers selected (Ary et al., 2013).
3. A standardized, open-ended interview and brief questionnaire was used for data collection purposes in this study. Consequently, the data are only as valid as the responses provided by the teachers at the particular point in time. Research is dependent upon the authenticity of the participants’ answers (Ary et al., 2013).
4. Generalizability of the findings of this study is limited because a qualitative phenomenological research design was used. The experiences and perspectives shared by the sample population for this study would most likely vary for a different sample population (Ary et al., 2013).

Summary

While the achievement gap has been a persistent concern within American public education, virtual education is a fairly recent phenomenon. As education changes and instructional practices adapt to online learning environments, exploration of strategies to narrow the achievement gap within an online learning platform is needed. This research study delved into the experiences of teachers as they provided instruction to diverse students in a web-based teaching platform.

CHAPTER TWO: LITERATURE REVIEW

History of the Achievement Gap

Numerous potential causes have been studied as factors that have led to the achievement gap in the United States education system. The gaps can “broadly be explained” by the fact that some populations “disproportionately experience the negative impacts of various inequalities that influence educational outcomes” (Lynch & Oakford, 2014, p. 7). A large amount of the discussion related to potential causes of the achievement gap focus on race, poverty, gender, language, and ethnicity. Socioeconomic status has been deemed a major contributor in the persistence of the achievement gap. Others have argued that the gap has its roots in the historically oppressive and discriminatory culture of the United States (Skiba et al., 2008). Ford and Moore (2013) conducted a literature review on the underachievement and low achievement of African American males in an urban setting and found a number of factors that have contributed to the achievement gap, including: lack of curriculum rigor, poor teacher preparation, teacher absence and turnover, class size, lack of technology, fear for safety, cultural factors, poor parent participation, student mobility, excessive television viewing, summer loss of learning, nutrition, low birth weight, and environmental damage.

Recently, there has been a push to replace the term ‘achievement gap’ with other titles. Terms such as ‘education debt’ (Ladson-Billings, 2013) and ‘opportunity gap’ (Carter & Welner, 2013; Milner, 2012) are sometimes used alternatively. Ladson-Billings (2013) maintains the position that *how* an issue is framed is as significant as the argument that is presented about it. She continues on, stating that consistently calling achievement inequalities among White students and Black and Hispanic students a ‘gap’ advocates that

there is something inherently responsible for these gaps within the Black and Hispanic communities, cultures, schools, and teachers. She posits that in reality, these achievement disparities are the consequence of historical, economic, political, and moral verdicts that society has created over time (Ladson-Billings, 2013). Despite this valid perspective, current education practitioners such as teachers and administrators continue to use the term ‘achievement gap’ to describe the difference in students’ achievement based upon demographics. This study will continue to use the term ‘achievement gap’ as well, aligning to current education practitioners.

The source of the achievement gap has been argued, and some may blame certain populations for the differences in achievement levels among subgroups. Further, the field will likely continue to debate the appropriateness of the phrase ‘achievement gap’ and may ultimately determine a phrase that represents a better description of the phenomena. Regardless, the fact remains that there is a persistent disparity between the academic achievement level of students based upon their race and ethnicity (Sousa & Armor, 2016).

Legislation designed to narrow and eradicate disparities in the achievement levels of students based on their race or ethnicity exists. The purpose of the No Child Left Behind (NCLB) Act, signed in 2004, was to champion an equitable, high-quality education for every child in the nation, and to ensure student proficiency on academic standards and achievement assessments. It declared that all schools had a responsibility to educate every student and not to separate students performing below their peers (Chenoweth, 2016). NCLB called for all students, including those with disabilities, to be proficient in mathematics and reading by the year 2010, with a specific, intense focus on areas where students were making progress as

well as where achievement gaps existed. The law called for additional support for students regardless of race, income, disability, language, or background.

After over a decade of NCLB, President Obama signed the bipartisan-supported Every Student Succeeds Act (ESSA) in 2015. NCLB was scheduled for reauthorization in 2007, but its prescriptive requirements had become difficult for schools and districts to implement. Consequently, the Obama administration joined the movement in 2010 to update the law in a way that focused on the distinct goal of preparing every student for college or career readiness and success while providing additional flexibility for states. This law contains provisions that ensure success for students and schools. The law upholds protections for marginalized and high-needs students, committing the country's educational policy to the cause of advancing educational equity.

The purpose of ESSA was to ensure that every student in the United States be taught to high academic standards that provide preparation for success in college and careers. The law guarantees that vital information found on annual statewide standardized assessments measuring student achievement and progress is provided to educators, families, students, and communities. The fundamental provisions of the law also support local innovations such as evidence-based and place-based intervention development as well as an investment in and increased access to high-quality preschool. Above all, ESSA upholds the expectation that there will be accountability and action to catalyze positive change in the nation's lowest performing schools. The law upholds and supports this expectation by focusing on schools where groups of students are failing to show progress as well as where graduation rates are historically and continually low. Legislation firmly champions narrowing the academic achievement gap throughout the U.S. education system. And yet there is little evidence that

the gap between minority students and white students' graduation rates is narrowing (Cortes, Goodman, & Nomi, 2013).

Mathematics Proficiency in Public Education

Mathematics is a specific content area where the academic achievement gap has been consistently prevalent (Timar & Maxwell-Jolly, 2012). Royer (2003) described the debate and conflict among professional educators, policy makers, mathematicians, and parents regarding K-12 mathematics education during the twentieth century (USDOE, 2018). The first half of the century saw a steady decline in students enrolled in advanced high school mathematics courses, but the "New Math" era followed and emphasized logical explanations for mathematical procedures and saw a small revival in mathematics education (Royer, 2003). The publication of *A Nation at Risk* in 1983 captured the public's attention (Gardner, 1983). It addressed a plethora of education issues but included specific inadequacies in mathematics instruction. It stated that, although Algebra I was offered, only 31 percent of recent high school graduates completed it at that time (Royer, 2003).

The height of contention surrounding mathematics instruction in the U.S. educational system occurred in the 1990s as a result of the introduction and distribution of mathematics textbooks with diminished content and an abundant focus on basic skills (Royer, 2003). Following this time period, there was strong advocacy towards student-centered, discovery learning and against rote learning and teacher-directed instruction (Royer, 2003). In 1989, the National Council of Teachers of Mathematics (NCTM) devised standards for mathematics instruction, and that same year President George Bush made a commitment to make U.S. students first in the world in mathematics by the year 2000 (Royer, 2003). The

NCTM standards were invaluable as educators sought to ensure mathematics instruction met specific goals and included pedagogical and conceptual best practices. The standards also set a benchmark for student achievement and highlighted student academic achievement gaps when goals were not met (Royer, 2003).

The next period of growth occurred from the time period spanning 1990 to 2007. The NCTM standards broadened to include standards for instruction, teacher education, and assessment (Dossey et al., 2016). The standards became part of practice in U.S. classrooms. The current and most recent era in mathematics instruction began in 2010 and continues today. It was initiated by the release of the Common Core State Standards for Mathematics (CCSSM), which outlined a national set of standards for all U.S. classrooms and preceded the passage of ESSA (Dossey et al., 2016).

The Common Core State Standards Initiative (2010) outlined the following Standards for Mathematical Practice:

- (1) Make sense of problems and persevere in solving them;
- (2) Reason abstractly and quantitatively;
- (3) Construct viable arguments and critique the reasoning of others;
- (4) Model with mathematics;
- (5) Use appropriate tools strategically;
- (6) Attend to precision;
- (7) Look for and make use of structure;
- (8) Look for and express regularity in repeated reasoning.

These standards outline goals for student expertise at all levels of mathematics learning (Common Core State Standard Initiative, 2010).

The U.S. government, through the Department of Education's National Center for Education Statistics (NCES), administers an assessment program titled the National Assessment of Educational Progress (NAEP). The program's mathematical assessment

began in 1973 and continues to measure the achievement of a random sample of students from grades 4, 8, and 12 every four years (Dossey et al., 2016). The mean scale score in mathematics performance for students in Grade 4 in 2015 was 240, which is below the standard for proficiency (USDOE, 2018). Further, 82% of students in grade eight performed at or above the Basic level cut point, while 40% were performing at or above Proficient. Fourth grade Black students' performance has increased significantly with each test administered from 2005 to 2015 but is still far below the performance of White students (USDOE, 2018). In 2015, 67% of the nation's eighth grade students' performance fell below the Proficient level on the NAEP (USDOE, 2018). The gap score between White and Black students in 2005 was 34 scale score points. This decreased to 32 in the year 2015 (USDOE, 2018). NAEP results indicate that there is a consistent discrepancy between students based upon their race. The academic achievement in mathematics gap persists.

There has been a tendency to assume that as 'standards rise,' all students will share in the benefits of improving achievements, but analysis of education statistics proves this a false assumption (Gillborn, Demack, Rollock, & Warmington, 2017). One of the major targets of NCLB and ESSA is to steadily decrease the gaps in achievement levels among students with differing demographics. The NAEP results demonstrate that the goal of NCLB to eliminate differences in achievement between racial groups has not been met.

Strategies to Narrow the Achievement Gap

The existence of the academic achievement gap in mathematics has been established. The challenge now lies in what actions educational leaders will take to narrow the gap. Strategies used throughout the country in traditional brick and mortar schools and districts

are discussed below. Each of these strategies have resulted in varying degrees of success or failure. The challenge will be to determine if and how these strategies may apply in the virtual setting.

Culturally Responsive Pedagogy

Culturally responsive teaching aims to ensure that students are taught in environments where they feel safe and valued. In a culturally responsive classroom, a student's background is a strength and learning revolves around the incorporation of students' culture. Culture may include the language, literature, symbols, values, celebrations, representations, and beliefs shared by a human group (Banks & McGee, 2010). The intention is that as culture is embraced, students will feel less alienated from the school environment and learn more fluidly with greater academic success. The implementation of culturally responsive pedagogy has room for growth so that it is not superficial and moves toward deeper learning for students (Ebersole, Hanahale-Mossman, & Kawakami, 2016). In order to support maximum student achievement for all students, especially minority students, teachers ought to hold lofty expectations, infuse culturally relevant materials in their instruction, monitor and scaffold instruction through differentiation, and build strong connections between the home and school environments (Ford, Stuart, & Vakil, 2014). If these conditions are met, culturally responsive pedagogy advocates believe that students will thrive in an environment of supportiveness. Culturally responsive pedagogy may be helpful in narrowing the achievement gap, but further education of teachers and schools is needed for this to occur.

Early Childhood Education

The achievement gap exists even as students enter kindergarten. Some students have attended preschool or pre-kindergarten, while others are experiencing school for the very first time. This gap in knowledge may be lessened if all children have access to early childhood education (Webb & Thomas, 2015). There has been a push across the country to support access to early childhood education for all students. Early childhood education is essential if the gap is going to be narrowed in a manner that is sustainable over time.

Teacher Quality

Teachers are the greatest factor in student achievement at the school-based level (Berry, Daughtrey, & Wieder, 2009). High quality teachers can transform a child's trajectory in life. In order to close the achievement gap, excellent educators must be in front of the most fragile students. Quality teaching benefits every child, but it is most beneficial for students who enter the classroom with low achievement (Marshall, 2009). Quality teachers are able to facilitate student achievement and gains that will help narrow the achievement gap. Unfortunately, on average, disadvantaged students receive less effective teaching (Max & Glazerman, 2014). Quality teaching is one of the most powerful strategies that can be used to narrow the achievement gap. A quality education for every child in the United States will only be achieved if students are taught by highly effective educators throughout their education.

Teacher Demographics

Recently, there has been discussion of the implications of white teachers and non-white student populations in public education. Some argue that students perform better when

their teachers share the same race or culture as they do. Goldenberg (2014) conducted a literature review of examples of white teachers in predominantly non-white schools. He suggests that teachers use student actions and rhetoric as valuable cultural capital. Viewing culture as an asset and a fluid part of the learning process will support student achievement. Goldenberg (2014) also calls teachers to engage in self-reflection. Much of the research on the race of teachers and the impact on student achievement has been qualitative and case study specific. But this research supports the benefits of shared background characteristics (Goldenberg, 2014).

Community Schools

Finally, an approach to narrowing the achievement gap has been to create community schools. Community schools incorporate social services as well as academics on their campuses. They build strong partnerships with community programs and seek to become a wealth of resources for students, families, and the community. Poverty makes academic and social support less available to students; influences health, safety, and well-being; and undermines the ability of parents and schools to control the climate of schools (Noguera, 2001). Community schools seek to provide services that will lessen the effects of poverty as well as provide quality educational opportunities. Community schools do not exist in virtual education environments. Online learning occurs in a web-based format and while virtual schools may provide resources to students and families, there are typically not physical campuses for community school programs.

History and Development of Virtual Education

Virtual schools at the K-12 level began in the early 1990s and have grown significantly since then (DiPietro et al., 2008). Virtual education is a growing educational platform for students throughout the country, as it is becoming increasingly accessible to a large population within the United States. Florida Statute 1003 part 4 (Florida Legislature, 2013) requires that all students entering ninth grade in the 2013-2014 school year take at least one online course as a requirement for high school graduation. According to a study by Miron et al., (2018), in 2016-17, there were 429 full-time virtual schools with 295,518 students enrolled across the United States. Enrollments in virtual schools increased by 17,000 students between 2015 and 2016 (Miron et al., 2018). Students take online courses for graduation requirements, course recovery, acceleration, flexibility, and an array of other reasons.

The school district where this study took place is an online public education system that serves students in grades K-12 in the state of Florida and throughout the world via an online format. It was founded in 1997 and initially served only high school students. Today, even with the addition of grades 6-8 in 2005 and K-5 in 2014, the majority of students are still those in high school. During the 2017-2018 school year, there were approximately 207,000 students in the virtual school district. Only six percent of these are middle school students and two and a half percent were in elementary school. Nearly 92 percent of the virtual school district's students were in grades 9-12. Twenty-eight percent of the semester completions were done by minority students. Children and families choose virtual education for a variety of reasons. Many students need course credit in order to graduate from high school and meet this requirement through the virtual school district's web-based platform.

Others prefer the flexibility offered by virtual education, the ability to accelerate learning, and the ability to learn from locations around the world. Sixty-eight percent of the students are from public and charter schools, 25 percent are homeschooled students, and seven percent are from private schools. Students in the Flex program are able to take online courses at their own pace and engage in one-on-one instruction with their teacher through discussion-based assessments.

Instructors provide online K-12 education in a web-based format. Students work with teachers in a learning management system (LMS) that contains lessons, assessments, and communication. Instruction occurs in several settings such as synchronous lessons in online chat rooms, and asynchronous instruction through email, grading feedback, text messages, and phone calls. Synchronous instruction occurs immediately, as students receive feedback and communication from their teacher instantly. Asynchronous instruction occurs as teachers respond to students within specific timeframes, but not immediately. Virtual education today serves students with an array of demographics and has a diverse student population.

Best Practice in Virtual Education

In recognition of the need to address quality standards and identify best practices in virtual education, several organizations have proposed guidelines for the online learning community. The International Association for K-12 Online Learning (iNACOL) published National Standards for Quality Online Programs (iNACOL, 2011). The iNACOL standards cover “program leadership, instruction, content, support services, and evaluation” (p. 4). They support practices that adapt to meet diverse student learning styles; frequent interaction

and communication between student, teacher, and families; training for teachers in virtual instructional techniques, and the ability to use online learning technology (iNACOL, 2011). The Southern Regional Education Board (SREB) (2006) also published guidelines for the virtual education community. The guidelines focus on three areas of web-based courses: curriculum, instruction, and student assessment. Areas of emphasis include support for active learning; facilitation of student interaction, cooperation and community; frequent interactions between student, teacher, and parents; teacher responsiveness to student needs; and the development of interventions for unsuccessful learners (SREB, 2006). iNACOL chose to fully endorse the SREB standards in 2011, creating a comprehensive set of criteria (iNACOL, 2011). Both the iNACOL and SREB guidelines confirm that there are established best practices for virtual education. The standards are being used as part of teacher evaluation and in the development and evaluation of online courses (iNACOL, 2011). As online learning has continued to grow, these standards for best practice have provided guidelines for virtual education programs to use as they develop their programs.

Challenges to Online Learning

John Dewey (1938) wrote, “the general pattern of school organization [by which he means the relations of students to one another and to the teachers] constitutes the school an institution sharply marked off from other social institutions” (pp. 17-18). But does this statement transfer to web-based school systems? While teachers may try to transfer many of the skills they learned in the traditional classroom, the relationship inherently changes in an online learning environment, so the methods of instruction will change as well.

There is physical separation between student and teacher in virtual education. Consequently, a distancing effect may occur where a student may feel disconnected or

isolated (Wolcott, 1996). Virtual teachers are not able to use visual cues or physical proximity to build relationships with students and establish rapport. This creates a challenge to student learning as a teacher must employ novel strategies to ensure learning is maximized online.

Using Rogoff's (2003) "Interacting Planes of Development" model to analyze traditional versus online instruction may be helpful. This model has been used by educational researchers to examine where learning takes place for the teacher and student. In traditional classrooms, students and teachers learn together in a community, where teachers lead a group of students in developing common language, rules, values, beliefs, and activities (Rogoff, 2003). The community aspect is not as evident in online learning. Online learners and teachers work primarily in the individual and interpersonal planes of development where cognition, affect, behavior, motivation, beliefs, attitudes, and values of the student guide their instruction (Rogoff, 2003). The instruction provided by virtual teachers at the community plane during collaborative learning activities will not have the same impact when provided in the online learning environment because the community experiences are much rarer and classroom community has not been established (Rogoff, 2003). The lack of community aspect may affect the ability to narrow the academic achievement gap as much learning transpires in independent spheres within the individual plane.

Teacher Best Practice

Teachers in the virtual environment can use specific strategies to maximize student learning. There has been some support for the belief that developing students' self-motivation and self-regulation will be the best method to support their online learning (Barnard-Brak, Lan, & Paton, 2010; Schunk & Zimmerman, 2007). Another suggestion has

been that higher levels of social presence from instructors in an online learning format are needed for students to successfully learn (Zhan & Mei, 2013). It is also important for students to experience positive emotions involved with online learning. Negative emotions may hinder the learning process (You & Kang, 2014). Educators must work to give the same socio-cultural signals they may have otherwise used in traditional classrooms (Liu, 2004).

Online instruction lacks visual cues that exist in face-to-face classrooms. These visual cues assist teachers as they identify when a student is confused, frustrated, and bored. Virtual educators must use other skills to determine these student characteristics. These skills include written presentation skills, classroom management techniques, and the ability to engage and motivate students (DiPietro et al., 2008). Learner-centered instructional practices that support communication, collaboration, and build rapport are essential to address the effects of virtual education (Wolcott, 1996).

Many of the areas of competence needed by online educators are the same skills required of traditional brick and mortar teachers, but they take on new dimensions within the virtual learning environment (Cyrus, 1997). Areas of competence needed by virtual teachers include course planning and organization, presentation skills both verbal and non-verbal, collaboration, questioning techniques, content area expertise, and the ability to involve students (Cyrus, 1997).

Virtual educators must provide timely, specific, and individualized feedback to students. Liu and Cavanaugh (2012) studied Algebra courses in a K-12 virtual learning environment and found that quality feedback provided by the teacher to the student taking an online course has a significant and positive effect. Teachers should monitor and provide feedback frequently and consistently in the online learning environment (Liu & Cavanaugh,

2012). In order to encourage student achievement in virtual education, teachers ought to employ best practices that support their students.

Support for At-Risk Students

Students struggling to learn within the online platform must receive support to ensure learning occurs. Much of the support provided to students in the online environment occurs in the form of scaffolding, a term which originated from the zone of proximal development as proposed by Vygotsky (Vygotsky, 1978). The zone of proximal development refers to the distance between what a student is currently capable of doing and their optimal development if provided assistance (McLoughlin, 2002). Scaffolding can also be applied to virtual instruction (McLoughlin, 2002). Similar to the physical scaffolds used by builders to support construction, educational scaffolds are removed as learners develop their own skills and the additional support is no longer needed. Scaffolds are designed in a way that promotes student progression from teacher-directed learning to student-directed (McLoughlin, 2002). Students need adult supervision and support, and will participate more actively, demonstrate persistence, and be more responsive if they receive encouragement and guidance from an adult supervisor (Frid, 2002).

Students at risk for failure in online courses need multiple levels of support. They need academic support which includes frequent assessment of student progress, support materials such as guided notes and resources, organized study groups, tutoring, and consistent communication (Watson & Gemin, 2009). Students also need technical support including access to course content and help resolving problems with software and hardware. Online tutorials are a useful way to provide technical support (Watson & Gemin, 2009).

Finally, students need administrative support. This type of support involves student enrollment and orientation (Watson & Gemin, 2009).

School-level interventions in virtual education such as increasing communication between teachers and families and identifying at-risk students as early as possible are essential (Archambault & Crippen, 2009). Professional development for teachers and virtual school staff is also a valuable tool for supporting students. Trainings should include classroom management, coordinating services, and resources to support struggling students (Archambault & Crippen, 2009). Individualized, one-on-one support or small group instruction with scaffolding is effective in supporting students (Archambault & Crippen, 2009). With the appropriate supports in place, at-risk students will have an increased ability to succeed in online courses (Archambault & Crippen, 2009).

Virtual Teacher Evaluation

Teacher education is a major component in producing highly effective teachers (Mincu, 2015). Teacher evaluation has become a contentious and debatable area in education in the most recent years (Goe, 2013). The virtual school district studied in this research uses an Instructional Evaluation System approved by the Florida Department of Education (Florida Virtual School, 2015). A teacher's performance rating is a combination of Student Achievement Measures (35%), Instructional Practice score (55%), and other indicators of performance (10%) (Florida Virtual School, 2015). Three years of student performance data are used to calculate the Student Achievement Measures. The teacher evaluation framework for Instructional Practice is based on models and research from Charlotte Danielson, author of *Enhancing Professional Practice: A Framework for Teaching* (Florida Virtual School, 2015). A Teacher Evaluation Rubric is used by teachers'

administrators to score their performance during Informal and Formal Evaluations (Florida Virtual School, 2015). Teachers are observed at least twice a year and receive a mid-year evaluation as well (Florida Virtual School, 2015). Teachers also create an annual Professional Learning Plan and participate in monthly discussions with their administrator (Florida Virtual School, 2015). Other indicators of performance include reflective practice, professional development, quality of communication with stakeholders, and overall professionalism (Florida Virtual School, 2015). Each teacher is given a yearly rating of either Highly Effective, Effective, Needs Improvement, or Unsatisfactory (Florida Virtual School, 2015). Teachers receive feedback from their administrator during monthly discussions, immediately following their informal and formal observations, and on the mid-year and summative evaluation (Florida Virtual School, 2015).

The Achievement Gap in Virtual Education

Compared to national public-school enrollment, virtual schools had significantly fewer minority students and fewer low-income students. The proportion of special education students in virtual schools is just shy of the national average of 13.1% of students with disabilities in traditional public schools (Miron et al., 2018). The average student-teacher ratio in public schools was 16 students per teacher, but virtual schools have close to three times as many students per teacher relative to the national average. “Virtual schools continue to underperform academically,” although the margin was narrowed during the 2016-2017 school year (Miron et al., 2018, p. 5). Overall, 36.4% of full-time virtual schools received acceptable performance ratings (Miron et al., 2018). The graduation rate of 50.7% in virtual schools fell significantly below the national average of 83%.

The proportion of minority students in virtual schools had slowly increased a few percentage points between 2012 and 2013 as well as between 2014 and 2015, but since this time, the percentage has remained constant except for a 2.5 percentage point decrease in enrolled Black students. Cumulative data on student ethnicity from virtual schools continues to differ considerably from the national average. During the 2016-2017 school year, nearly 66% of the students in virtual schools are White, as compared to the national mean of 49.8% (Miron et al., 2018). The proportion of Black and Hispanic students in virtual schools is lower than the national average. Only 12.7% of students in virtual schools were Black, while the national average of Black students in public schools was 25.5% (Miron et al., 2018). Only 12.9% of students in virtual schools were Hispanic as compared to the national average of 15.5% (Miron et al., 2018). In 2015-16, the proportion of students in virtual schools with available data (359 schools) who qualified for free or reduced-price lunch (FRL) was 35.9% (Miron et al., 2018), which is 15.4 percentage points lower than the national average of 51.3% (Miron et al., 2018). The statistics demonstrate that virtual schools have a less diverse student population than traditional schools; thus, leading to the question of whether or not diverse students receive equal access within this new learning environment.

Student Performance at the Virtual School District on FSA and End-of-Course Exams

Students at the virtual school district in Florida in this study participate in several state-mandated assessments if they are public school students or students in the virtual school district's Full-Time program. A demonstrated achievement gap exists between the student subgroups on these assessments. The achievement gap is most noticeable in the End-of-Course exams (EOCs) for mathematics courses.

Data from the 2017 Algebra I EOC taken by the virtual school district's Full-Time students showed that 82% Asian, 25% Black, 75% Hispanic, 76% Multiracial, and 63% White students scored on/above grade level. There was a 38-point difference between White and Black students. Data from the Full-Time students' 2017 Algebra II EOC results demonstrated that 64% Asian, 8% Black, 29% Hispanic, 41% Multiracial, and 38% White students performed on/above grade level. There was a 30-point difference in the achievement results between White and Black students. Data from the Full-Time students' 2017 Geometry EOC scores show that 32% Black, 59% Hispanic, 33% Multiracial, and 63% White scored on/above grade level. There was a 31-point gap between White and Black students.

Student achievement results on the 2017 Algebra I EOC taken by students in the virtual school district's Flex program also demonstrate an academic achievement gap. Data from Flex students on the Algebra I EOC reports that 59% of White students, 29% of African American students, 39% Hispanic students, 26% English Language Learners (ELLs), 36% of students on Free or Reduced Lunch (FRL), and 57% of students not on FRL performed on or above grade level. There was a 30-point difference in the achievement results between White and Black students and a 33-point difference between White students and ELLs. There is a 21-point difference between students on FRL and their peers who are not receiving FRL. The student achievement results provided demonstrate an academic achievement gap in mathematics between White students, Black students, ELLs, and students receiving FRL at the virtual school district studied.

Across the state, there is also an academic achievement gap found in the results of standardized assessments. Data from the 2017 Algebra I EOC taken by students throughout

the state of Florida showed that 43% Black, 54% Hispanic, and 71% White students scored on/above grade level (FDOE, 2017). There was a 28-point difference between White and Black students and a 17-point difference between White and Hispanic students. Data from the state wide 2017 Algebra II EOC results demonstrated that 30% Black, 45% Hispanic, and 57% White students performed on/above grade level (FDOE, 2017). There was a 27-point difference in the achievement results between White and Black students and a 12-point difference between White and Hispanic students. Data from the 2017 Geometry EOC taken by students across Florida show that 31% Black, 64% Hispanic, and 66% White scored on/above grade level (FDOE, 2017). There was a 35-point gap between White and Black students and a 2-point gap between White and Hispanic students. There is an academic achievement gap found in data from students in the virtual learning environment, as well as EOCs taken by students throughout the state.

Algebra I

Algebra is the area of mathematics that utilizes letters and symbols to represent numbers and values (Moseley & Brenner, 2009). It is a course typically taught to students in grades eight through ten, depending upon the school district or state. Algebra skills are foundational toward the production of higher-order mathematical knowledge and skill (Clotfelter, Ladd, & Vigdor, 2012). Algebra I is a key step on the path to college and career readiness (Stoelinga & Lynn, 2013). It is often taken after a prerequisite Pre-Algebra course where students learn foundational concepts. Pre-Algebra asks students to progress from concrete thinking to an abstract model where numbers are replaced by variables and students calculate the value of the variable (Moseley & Brenner, 2009). High school mathematics

courses typically follow a sequential progression; students must complete Algebra I successfully before they proceed with Geometry, Algebra II and then more advanced courses such as Trigonometry, Pre-Calculus, and Calculus (Heppen et al., 2012). The majority of states and school districts within the United States impose an algebra course as a requirement for high school graduation (National Center for Education Statistics, 2012). This graduation requirement also usually entails taking and passing an end of course exam. Previously, Algebra II was also a requirement for graduation in the state of Florida, but Florida Statute 1003 part 4 eliminated this requirement for the 2013-2014 school year (Florida Legislature, 2013).

Algebra students are expected to master knowledge and skills that can be classified into three domains: conceptual knowledge, procedural knowledge, and procedural flexibility (Star et al., 2015). Conceptual knowledge ensures that students understand algebraic ideas, operations, procedures, and notation (Star et al., 2015). Procedural knowledge involves selecting operations and procedures to solve problems and applying them to arrive at the correct solutions (Star et al., 2015). Finally, procedural flexibility is identification and implementation of multiple methods to solve problems (Star et al., 2015).

Challenges to Success in Algebra I

Algebra I is often the very first course taken by students that requires them to engage in abstract reasoning and critical thinking that makes mathematics meaningful (Vogel, 2008). It is a course widely known as the “gateway” to advanced high school mathematics and science (U.S. Department of Education, 1997). Early success in Algebra I facilitates students’ ability to take more advanced mathematics courses (Paul, 2005; Spielhagen, 2006)

and achieve higher mathematics scores (Kurlaender, Reardon, & Jackson, 2008). But many students struggle with Algebra I. The National Mathematics Advisory Panel (2008, p. xii) stated that “although our students encounter difficulties with many aspects of mathematics, many observers of educational policy see Algebra as a central concern.”

There are several proposed reasons why Algebra I is such a struggle for students. It is a transition point in mathematics; the first course where generalized models, mathematical abstractions, and understandings of variables and symbols are required (Stoelinga & Lynn, 2013). It is more difficult than the numbers and operations found in younger grades, and students may be underprepared for algebraic thinking (Stoelinga & Lynn, 2013). There is a “leak in the pipeline” from Algebra I to more advanced mathematics classes (Liang, Heckman, & Abedi, 2012, p. 338). A student’s trajectory toward higher level mathematics classes may be stopped by Algebra I. When students struggle in this course, or even fail, their path to advanced classes is deterred. Because Algebra is considered the precursor to post-secondary opportunities and economic potential in the workforce, it is essential that students are successful (King-Sears, Brawand, Jenkins, & Preston-Smith, 2014).

Difficulties with Algebra I have led many students to repeat the foundational mathematics course. One study of 3,400 students in California found that 44.3 percent repeated Algebra I (Fong, Jaquet, & Finkelstein, 2014). A student’s course grade, teacher recommendation, or score on a standardized assessment such as an end of course exam can result in their required repetition of Algebra I (Fong et al., 2014). Repeating Algebra can be detrimental to the student and the school district (Fong et al., 2014). Students may be demoralized, and they miss the opportunity to take other mathematics courses (Fong et al., 2014).

There have been noted discrepancies in achievement and access when minority students are compared to non-minority peers in Algebra I. Continued inequities in access to algebra classes that include rigor have excluded many students from higher mathematics classes, particularly minority students (Stoelinga & Lynn, 2013). Students in urban high schools where students are predominantly low income and minority are at a high risk of failing to earn their high school diploma, often because prerequisite courses such as Algebra I are not completed successfully (Cortes et al., 2013). Algebra I is essential for student academic success in most states; yet it is a persistent challenge for students across our nation.

The shortage of certified mathematics teachers in Florida further complicates the endeavor to improve student achievement in Algebra I across the state. While there are teacher shortages in multiple subject areas, there is a critical need for teachers certified in mathematics (FDOE, 2018b). A substantial number of teachers are teaching mathematics courses who are not certified in the appropriate field (FDOE, 2018b). Exacerbating the problems posed by the significant vacancies across the state, postsecondary institutions are not producing enough graduates to fill positions needed by Florida's K-12 student population (FDOE, 2018b). As a result of these issues, 6.75% of teachers teaching mathematics are certified in areas other than mathematics (FDOE, 2018b).

Strategies to Support Algebra I Success

Many actions have been taken to address the challenges of the Algebra I requirement. One strategy has been to delay student enrollment in Algebra I if they are underprepared (Stoelinga & Lynn, 2013). Another has been to stretch the curriculum over a two-year time frame (Stoelinga & Lynn, 2013). One of the most widespread methods to increase student

success in Algebra has been to encourage enrollment earlier than high school. Regardless of the specific strategy taken, it is evident that a rigorous approach to algebra must be taken for all students (Stoelinga & Lynn, 2013).

Algebra for All

Algebra instruction in middle school has been widely proclaimed as a method to improve mathematics achievement and college readiness for high school students (Clotfelter et al., 2012). The U.S. Department of Education asserted that expanding access to Algebra I for eighth grade students should be a priority for all states (U.S. Department of Education, 1997). A 2008 report by the National Mathematics Advisory Panel recommended that “all prepared students [should] have access to an authentic algebra course—and [that districts] should prepare more students than at present to enroll in such a course by Grade 8” (National Mathematics Advisory Panel 2008, p. 23). Students who take Algebra I in middle school have stronger mathematical skills and continue over time to take more mathematics courses than other students (Heppen et al., 2012).

A widespread approach has been to mandate algebra for all students (Stoelinga & Lynn, 2013). The Clinton administration made enrolling all children in an algebra course by the end of eighth grade a national goal (Loveless, 2008). In states where policy has chosen algebra for all, most often students are grouped by ability. In these settings, students in the lower skill classes receive less rigorous instruction and teachers with less capacity (Stoelinga & Lynn, 2013). Minority students are disproportionately placed in these classes where low expectations regarding their achievement prevail (Stoelinga & Lynn, 2013). While algebra for all was successful in increasing enrollment in the course, it was not successful in raising achievement (Loveless, 2008). Algebra for all has seen very little improvement in students’

failure rates (Cortes et al., 2013). It also resulted in students misplaced in advanced courses (Loveless, 2008). These misplaced students are more likely to come from poor families and are overwhelmingly minority students (Loveless, 2008).

Double Dose Algebra

Another attempt to increase student achievement has been labeled, “double-dose Algebra” (Cortes et al., 2013). This method requires students to take two periods of algebra in ninth grade if they test below the national median on the mathematics portion of the eighth-grade standardized test (Cortes et al., 2013). Cortes et al. (2013) found positive and substantial impacts of double-dose algebra on college entrance exam scores, high school graduation rates, and college enrollment rates in their study of two cohorts of students in Chicago Public Schools. Providing increased instruction in algebra may prove a helpful strategy in supporting student success.

Early Exposure to Algebra

Early exposure to algebra is critical for student success and is linked to higher performance (Stoelinga & Lynn, 2013). Algebra policy should focus on early student learning and not completing a course (Loveless, 2008). Prerequisite skills should be taught and assessed, and elementary mathematics must be emphasized, with early intervention provided to students who struggle or fall behind (Loveless, 2008). If students are prepared with the foundational mathematics skills in algebraic thinking, they will be more successful in later higher order mathematics courses such as Algebra I.

Teacher Quality

Teacher quality “trumps virtually all other influences on student achievement” (Stoelinga & Lynn, 2013, p. 11). There must be a commitment to development of teacher content knowledge and pedagogical skill in Algebra I. The most qualified teachers should be assigned to algebra courses, particularly those where underprepared students are enrolled (Stoelinga & Lynn, 2013). Preservice and in-service teacher professional development should support teachers as they build capacity and positively support student achievement (Stoelinga & Lynn, 2013). A commitment to student success in Algebra I must include a commitment to building teacher capacity and effectiveness.

Instructional Best Practice

The Institute of Education Sciences (IES) published a practice guide that provides educators with evidence-based recommendations that address the challenges of teaching Algebra I (Star et al., 2015). The guide synthesized all the quality available research and shared best practices for instruction, including examples for each concept presented (Star et al., 2015). The guide highlights three themes for improving algebra learning and instruction: (1) developing a deeper understanding of Algebra; (2) promoting process-oriented thinking; and (3) encouraging precise communication (Star et al., 2015). Three overarching recommendations are made as teaching strategies for improving algebra knowledge. These recommendations include: (1) use solved problems to engage students in analyzing algebraic reasoning and strategies; (2) teach students to utilize the structure of algebraic representations; (3) teach students to intentionally choose from alternative algebraic strategies when solving problems (Star et al., 2015). Stoelinga and Lynn (2013) proclaim that algebra policy should include procedures that ensure equitable rigor for all students so

that they are prepared before algebra, supported during algebra learning, and provided with teachers with a strong capacity for algebra instruction. Quality Algebra I instruction incorporates rigor along with the recommendations of the IES.

Algebra I Online

Virtual education has the potential to increase accessibility to Algebra I and provide a diverse format for student learning (Heissel, 2016). The National Council of Teachers of Mathematics (NCTM) supports the use of technology in mathematics education and stated that “technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students’ learning” (2000, p. 11). Students benefit from technology integration because students at differing levels of mathematical skill can visualize and explore in multimedia environments that expand their comprehension and foster understanding in novel ways (Hohenwarter, Hohenwarter, & Lavicza, 2008). NCTM (2000) also proclaims that utilizing technology in the classroom has the potential to increase student learning. The *Principles and Standards of School Mathematics* have the “Technology Principle” as one of the six principles that encourage quality mathematics education (NCTM, 2000). The principle posits that “technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students’ learning” (NCTM, 2000, p. 24). Algebra I at the virtual school district in Florida incorporates technology ceaselessly. This “gateway” course may prove a challenge for many students across the nation, but an online environment provides a unique opportunity for mathematics instruction.

Heppen et al. (2012) conducted a randomized control trial that aimed to guide policy makers as they sought to provide access to Algebra I to eighth grade students through virtual learning. They measured the effects of online Algebra I to students demonstrating skills ready for the course in schools that do not normally offer the course. Results indicate that online Algebra I is an effective way to increase access to the course in schools that would not typically offer it (Heppen et al., 2012). Students' achievement was significantly affected in a positive manner and students' likelihood of enrollment in an advanced mathematics course increased (Heppen et al., 2012). The study demonstrates that implementation of online courses can be effective in promoting student success when they would otherwise not have the opportunity (Heppen et al., 2012).

There has also been research focused on postsecondary education using virtual education. A meta-analysis by the U.S. Department of Education (2009) found that online learning has positive effects compared to face-to-face instruction. Offering online courses is a way for schools to expand their available curriculum and provide greater access to students (Heppen et al., 2012). Virtual education has grown in popularity as a result of technological advances and the flexibility that the courses provide to content and instruction (Heppen et al., 2012). Online courses broaden the pool of qualified teachers and expand course offerings for students (Heppen et al., 2012). Algebra I taken in a virtual learning environment may prove a beneficial way to increase student achievement and broaden access to quality instruction.

Highly Effective Teachers

Schools across our nation contain highly effective teachers, mediocre teachers, and inadequate teachers. It is assumed that each category of teacher effectiveness impacts how much students learn (Hassel & Hassel, 2010).

Defining a Highly Effective Teacher

A highly effective teacher is difficult to define because there are so many diverse individuals able to achieve significant gains with students. The 2004 reauthorization of IDEA included a definition of what it means to be a “highly qualified teacher,” and requires that teachers possess “adequate academic content knowledge” (Seidl & Pugach, 2009). However, a “highly qualified teacher” is not synonymous with a highly effective teacher. Highly effective teachers demonstrate their skill through the value-added model based on learning gains on standardized state assessments (Max & Glazerman, 2014). They are motivated and committed to reform (Mincu, 2015). Studies have demonstrated that teachers are significantly more effective if they enter the profession fully prepared, are certified in the content area they teach, achieve high scores on their licensing tests, graduate from a competitive college or university, and have at least two years teaching experience (Berry et al., 2009). *A highly effective teacher* can be defined as an instructor who has demonstrated success through data, is fully certified, utilizes evidence-based practices for differentiated instruction, possesses a strong background of achievement, and has at least two years of prior teaching experience (Berry et al., 2009).

Strategies Used by Highly Effective Teachers

Highly effective teachers routinely use evidence-based practices in their classrooms that result in student achievement. Teacher effectiveness encompasses a plethora of factors, but certain best practices are consistently implemented. Overall teaching competence is valuable, as well as coverage of curriculum, instructional approach taken, level of structure provided, implementation of differentiation to meet individuals' needs, and actionable and timely feedback given to students (Mincu, 2015). Constant and comprehensive assessment also contributes to student success. Highly effective teachers use research-based strategies that are proven to result in student achievement outcomes.

Highly effective teachers strategically utilize strategies when it is most appropriate in order to motivate students to produce academic achievement results. Broadly, support for content lessons, routines, and strategies enacted on the spot must be mastered for effective teaching (Marzano, 2009). Highly effective teachers are able to discern the appropriate time and lesson to employ each best practice so that its benefits are maximized with students.

The ability to form strong relationships is a necessary skill of an effective teacher. Teachers who build solidarity with their students are able to achieve greater results. They are “deeply invested in their students’ lives and communities” (Boucher, 2016, p. 104). Relationally skilled teachers are more than just caring. These teachers “defend, support, coach, mentor, and provide for their students in ways that put student needs first, as well as see themselves as part of the communities beyond the school” (Boucher, 2016, p. 91). The best teachers demand a great deal from their students and love them wholeheartedly (Delpit, 2012). Their lofty expectations reach every student, and they encourage each child to reach their potential. These teachers return work that is incomplete, get angry over students’

mistakes, and cry at their children's failures. They push for academic excellence at all times and ensure students are supported socioemotionally (Delpit, 2012). Highly effective teachers achieve their success through pedagogy as well as relational solidarity and skill.

Impact of Highly Effective Teachers on the Achievement Gap

Nothing is more important in the education of a child than their teacher (Delpit, 2012). Teachers are the greatest factor in student achievement at the school-based level (Berry et al., 2009). Quality teaching benefits every child, but it is most beneficial for students who enter the classroom with low achievement (Marshall, 2009). Unfortunately, on average, disadvantaged students receive less effective teaching (Max & Glazerman, 2014). It is noted that teachers who champion every child's academic success are the most effective (Delpit, 2012).

In the past, teacher effectiveness may have been measured by subjective assessments and the teacher's number of years' experience in education. Currently, a value-added model is being used in many states to evaluate the effectiveness of teachers and other instructional personnel. The value-added model analyzes the learning gains made by students within a teacher's classroom for one year (Harris & Sass, 2009). It has also been found that school principals can generally determine their most effective teachers when using subjective ratings scoring systems (Harris & Sass, 2009). However, past value-added measures are the best predictor of performance with students (Harris & Sass, 2009). There are general principles of effective teaching that directly affect standardized test scores (Good, 2014). Teachers that provide an opportunity to learn, make an effective use of time, focus on meaning and practice, possess high expectations, and have strong classroom management are able to reach higher levels of achievement on assessments (Good, 2014). Students taught by teachers with

consistently high value-added measures are able to achieve more. Highly effective teachers are able to achieve great results on standardized assessments, and therefore support the elimination or minimization of the achievement gap.

Teacher Beliefs

Teachers' beliefs greatly influence their instructional decisions. According to Fives and Gill (2015), there is a close relationship between teachers' mathematical beliefs and their approaches to instruction. *Beliefs* are broadly defined as mental representations that are essential components of an individual's conscious thought, developed over a lifetime of experiences and interactions with the world and others (Fives & Gill, 2015). Beliefs provide a framework that guides one's daily experiences and actions. A teacher's beliefs will direct their actions in the classroom, and they may hold beliefs regarding content as well as beliefs about individual students.

Teacher Beliefs Related to Mathematics

According to Handal (2003), *teachers' mathematical beliefs* refers to the system of beliefs related to teaching and learning mathematics held by teachers. Research demonstrates that both internal and external factors and experiences affect teachers' beliefs and practices (Handal, 2003). Beliefs are originally shaped from one's own experiences as a student and continue to be formed during observations of other teachers. Beliefs will influence teacher instructional practice, and practice will influence belief. It is a complex relationship (Handal, 2003). Despite educational reforms, many teachers still possess traditional beliefs on mathematics instruction and continue to teach mechanically rather than constructively.

Fives and Gill (2015) posited that teachers may possess two distinct sets of beliefs: beliefs about the nature of mathematics and beliefs about pedagogy. There is a connection between teachers' content-specific beliefs and their efficacy and knowledge (Fives & Gill, 2015). Teachers with stronger efficacy are more open to new ideas and strategies to teach mathematics (Fives & Gill, 2015). There is significant alignment between teachers' beliefs about mathematics and their observed classroom practices (Stipek, Givvin, Salmon, & MacGyvers, 2001). A substantial connection between teachers' self-confidence level as mathematics instructors and their students' self-confidence as mathematics learners exists. Teacher beliefs regarding mathematics instruction and pedagogy undeniably affects the instruction they provide to their students, and the consequential student learning.

Teacher Beliefs about Cultural Diversity

In addition to beliefs regarding content areas such as mathematics, teachers also hold beliefs regarding a plethora of other topics. Research has found consensus on several findings related to teachers' beliefs about cultural diversity. In a study about teachers' beliefs on how to respond to student differences, researchers found that many teachers believe the most appropriate way to deal with cultural, ethnic, and racial diversity is to ignore it (Fives & Gill, 2015). Some teachers prefer to proclaim colorblindness and deny widespread educational and societal inequities. Teachers often choose to focus on human similarity and believe that acknowledging explicit differences would be a form of racism or lead to contention and division. Teachers lack confidence in their own ability to positively address cultural diversity (Fives & Gill, 2015).

Some teachers held the belief that the achievement problems of students of color are their own fault and can be overcome by effort and determination, aligning with the ideal of

the ‘American Dream’ (Fives & Gill, 2015). Research has found a strong connection between teachers’ personal experiences and their professional beliefs about cultural diversity (Fives & Gill, 2015). A teacher’s beliefs about cultural diversity are extremely valuable. Teacher beliefs form the foundation for the relationship between a child and his or her educator. When a teacher holds different expectations for a child, this affects the treatment of the child, and leads to diverse student outcomes (Fives & Gill, 2015).

Kottler (1997) asserts that all teachers possess inherent cultural biases that are harbored within the individual, leading teachers to prefer certain students over others. A teachers’ preferences will affect how they interact with their students. Societal and personal socialization has created narratives within teachers and these narratives drive their actions daily. Teachers’ mindsets and beliefs affect their actions, which affect student actions and lead to student achievement results.

Summary

In this chapter, the researcher reviewed the history of the achievement gap, mathematics education, and virtual education. Further, the researcher discussed the research regarding strategies to narrow the achievement gap in both traditional schools as well as in virtual learning environments, which, along with current statistics, support the notion that a persistent achievement gap for mathematics in public, as well as virtual, schools, exists. Finally, the researcher presented literature regarding the impact of teachers’ beliefs on their teaching practices, and thus, their students.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

Introduction

A review of the literature and related data demonstrate a persistent gap in mathematics achievement between White students and Black students. However, there is a dearth of research focused on the role of the teacher in narrowing the achievement gap in virtual learning environments. The purpose of this study is to examine the lived experiences of online Algebra I teachers as they provide instruction to minority students. A qualitative research design has been utilized to examine their lived experiences.

The purpose of qualitative research is to examine a phenomenon in full detail, using a flexible design and inductive approach. Qualitative research puts an idea in context, interprets behavior, and seeks understanding from diverse perspectives. The researcher is the primary data collection instrument and small samples are used to provide narrative description (Ary et al., 2013). Qualitative research starts with the assumption and use of theoretical frameworks that guide the study of research problems prescribing the meaning that groups or individuals place upon a problem (Creswell, 2013). Data are collected in a natural setting during interviews, observations, focus groups, or document review. Data analysis aims to establish patterns or themes. Common key elements of qualitative research include a natural setting, the researcher as a key instrument, multiple methods of inquiry, complex reasoning, participants' meaningful reflection, emergent design, reflexivity, and holistic accounts (Creswell, 2013). Qualitative inquiry permits the researcher to grasp a complex and comprehensive understanding of a phenomenon in its natural setting (Creswell, 2013). A qualitative study built on a phenomenological approach that seeks to understand

the lived experiences of virtual teachers allows the researcher to study constructs that are critical to education practice and research.

In this chapter, the researcher provides a summary of the methodology used to investigate Algebra I virtual education teachers' lived experiences instructing minority students at a virtual school district in Florida. This chapter defines the research question and describes the design rationale and structure. It further includes description of the study's sample, instrumentation, data collection procedures, and data analysis procedures.

Research Question

The purpose of this study was to examine the perspectives of teachers through their lived experiences in an online learning environment, specifically, as they related to their experience teaching minority students in Algebra I. A qualitative approach was chosen to gain insight into the perceptions of Algebra I teachers in a virtual education platform. The researcher used the following research question to guide the study: What are the lived experiences of Algebra I virtual education teachers, as they relate to the instruction of minority students?

Research Design

The most appropriate research approach and design to investigate the lived experiences of teachers in an online learning environment is a qualitative research study. Understanding the reality from the viewpoint of the individual within the role is a necessary starting point for constructing a theory of the meaning (Fullan, 2007). The focus of the

research was on constructing meaning from the experiences of individuals. As a result, a phenomenological research design was used (Ary et al., 2013; Merriam, 2002).

The Phenomenological Approach

Background of the Methodology

This study used a phenomenological research design to answer the research questions. This research design facilitated data collection that is ripe with rich descriptions of each individual's lived experience of a phenomenon as he or she experiences it (Creswell, 2013). Phenomenological research designs are derived from twentieth-century philosophy and have been used in many areas of research (Creswell, 2013). Edmond Husserl, a German mathematician and philosopher, created the term "phenomenology" and is known as the founder of the design (Vandenberg, 1997). Husserl proposed that the essence of a phenomena can be found within data related to an individual's experience, perception, and memory (Moustakas, 1994). Phenomenological research allows the researcher to examine the phenomena in an unprocessed form before it is analyzed, classified, or defined (Husserl, 1970). It offers insight into the surrounding world (Creswell, 2013).

In a phenomenological research study, data emerges without the researcher's intervention (Moustakas, 1994). The phenomena can only be drawn through direct experience with it and cannot be garnered through indirect knowledge (Gadamer, 1989). The philosophical intent of a phenomenological research design is that of description and not explanation or analysis (Merleau-Ponty, 1956). In order to attempt to remove researcher bias that is inherent in the human experience, a process to set aside researcher bias must be incorporated into phenomenological research (Moustakas, 1994).

Phenomenology

Phenomenological research is “a type of qualitative research designed to gain an understanding of how participants experience and give meaning to an event, concept or phenomenon” (Ary et al., 2002, p. 565). There are seven different approaches to phenomenology (Embree, 1997). A descriptive approach has been employed during this research study. This descriptive phenomenological approach allows the researcher to describe in detail a phenomenon, and also permits interpretation of the data collected. After the lived experience of the phenomenon is described, the researcher can make meaning (Creswell, 2013). During this stage of phenomenology, the researcher must ensure that objectivity is sought and the influences upon data analysis are accurately described. Consequently, positionality must be examined, and bracketing occurs so that misinterpretation of data is avoided.

Rationale for Research Design

A phenomenological study describes the shared meaning of several individuals based on their lived experiences (Creswell, 2013). Data collected through interviews provide verbatim quotes and direct reporting strategies using the voice of the participant. This allows the researcher to incorporate the voice of the participant, and readers can interpret the data using their own personal understanding (Creswell, 2013). Thick descriptions of teachers’ lived experiences are essential to understanding the phenomenon of the academic achievement gap in virtual education. A qualitative, phenomenological research design aligns with the goal of developing a deeper understanding of the shared experiences of teachers instructing minority students in a virtual learning environment (Creswell, 2013).

The focus of this study is the shared lived experiences of teachers supporting Algebra I, in a virtual learning environment as they relate to minority students.

Instrumentation and Qualitative Research Protocols

Human Research Procedure

This study used research design procedures for phenomenology proposed by Creswell (2013) and Moustakas (1994). Appropriate permissions for the study were obtained through the University of Central Florida's (UCF) Institutional Review Board (IRB). All IRB forms were submitted, and research ensued once approval was received (see Appendix A). Having received approval from the UCF IRB, the researcher completed the Research Request Proposal at the virtual school district in order to gain access to data and approval for teacher interviews. Participants were at minimal risk during this study and their informed consent was obtained prior to participation (see Appendix B). Participation was voluntary, and withdrawal was permitted at any time during the study.

Confidentiality of participants and data was protected. Data access was limited, and password protections were implemented. Participants were assigned alphanumeric codes for identification instead of names. Identifying data were not used in any publication. Identities were confidential through transcription as well. Participants were asked to omit names of schools, students, colleagues, and all identifying data during their interviews. The transcription service used requires employees to sign confidentiality agreements and ensures all files are secured. Data will be disposed after the prescribed time has passed.

Bracketing

Before the start of data collection in this study, the researcher participated in the bracketing process. Bracketing is the process of intentionally “putting aside one’s own belief about the phenomenon under investigation or what one already knows about the subject prior to and throughout the phenomenological investigation” (Chan, Fung, & Chien, 2013, p. 1). Bracketing adds validity to the results of a phenomenological study. In order to decrease the researcher’s influence upon interpretation of data collected, bracketing requires the researcher to identify and describe her personal experiences, biases, assumptions, and cultural influences (Creswell, 2013). Because the researcher actually *is* the instrument for data collection in a qualitative study, bracketing is extremely important. The researcher’s role is embedded in the study and can be subjective leading to an impact upon the data analysis (Creswell, 2013). Consequently, bracketing was employed.

Procedures used in bracketing included a statement of positionality, a bracketing interview, and a peer-debriefer (Creswell, 2013). The positionality statement was written at the start of the study and provides an overview of the researcher’s educational and professional background, as well as her perspective on the construct and experiences with the phenomena. This allows the reader to draw conclusions about the researcher’s data analysis of participants’ experiences (Creswell, 2013). The positionality statement is included towards the conclusion of this chapter.

The bracketing interview was conducted prior to the start of the research study. A current doctoral candidate with experience pertaining to the achievement gap was selected to interview the researcher. The interview was comprised of questions about the researcher, including her educational and professional background as well as the researcher’s experience

with the phenomenon. The bracketing interview is available to the reader to facilitate interpretation of data analysis and is included in Appendix C.

Finally, peer-debriefing occurred (Hycner, 1985). A peer-debriefer with knowledge of qualitative research was chosen to review the interview transcriptions and data analysis documents. The criteria for peer-debriefer selection included that the debriefer (a) was a current or former doctoral candidate and (b) had self-reported knowledge and interest in qualitative research. The selected peer-debriefer was a recently graduated post-doctoral scholar with her Ph.D. from the same university where research was conducted. The peer-debriefer was provided digital copies of each participant's interview transcript and the Excel file containing data analysis. She was given thorough instructions and asked to state whether she agreed or disagreed with each relevant meaning and related theme assigned to the data by the researcher. Instructions for conducting inter-coder reliability were provided (see Appendix D). Implementing a positionality statement, bracketing interview, and peer-debriefing enlightened the researcher to potential preconceptions held that might influence the research study.

Participant Sampling and Recruitment

Sampling

Purposive and criterion sampling methods were used in this study to select participants (N = 5) (Creswell, 2013; Ary et al., 2013). The population for this study was Algebra I teachers at a selected virtual school district in Florida. Teachers at this virtual district must possess at least two years' experience in a traditional brick and mortar classroom as a condition to their hiring. The only exception are teachers who successfully

completed a college level junior or senior internship with the virtual school district.

Purposive, criterion sampling allowed the researcher to gather individual accounts of experiences that are most closely related to the phenomena. Teachers with experiences related to mathematics instruction in virtual education were sought for participation in the study. They were selected as a result of their experiences so that data gathered answered the research question (Creswell, 2013). It is established that teachers have experience teaching minority students by the fact that 29% of K-12 students at the virtual school district in Florida are minority students and teachers instruct approximately 300 students per year (Florida Virtual School, 2017).

A sample size of three to ten participants is recommended in phenomenological research (Dukes, 1984). The goal is not to have a certain number of participants, but rather to saturate, or fully develop the exploration of the phenomenon by collecting extensive detail about each individual (Creswell, 2013). The goal is to explain the specifics of each participant's experience in depth (Creswell, 2013). The virtual school district has 44 Algebra I teachers. Of these teachers, 32 met criteria for participation in the research study. A representative from the Analysis, Assessment, and Accountability department at the virtual school district emailed each potential participant inviting them to participate in the research. Five teachers responded positively, willing to participate in the research.

Participant Criteria

The first step in selecting a sample is to determine essential criteria for choosing participants (Merriam, 2002). From the population, participants were selected using the following inclusionary teacher participant criteria: (a) state certification in mathematics instruction; (b) two or more years' experience teaching Algebra I in the virtual learning

environment; (c) employment at the selected virtual school district in Florida; and (d) currently teaching Algebra I. This criteria for participants resulted in similarities among participants, while still allowing data collected to be rich and diverse (Creswell, 2013).

Participant Demographics

Participant demographics were identified through a demographic survey (see Appendix E). Demographics including gender, age, race, certifications, years teaching at the virtual school district in Florida, total years of teaching experience, and levels of education were surveyed. Five participants (N = 5) were included in this study. Three of the participants were male and two were female. One participant identified as African American, one as White, one as Asian, and two as Puerto Rican. Their ages ranged from 26 to 44, with an average of 34 years old. The average years of teaching experience was 8, with a range from three to 18. Their average years at the current virtual school was five and a half, with one teacher having as few as two and the longest tenure of eleven years. All teachers were certified in Mathematics 6-12, and several others added Mathematics 5-9 or Science 5-9 to their certifications. Three of the teachers became certified in mathematics in the state of Florida after receiving their undergraduate degree, one was certified after a two-year master's degree, and one received alternative certification in mathematics instruction. Three of the five teachers possess a master's degree, and one teacher had begun work on her doctorate degree.

Data Collection Procedures and Instrumentation

Phenomenological research design characteristically involves the researcher interviewing individuals who have shared experiences with the phenomena of focus (Creswell, 2013). After interviews were conducted, a demographic survey was provided and completed by each participant (see Appendix E). This was administered after the interviews so that the survey questions on minority students did not influence participants' interview responses. The demographic survey was created through Qualtrics and included 13 questions regarding participants': (a) personal information (i.e., gender, age, race); (b) current employment status; (c) areas of teaching certification; (d) teacher experience (i.e., number of years teaching total, subject(s) taught, grade levels taught); (e) virtual education experience (i.e., years teaching at the virtual school district in Florida, positions within the virtual school district in Florida, other virtual experience); and (f) route to teaching certification (i.e., certification program; education: where and when degrees were received, highest level of education).

Interview Process

After bracketing, the researcher developed an open-ended, standardized interview protocol (Creswell, 2013). The interview was designed to elicit information related to the teachers' experiences providing mathematics instruction in both a traditional classroom and online. It explored their experiences instructing minority students in Algebra I online. After participants were identified, the researcher contacted them via email to arrange a date and time for the interview. Because the instructors for the virtual school district in Florida are located throughout the state of Florida, interviews were conducted using Skype for Business.

Video capability was not used because the district's Research Request Proposal stated that videography is not approved during research within the district. Interviews were scheduled at the participants' preferred time and date. They began November 12, 2018 and concluded November 14, 2018. The length of the interviews varied and was reliant on the participants' reply to each question. The interview length ranged from 13 minutes to 33 minutes.

During the interview, the researcher used the interview protocol to ask all questions verbatim. The researcher asked clarifying questions as needed. All interviews were recorded and saved with the permission of the participant. A transcription service was used to transcribe the interviews. Recordings were saved on the researcher's computer and digitally provided to the transcription service through a secure website. Transcriptions included participants' non-verbal communication such as filler words, laughter, repeated words, and pauses. Participants were provided the opportunity to review the verbatim transcription of the interview to ensure the validity of the data (Hycner, 1985). Only one participant noted changes, which were related to phonetic inconsistencies, not content of the interview transcript. This process, often labeled 'member checking,' allowed participants to verify that the transcription captured their experience correctly and provide any additional clarification if needed (Creswell, 2013).

Interview Questions

Interview questions for this study were developed to elicit the lived experiences of the participants related to their instruction of minority students in Algebra I in the virtual learning environment. Questions sought to build rapport between the participant and researcher, and prompt in-depth responses that would capture the participants' experiences (Moustakas, 1994). An expert in qualitative research was asked to review the interview

protocol and ensure its validity and reliability. Semi-structured interviews were employed, and open-ended questions were utilized so that the researcher was able to remain flexible, asking probing questions that elicited greater detail in participant responses (Creswell, 2013). The interview protocol for this study is included in Table 1.

Table 1

Interview Protocol for Algebra I Virtual Teachers

Data Type	Interview Questions	Probing Questions
Build Rapport, Background Information	Tell me a little about yourself.	Position/Content Taught Time at virtual school
Mathematics Teaching Experience (Brick/Mortar & Virtual)	Describe your experiences in mathematics instruction.	Positive experiences Negative experiences Brick/Mortar Virtual School
Student Demographics	Describe your students.	Ages, Gender, Race, Motivation, Communication, Respect, Goals, Location
Minority Student Teaching Experience	What are your experiences teaching diverse students Algebra I online?	Positive experiences Negative experiences
Experience Supporting Minority Students Online	Describe the ways you adjust your instruction to meet the needs of your diverse students.	Communication, Time Instructing Curriculum Restraints, Accommodations, Race/Minority Status, Gender, Disability
Conclusion	Is there anything else about your experience teaching students in a virtual learning environment that you would like to share?	Biases, Differentiation, Student Achievement
Member Checking	Paraphrase what I heard about the main data: 1. Virtual teaching experiences 2. Math teaching experiences 3. Experiences with minority students in online learning 4. Experiences meeting the needs of diverse students	Tips: Seek elaboration! Can you give details? Do you have any examples? What did you mean by...?

Data Analysis Procedures

Demographic Data

Each participant completed a demographic survey (see Appendix E). The demographic survey was completed digitally using Qualtrics. Resulting data were analyzed and outcomes were reported in Chapter 3 of this study. The researcher calculated the range and mean for various numeric indicators such as age, total number of years teaching, and number of years teaching virtual education. A detailed descriptive narrative is provided in Chapter 4 of this study to describe the participants' other demographic characteristics through individual biosketches.

Interviews

Data analysis in phenomenology follows systematic procedures that move from narrow to broader units of analysis, and then on to detailed descriptions that summarize what and how participants have experienced a phenomenon (Creswell, 2013). Upon completion of the interviews, the researcher reviewed the collected data by explicating the participants' statements, drawing upon the guidelines for phenomenological analysis presented by Colaizzi (1978). The guidelines for analysis of phenomenological data used in this study are presented in Table 2 (Sanders, 2003; Slanda, 2017).

Table 2

Guidelines for Interview Data Analysis

Guideline	Description
1 <i>Gaining the Experiences of Each Participant's Transcript</i>	Using the recording and verbatim transcription of the interview, listen and review each interview multiple times to obtain understanding of the participants' experiences. The participant will be involved to verify their experiences. The participant will review the transcript (member checking) and make notes or clarify their statements to ensure the transcript is an accurate representation of their experiences (Hycner, 1985).
2 <i>Selecting Significant Statements or Phrases</i>	Consider each statement in the transcript in respect to its significance to the phenomena. Significant statements or phrases from the transcript that add broad meaning and capture the participants' lived experiences are recorded.
3 <i>Describing Components of Meaning</i>	Formulate more general restatements or meanings for each significant statement recorded from the transcript. Review each transcript and recording multiple times to garner context for thematic emergence. Elicit data that directly relates to the research questions.
4 <i>Organizing Units of Relevant Meaning</i>	Arrange the formulated meanings into clusters of themes. Relate components of meaning and cluster them together into central themes.
5 <i>Describing the Phenomenon</i>	Integrate resulting themes to provide a comprehensive description of the phenomenon.
6 <i>Describing the Fundamental Structure of the Phenomenon (Colaizzi, 1978)</i>	Synthesize the units of meaning and themes into a description of the lived experiences of the participants. Narrow the comprehensive description to an essential structure. Provide a structural synthesis (Patton, 2002).
7 <i>Member-Checking</i>	Return to participants for a final validity check. Elicit participant views on the essential structure of the phenomenon to confirm it represents their experience.

The seven-step process presented by Colaizzi (1978) in Table 2 was followed in this study. The researcher first read the transcripts and listened to the corresponding recording multiple times in order to gain a sense of the “whole” before the data were separated and placed into units (Creswell, 2013). The transcripts were read, the recording was listened to, and the researcher also read the transcripts while listening to the recording.

In order to enable the process of phenomenological data analysis, an Excel file was designed for each participant. The Excel spreadsheet included columns for each step in the process of data analysis. The columns were titled: (a) Significant Statements; (b) Description of the Components of Meaning; (c) Organization of the Units of Meaning; and (d) Description of the Phenomenon (Themes). There were two added columns for the peer-debriefer to make notations and for reconciliation of any disagreement in findings from the peer-debriefer.

Significant statements were copied verbatim from the transcript into the Excel spreadsheet in separate cells under the first column. Verbatim statement use maintains the objectivity of the data by preserving their integrity, more precisely captures the experience of the participant, and supports the peer-debriefer in his or her task of verification of findings (Creswell, 2013). After the significant statements were recorded, the researcher reviewed the statements and described their components of meaning in the second column of the Excel file. Next, the components of meaning were organized into units of relevant meaning. Units of relevant meaning were recorded in the third column. In the final step of the data analysis on this Excel file, units of relevant meaning were synthesized into descriptive themes. A description of the themes was included in the fourth column of the Excel spreadsheet. Steps

1-3 were completed in isolation for each participant. Steps 4-5 were conducted simultaneously, as the researcher sought to capture the shared themes among the participants' lived experiences. After the researcher completed this process, the file was shared with the peer-debriefer digitally for review of the data analysis outcomes. Instructions were given on her role in the process and the feedback requested (see Appendix D).

Once the peer-debriefer's feedback was returned and any disagreements were reconciled, a composite description of meanings and essences of the experiences began. The themes were integrated into a universal structure that describes the shared experiences representing the group as a whole (Moustakas, 1994). To facilitate this process, the researcher created a separate Excel workbook with multiple worksheets. Sheet one was labeled *Units of Relevant Meaning* and included each unit of meaning from all participants, organized alphabetically. Sheet two, *Themes*, included all themes that were found during data analysis of the participant interviews. The third sheet, *Overarching Themes*, included overarching, shared themes that were found among the lived experiences of the participants. A final, fourth sheet, *Themes & Sub-Themes*, includes all themes categorized into broader themes. This spreadsheet was then sent to the peer-debriefer for further feedback. The peer-debriefer was asked to state whether or not she agreed with the themes and asked to explain her reasoning. The peer-debriefer's feedback was considered before final data analysis was synthesized and reported.

A phenomenological study ends with a descriptive narrative that discusses the essence of the lived experiences of individuals and their shared experiences (Creswell, 2013). Colaizzi (1978) suggests synthesis of the units of meanings and themes into a description of

the lived experiences of the participants but recommends that the comprehensive description be reduced to an essential structure. The researcher summarized the study in its entirety and discussed the outcomes of the study in terms of social meanings and implications throughout this dissertation (Moustakas, 1994). A structural synthesis that provides the essence of the phenomenon is provided (Patton, 2002). A comprehensive, written description of the shared meaning discovered from examining the lived experiences of educators teaching Algebra I in a virtual learning environment, as they relate to the instruction of minority students, is the final product.

Validity and Reliability

Because the researcher is the instrument for data analysis during a qualitative research study, measures must be taken to maintain the fidelity of the data. Validity is increased by the researcher taking steps to reduce personal bias. Ensuring trustworthiness of data began with bracketing and continued as verbatim transcription by a neutral third party was conducted. Triangulation of data also occurred. The peer-debriefer, used throughout the study as an independent rater to check the researcher's work, was used again to review the meaning assigned to data. Consultation with a faculty expert reviewer transpired. The faculty expert reviewer was used to discuss the study's findings and validate the data. Neither party was involved in the data collection process and their feedback was independent from the researcher. Member checking was used to ensure validity (Creswell, 2013). Participant consultation occurred as the researcher clarified participants' statements, perspectives, and experiences. As a final check for validity, the researcher returned to participants after data

analysis and the comprehensive description of the phenomenon. The participants were asked their views on the essential structure of the phenomenon to confirm it represents their experience.

Researcher's Role

Data collection in phenomenology typically involves the researcher interviewing individuals who have shared experiences. Therefore, the researcher is the main instrument for data collection (Creswell, 2013). The researcher determines the questions to ask, and what to observe and record. It is important that the researcher reflect upon personal biases and beliefs and determine their impact on the study's data and interpretations (Mertens, 2005). The researcher has included her positionality statement that describes her perspectives. She also participated in a bracketing interview where her views were noted, and then placed aside so they did not affect the process (Merriam, 2002). The researcher strived to maintain objectivity, reciprocity, and positive relational status with all participants involved in the study.

Researcher Positionality

This study includes a statement of positionality by the researcher. It includes the researcher's educational and professional background in regard to the study's phenomenon. The positionality statement below provides the reader with information regarding the researcher's perspective (Creswell, 2013).

Positionality Statement

I am a female, Caucasian educator who has spent most of her career in urban settings. After completing a two-year commitment to Teach For America on Chicago's south side as an elementary school teacher, I returned to Central Florida to teach in the ninth largest urban district in the nation. I have five total years classroom teaching experience, two years as an elementary mathematics coach, over three years as an assistant principal, and three years as a school principal at brick and mortar public schools. All my professional experience within traditional school settings has been in urban, Title I schools with large populations of African American students.

After thirteen years in a traditional school setting, I transitioned to virtual education. I am currently an administrator at a virtual school district in Florida. I led the high school world history and music departments for ten months before transitioning to the elementary level. The teachers under my supervision instruct students using an online learning environment.

I completed my Master's in Teaching (MAT) at a small, Catholic university on Chicago's west side, and my specialist degree in Educational Leadership at a small private university within the state of Florida. I am currently a doctoral candidate at the University of Central Florida. My research has focused on urban education, special education, and the academic achievement gap. As a doctoral student, I am part of the National Urban Special Education Leadership Initiative (NUSELI), a federally-funded grant through the Office of Special Education Preparation (OSEP) for doctoral preparation of urban school administrators in educational leadership and special education.

I believe that it is our nation's responsibility to ensure that each and every child has the opportunity to attain an excellent education. I believe that a child's skin color or neighborhood should not determine his or her academic achievement or educational outcomes. I have found that more can always be done to ensure educational equity and that children will meet the expectations that are set for them. I believe that virtual education has the power to offer a medium where students can learn equitably and where diverse needs can be met. But, I also believe this is a relatively new platform and there is much to be learned about current practices. I am eager to learn from the participants in this study.

The development of this research study has been my sole responsibility. It could be claimed that my positionality and previous experiences in urban and online education will impact the study. However, my experiences and knowledge of the academic achievement gap and virtual education will allow me to add analysis, reflection, and introspection that contains a level of expertise. An understanding of the constructs studied is necessary for accurate data collection and analysis and supports the process of adding meaning to the findings.

Limitations

Great care was taken to ensure that this study maintained a high standard for research and all research procedures were implemented with fidelity. Potential limitations to the study include:

1. The study was conducted in one organization within the state of Florida. Transferability may be a limitation, but through “sufficiently rich, detailed, thick descriptions,” comparisons and judgments can be made (Ary et al., 2013, p. 535).
2. A small number of teachers were included in the sample population. These teachers were selected purposefully based upon their instructional experience at the studied virtual school district. Selection effects may have occurred because the constructs are unique to the group of teachers selected (Ary et al., 2013), but appropriate procedures address this limitation.
3. A standardized, open-ended interview and brief questionnaire was used for data collection purposes in this study. Consequently, the data are only as valid as the responses provided by the teachers at the particular point in time. Research is dependent upon the authenticity of the participants’ answers (Ary et al., 2013).
4. Generalizability of the findings of this study is limited because a qualitative phenomenological research design was used. The experiences and perspectives shared by the sample population for this study would most likely vary for a different sample population (Ary et al., 2013).

Summary

This chapter provided an overview of the research methodology that directed this study. The chapter outlined the rationale for the study’s phenomenological design, and the procedures and protocols that were implemented for data collection and analysis. In

addition, the chapter described the procedures for bracketing and the researcher's positionality statement.

CHAPTER FOUR: DATA ANALYSIS

Introduction

This chapter presents the findings of the phenomenological research study that examined the lived experiences of Algebra I teachers at a virtual school district in Florida. The central phenomenon was their experiences providing instruction to minority students in the virtual learning environment. After analysis of the data, eight themes of the phenomenon were identified. The eight themes found in this research study are: (a) teachers believe that student characteristics are a primary determinant of their success in virtual education; (b) teachers believe they have a strong impact upon student success in a virtual learning environment; (c) teachers believe Algebra I is a challenging content area for student achievement; (d) teachers believe family involvement impacts student learning in virtual education; (e) teachers believe frequent and consistent communication is vital in virtual education; (f) teachers believe there are challenges communicating with English language learners; (g) teachers believe strategies can be implemented to support student success in an online learning environment; and (h) teachers believe virtual education is a unique learning environment. A total of 27 tertiary themes were identified and each is presented.

The following research question was addressed:

What are the lived experiences of Algebra I virtual education teachers, as they relate to the instruction of minority students?

The chapter is structured in two sections. It begins with biosketches of each participant. The biosketches afford the reader the opportunity to learn the background of each of the five

participants and are a valuable part of understanding the data collected. Next, the data analysis results are presented. The section's organization is guided by themes and their accompanying tertiary themes. In order to answer the research question, the themes are supported with detailed description of the participants' lived experiences using verbatim words, phrases, and transcription.

Participant Biosketches

Although participant demographic information and background were presented in Chapter 3, biosketches include further information. The biosketches offer the reader a detailed background of each individual participant in the study.

Juan

Juan was a 26-year-old Puerto Rican male. After receiving his undergraduate degree, he pursued his master's in education from a large university in Florida. He has taught three total years, all at the virtual school district in this study. Juan taught Mathematics for College Readiness for one year prior to his current position as an Algebra I instructor. He is a fluent Spanish speaker. Juan stated that, "I've known I wanted to be a teacher all my life, so I'm doing exactly what I love."

Amber

Amber was a 34-year-old female who identified as Asian. Amber began her undergraduate degree as a computer science major but realized her passion for education and changed to a degree in secondary science and mathematics teaching in the arts and sciences department. She taught in a traditional, brick and mortar school for two years before transitioning to her current role as a virtual educator. She has 8 years of teaching experience in virtual instruction and has taught many courses including Algebra I, Geometry, Intensive Mathematics, Algebra II, and variations of these courses such as Honors and Advanced Placement. Amber is certified in Mathematics 6-12 and holds a bachelor's degree of Arts and Sciences from a large university in Florida.

Sally

Sally was a 44-year-old African American female. She took an alternative route to teaching certification but has a bachelor's degree, master's degree, and has completed all of the coursework for her doctorate degree but has yet to complete her dissertation. Sally taught for seven years at a traditional brick and mortar school before joining the virtual district in 2007. She has 18 total years of experience teaching middle school mathematics and science, and Algebra I. Sally is certified in Mathematics 6-12, Mathematics 5-9, and Science 5-9.

Ivan

Ivan was a 26-year-old male who identifies as White/Hispanic or Puerto Rican. He received his bachelor's degree in education and full certification through a large university in Florida. He has taught a total of nearly five years, with three of these at the current virtual district. His two years at a traditional high school in Florida were spent at a school with a student body categorized as having high socioeconomic status that he characterized as "somewhat diverse." There, Ivan taught regular and honors Geometry. He is certified in Mathematics 6-12 and has taught Algebra I, Geometry, and Algebra II. Ivan was raised in a low socioeconomic environment and attended public schools in Florida throughout his educational career.

Mark

Mark was a 38-year-old Caucasian male who entered teaching as a second profession. He began teaching eighth grade mathematics through an alternative certification program in a large city in the Midwest part of the United States. When he moved to Florida, he decided to pursue his bachelor's degree in education at a large university. After completing his bachelor's, Ivan received his master's degree in Educational Leadership. Ivan has taught 8th grade mathematics and Algebra I for a total of five years. He has been an Algebra I teacher at the studied virtual school district for three years.

Data Analysis Results

The five participant interviews length ranged from 13 to 34 minutes. The average interview length was 22 minutes. The data from the five interviews were recorded, transcribed, and analyzed. Data analysis produced 210 Significant Statements (Colaizzi Step 2). From these statements, 125 Description of the Components Meaning were identified (Colaizzi Step 3) with 112 corresponding Organization of the Units of Meaning (Colaizzi Step 4). A total of 27 tertiary themes emerged from the descriptions. These 27 tertiary themes were used to construct the eight main themes found in this study through a Description of the Fundamental Structure of the Phenomenon (Colaizzi Step 6). The eight themes include: (a) teachers believe that student characteristics are a primary determinant of their success in virtual education; (b) teachers believe they have a strong impact upon student success in a virtual learning environment; (c) Algebra I is a challenging content area for student achievement; (d) teachers believe family involvement impacts student learning in virtual education; (e) frequent and consistent communication is vital in virtual education; (f) there are challenges communicating with English language learners; (g) teachers believe strategies can be implemented to support student success in an online learning environment; and (h) virtual education is a unique learning environment. The tertiary themes were categorized based upon the experience of the phenomenon as typical, frequent, or variant (Nelson, Englar-Carlson, Tierney, & Hau, 2006). An experience was labeled *typical* if it was mentioned by 4-5 participants, *frequent* if it was mentioned by three participants, and *variant* if it was mentioned by 1-2 participants. This categorization of data was chosen by the

researcher so that the reader may hold a deeper understanding of the data across participants and how the shared lived experiences led to the study's themes.

Table 3:

Frequency of Participant Experiences and Meanings by Themes and Tertiary Themes

Theme	Tertiary Theme	Typical	Frequent	Variant
<i>Teachers believe student characteristics are a primary determinant of their success in virtual education.</i>	Demographics	X		
	Motivation	X		
	Prior Knowledge			X
	Pace			X
<i>Teachers believe they have a strong impact upon student success in a virtual learning environment.</i>	Teacher Background	X		
	Teacher Beliefs		X	
	Relationship Building	X		
<i>Algebra I is a challenging content area for student achievement.</i>	Content	X		
	Assessments			X
<i>Teachers believe family involvement impacts student learning in virtual education.</i>	Demographics		X	
	Effect on Student Success		X	
	Strategy to Support Students			X
<i>Frequent and consistent communication is vital in virtual education.</i>	Frequency of Communication	X		
	Communication with Student	X		
	Communication with Family			X
	Communication of Expectations	X		
<i>There are challenges communicating with English language learners.</i>	Language Barriers	X		
	Spanish Speaking Students		X	
	Spanish Speaking Parents		X	
<i>Teachers believe strategies can be implemented to support student success in an online learning environment.</i>	Time			X
	Student Focused Support		X	
	Resources		X	
	Differentiation		X	
	Student Learning Style	X		
<i>Virtual education is a unique learning environment.</i>	Benefits		X	
	Challenges	X		

Note. Typical = 4-5 Participants; Frequent = 3 Participants; Variant = 1-2 Participants

Research Question Findings

This study addressed the research question, “What are the lived experiences of Algebra I virtual education teachers, as they relate to the instruction of minority students?” The lived experiences of participants were found in their descriptive responses throughout the interview process. Participants each shared their unique experiences and perspectives, and together they created an intricate description of the lived experiences of Algebra I virtual teachers as they instruct minority students.

Participants shared their belief that student characteristics are a primary determinant of their success in virtual education. They discussed students’ demographics, noting certain groups that are perceived to be more successful and those perceived to be less successful. Participants noted that a student’s reasons for taking Algebra I online affects their achievement level. If a student is motivated to complete Algebra I successfully, they are more likely to achieve this goal. Student prior knowledge and the pace that they progress through learning was shared as impacting success. Participants found that students with more mathematical knowledge before taking the course are more successful.

Participants also shared a great deal about themselves. Their experiences supported the belief that teachers have a strong impact upon student success in a virtual learning environment. They discussed their background: demographics, socioeconomic status, and experiences; and how this affected teaching and learning. Teachers who were minorities or from a socioeconomic background that mirrored their students found that this helped them relate to their students. Teachers’ beliefs were highlighted during the interviews as well.

How a teacher feels about their role as virtual educator, and how they perceive their minority students impacts student achievement. Every participant mentioned the value of relationship building in an online learning environment and discussed ways they connect with their students.

Algebra I is a challenging content area and participants noted this belief repeatedly. According to participants' beliefs, both the content of Algebra I, as well as the assessments that accompany the course are rigorous and add unique challenges for students. Participants reiterated that it is important to recall a student is not an isolated individual. In many cases, families are involved in student learning. Participants mentioned the impact of family involvement on student learning in virtual education. Their experiences led them to believe that students with more family involvement tend to be more successful. Participants discussed the family's demographics and correlated level of involvement. They found that more family involvement positively affects student success. Consequently, participants try to involve families and use this as a strategy to support students.

Communication was highlighted by participants as important in a virtual learning environment. Participants believed frequent and consistent communication is vital to online education. Participants discussed communication with the student and communication with the family. They found that communication with both is essential. All participants noted the importance of communicating explicit expectations for the online course with the student and family. However, one challenge participants cited was communicating with English Language Learners (ELLs). The language barrier between a teacher and student or family is

difficult when communicating virtually. Participants revealed that Spanish speaking students and families are particularly prevalent.

While language discrepancies may present a challenge to learning, participants shared many strategies they implement to support student success in an online learning environment. Participants provide additional time, spending added minutes and hours with students in need of tutoring or other support. They focus the support on the student's unique learning needs and provide resources that will increase learning and student achievement. Participants use differentiation as well and often focus on the student's learning style as they facilitate student success in online Algebra I.

Finally, participants discussed their belief that virtual education as a unique learning environment. They shared the many benefits of virtual education, such as individualized learning and the ability to move through the curriculum at a pace appropriate for the student's learning needs. But they also shared the unique challenges of online learning. Virtual education is a format that is growing and often students have an adjustment period before they find success. It can be difficult to communicate with students virtually, and there are organizational constraints that may impact instruction. Participants shared their belief in the ability for virtual education to support student success and noted their actions toward achieving this goal for every child.

Research Question: Supporting Data

Theme One: Teachers Believe Student Characteristics are a Primary Determinant of their Success in Virtual Education

Interview data in this study uncovered what teachers believe are the effects of a student's characteristics on their success in virtual education. Participants mentioned many different characteristics of their students and discussed the effects on the students' achievement in Algebra I in the virtual learning environment. As Sally stated:

Especially like in virtual school, there's a lot more things that could impact or make a difference in their learning. Things such as whether they have internet consistently, whether they do a lot of different activities...there's a lot of factors that go into play being virtual.

A plethora of factors affect a student's academic achievement. In an online learning environment, certain characteristics are highlighted. Participants noted these common characteristics throughout interviews and shared their reflections on their students.

Tertiary Themes

The theme *Teachers Believe Student Characteristics are a Primary Determinant of their Success in Virtual Education* has four tertiary themes: (a) student demographics; (b) student motivation; (c) student prior knowledge; and (d) pace of learning.

Tertiary Theme One: Student Demographics

Every participant in this study mentioned their students' demographics. Participants found their classes to be diverse but noted the effects of demographics upon success. As Ivan shared, "A lot of [my] students have an interesting correlation with their demographics." Participants noted demographics such as age or grade level, school program, race, ethnicity, and socioeconomic class as factors that affect student learning.

Some participants expounded upon the effect of their students' demographics and discussed race and socioeconomic status. They noticed that a student's background affects their grade and goals for Algebra I. Amber shared that "some of them just needs [sic] that, that "D" in order to, to move forward. And I did notice depending on where they're from, it plays a big part." Amber continued, discussing certain ethnicities that have achieved more academic success in her experience, noting that "anyone coming from India or any of the surrounding areas there, anywhere in Asia, that whole area ends up having really top scores. Like they're your "A" students."

Sally discussed the African American demographic, sharing that some of her students have very different background experiences prior to enrolling in Algebra I. "My African American students...Their whole perspective...was very different than a Caucasian student who has been to the beach or live[s] on the beach." She also mentioned their performance on assessments: "Overall in the state of Florida, you know, African Americans usually perform less on standardized testing." Sally's observation on African American students' background knowledge and assessment performance highlights the achievement gap in online education.

Participants also commented on the relationship between socioeconomic status and achievement. Ivan stated that he taught “a pretty diverse group of kids. I mean both like ethnicity wise, [and] socioeconomic status...I do kind of believe in like a correlation with socioeconomic status and how they end up doing in like mathematics sometimes.” Amber also believed that students from lower socioeconomic status environments struggled more to achieve success in Algebra I online. She elaborated:

Anyone coming from poorer areas...Usually the student also has a job so that they can take care of the family as well and that means that their education is yes, they're doing the best they can, but they really don't have the time to put into it as much as they need to. And so for students like that, I will work with them to get them by.

Interview data indicates that there is a correlation between student demographics and student achievement. Ivan perused his gradebook during the interview and revealed the implications of race and socioeconomic status upon student success. He noted, “I'm looking at a list right now...students who have under a 70% in my grade...a pretty fair chunk [is] definitely minority students, Hispanic, or African American. Or any students that are white [and have a D or lower] are living in rural areas.” Mark discussed the effects of a student's ethnicity upon academic achievement on state tests. He shared:

While our school is meeting state averages and stuff, it's still pretty bleak across the page for any class or any ethnicity. So there's not a whole lot of difference, especially because a giant part of our population is in the, the white community...I do know that the, uh, African American achievement is the lowest of all of them.

Algebra I is course that has pre-requisite skills. Mark described his experience with students, noting that by the time they reach his course, the differences in students' past educational experiences are apparent.

I would say certain demographics have moved through their educational career with better opportunities, or less opportunities, and you can start to see some of those students that have had less opportunity to succeed. And either it's beaten them down to where they just, you know, they've gotten into that habit of guessing immediately, not really focusing on any of the content...I've never been told that I have to learn it. I've never been told that I have to remember it once I'm done. All I was told was get through the class.”

Mark contrasted those challenges with the challenges found in teaching students with affluent backgrounds. He shared that such students often do not understand the value of learning Algebra I:

One of my issues I would say is dealing with students who seem to have come with that silver spoon...they don't really know that at some point the world might be on their shoulders. And this is where the importance of math comes in.

Participants all described their students' background and demographics. They shared their experiences with certain races or ethnicities and also noted the effects of socioeconomic status upon academic achievement. Interview data demonstrates that, in the virtual learning environment, racial minorities and students from low socioeconomic backgrounds struggle academically.

Tertiary Theme Two: Student Motivation

Participants in this study indicated their belief in the importance of student motivation upon learning. Participants felt that this student characteristic—motivation to achieve—has a large impact upon student success in Algebra I. As Sally said:

Oh, I think motivation is key. You know, finding ways to motivate students to take control of their learning and, and to facilitate that learning in them. I think that's the key to giving them the greatest chance of having success.

Juan shared that his students' motivation levels vary, but some of them are extremely motivated and move through the course at a rapid pace.

Motivation levels are all over the place. I have some that are very, very engaged, some that are kind of, like, I call 'autopilots'. I contact once at the beginning of the week and before Wednesday or Thursday, they're already done and they did exactly what was promised to me.

Sally believes that her students are hard workers. “I think the students work really hard at understanding their learning gaps.” She uses purposeful strategies to motivate her students to achieve. “I use a lot of the growth mindset type of phrases and I'm like, well, you didn't meet your goal but hey, you know, go to every goal, every step forward counts.”

Participants discussed the various reasons that students take Algebra I online. They cited several reasons and shared how this affected motivation levels for success. Students taking the course earlier are often motivated, high achieving students. Those taking the course in 9th or 10th grade are on pace and motivation levels vary. Students taking the course later in their academic careers are motivated to graduate. Ivan noted:

7th and 8th graders are taking it to get ahead, more or less. And then 9th and 10th graders are taking it when they're supposed to, or they had something going on in 9th grade from public school, or from a physical school, and then they transitioned to homeschool with the goals of either catching up to get back to physical school, or just transitioning fully to online learning. Seniors, and 11th graders are making sure they're getting done before they graduate. So, you know, they all have their different challenges.

Mark shared similar reasons that his students enroll in Algebra I online.

I've had other students that may have failed it the first time and have to make up that credit, so they can graduate. And then I have students that are accelerated and they're trying to get that math credit done, so that maybe, maybe they're in seventh or eighth grade and they're trying to get into an accelerated tech school or just get ahead of the game.

Students taking the course to get ahead are typically motivated to achieve. Those taking the course to graduate, may have struggled previously and have negative prior experiences, but they are motivated to complete the course because it is a requirement for high school graduation in the state of Florida. The reason a student takes the course affects a student's motivation level to achieve.

Another factor in motivation level is the student's school of record. Mark shared that home school students are the least motivated in his experience, noting that "homeschool students are probably the least motivated when it comes to a pace, a time table, 'cause they

feel that they can do it whenever they want. Some of them don't really care that they're gonna do it year-round.”

Sally discussed the reasons that African American students take Algebra I online compared to other students.

I would say most of my African American students, join the class because of sports or they're trying to improve a grade, they are, you know, retaking the class...other groups of students are trying to get into an IB program and trying to improve their grade, things like that. But I think just disproportionately, most of the African American students, especially the male students, are taking the classes online to be able to have greater access to sports.

Participants in this study indicated their belief that a student’s motivation level undeniably affects their academic success when taking Algebra I in a virtual learning environment.

Tertiary Theme Three: Student Prior Knowledge

Participants in this study proclaimed that a student’s prior knowledge affects their academic success in Algebra I online. They believed that students with prior knowledge, a solid mathematics foundation, and exposure to higher order questioning are more prepared for success in the course. Those who lack prior knowledge often struggle.

Sally stated, “I think prior knowledge or how they're coming at it, is the most important.” She continued on to say, “I do feel that there are gaps as a result of experiences.” These academic achievement gaps are apparent when a student arrives in Algebra I. Sally shared that “most of our students have seen the material before...but they didn't quite learn it

all the way, then they have those misconceptions.” Without comprehensive prior knowledge, students may arrive in Algebra I with misconceptions and gaps in knowledge. Students also may lack experience solving problems that require higher order thinking skills. As Sally explained, “they may or may not have had exposure to that type of questioning or that type of assessment... they meet the challenge a little less than the students who are familiar with that type of questioning.” Participants found that students who are familiar with complex questioning are at an advantage. As Mark explained:

One thing that I noticed is the difference between who's gonna work through quickly and... who is going to succeed because they're able to do it on their own and not have to follow a format and then those that actually need some more help.

Participants felt that it is evident from the start if a student has prior knowledge in Algebra I and experience in critical thinking. Those students with prior knowledge are more likely to succeed in Algebra I online.

Tertiary Theme Four: Pace of Learning

In a virtual learning environment, students have the ability to move at a pace unique to their needs and desires. Students may accelerate their pace to complete the course sooner or may move more slowly as they take time to master the content or adjust for life events. Participants noted that some students, specifically diverse students, may not understand the need to maintain a pace that is academically appropriate for student learning. If a student follows too slow a pace, they may fail to truly master the content and struggle on the final exam or End of Course Exam. Mark confirmed the importance of an appropriate pace for

student learning, saying “I do think [virtual education] can also be used as a crutch for students...taking more time than they should. And then they lose track of some of the principles.” Ivan advocated for more support in helping students understand the importance of pacing.

And I think that like one of the biggest things that my diverse students need is more support from either our personal counselors here at our school, or even the state, in like making sure that they fully understand what's possible on an online environment. Like what they can get done, what the timeframe would be, why they have to do ... Because there are teachers that say, ‘Hey, do four assignments a week.’ They may not understand the reason to do that is so they get done with the class in eight months.

Participants shared that a student’s pace in completing Algebra I online affects their academic success. Accordingly, they felt that greater support for students to understand the necessity for an appropriate pace is needed.

Theme Two: Teachers Believe They Have a Strong Impact in a Virtual Learning Environment

Interview data in this study highlighted the role of the teacher in an online learning environment. Participants shared their backgrounds and often noted how it affected their students and academic outcomes. Juan stated that, “it's really good I have that background to be able to suit those students. I feel like gives the edge of my class as opposed to with another Algebra teacher. I consider it lucky on both parts.” Participants’ beliefs about students, diversity, and virtual education were proclaimed. Every single participant noted the

importance of relationship building to academic success. They shared how they build relationships and the impact this has upon their students. Interview data demonstrated that all participants believed that the teacher in a virtual learning environment has a profound impact.

Tertiary Themes

The theme *Teachers Believe They Have a Strong Impact in a Virtual Learning Environment* has three tertiary themes: (a) teacher background; (b) teacher beliefs; and (c) relationship building.

Tertiary Theme One: Teacher Background

Participants revealed their backgrounds throughout the interviews. They shared their own racial, ethnic, and socioeconomic demographic information. Participants indicated their belief that their background was an advantage, allowing them to relate to their diverse students and provide a quality education to all of their students. Participants who identified as a minority, those who spoke Spanish, and those from poverty found these characteristics to be advantageous in supporting student academic success.

For instance, Juan found his Hispanic background to be advantageous for his students, noting “it's really good for me because most of the minority students that we get are students that speak Spanish and I speak Spanish.” Amber equally found her minority background to be helpful in her instruction. She shared that, “due to where I'm from and my background, 'cause I am a minority, it helps me relate a lot better with that level of students.

So, I always had a better connection than some of my peers may have.” Her background allows her to communicate with students more effectively. Amber shared that she can understand thick accents and, as a result, provide effective instruction to a greater group of students.

I have students that are, they have background either from the Islands, or from India, and for me that's awesome. I'm Guyanese so the country is in South America that definitely helps with both the Indian accent and those heavy thick accents. It also helps with any of the Spanish descendant accents.

Ivan mentioned his upbringing within a less wealthy environment and believes that this helps him relate to students from various backgrounds. He stated that, “I do come from, personally a low socioeconomic status. I've gone through the public-school system the whole way.” Mark was also raised within a lower socioeconomic environment. He finds that this allows him to connect with his students because he is a living example of what can be achieved regardless of one's background.

I can speak with the disadvantaged, whether it's white, black, or whatever, students about how this is gonna improve their life or move them to a different status, because that's what happened... I was the only one in my family to go to college. So I'm able to discuss that with them. I have a harder time speaking with students that have anything or everything.

A finding in this study is that a teacher's background affects their instruction. Participants in this study believe their backgrounds are an advantage to teaching diverse students within a virtual learning environment.

Tertiary Theme Two: Teacher Beliefs

Some common beliefs emerged among participants during the interviews. They shared their passion for teaching, satisfaction with online education, and beliefs on diverse students. Amber revealed that her passion was always for education. She further noted a strong desire to teach online, stating, “my passion was more for anything related with education and helping others...My passion was to go on to a virtual atmosphere.” She believed that she will best serve students in lower level courses, noting, “I always want low level classes which is why I find algebra to be perfect for me. And not honors, usually just regular.” Ivan also shared his contentment with teaching online. His enjoyment of the virtual learning environment came through when he shared, “I’ve enjoyed working with all kinds of students [in the virtual setting]. So, I would say it’s a pretty positive experience so far. Like, I’m enjoying myself.”

Mark described how a student’s race does not affect his instruction, noting that “it [their race/ethnicity] doesn't really drive my decision making on what's important.” He further shared that his beliefs about diverse students do not impact his teaching. He focuses on the learning process, which is universal.

I try to understand the diversity and let that motivate some decisions, but I don't ... I try not to dwell on it too much, because I think if we can focus on the learning process, that's across the board for anyone.

Participants in this study reiterated this satisfaction in their positions teaching virtually, and they posit that they do not let beliefs affect the instruction they provide diverse students.

Tertiary Theme Three: Relationship Building

According to participants, one of the most impactful strategies a teacher can employ to support success in a virtual learning environment is to build a relationship with their students. As Amber proclaimed, “you've got to know your students.” Participants in this study discussed ways that they build relationships, as well as the information they seek to gather as they develop relationships with their students. Focusing on the students can facilitate a connection that will support student learning. Ivan said, “I've always tried to connect with the students directly. You know, focusing on them.”

Participants shared various methods they use to build a relationship with their students. Sally begins her conversations with students by asking them questions. She seeks to draw information from them and build upon what they share. “I tell the students, ‘tell me what you felt comfortable with.’ And I know a lot of people use that kind of strategy.” Juan finds that once the student is in the routine of engaging in the content, the relationship tends to flourish. He finds this especially true with his minority students.

We're comfortable, once we're really into the Algebra swing and we're really doing Algebra, I really see that click. I really see that click with that minority students and I feel like partially it is because I'm able to connect with most of them on a more personal level because a lot of minority students are Spanish speaker ones, so it's really easy to connect.

In order to build a relationship with a student, teachers must know details of students' lives. Ivan notes the information that is important to draw from students.

The biggest thing is trying to figure out what their schedule's like...building a rapport, trying to figure out how often are they available to do the class. Like, why aren't they working if they're not working? What support do they need? What prerequisites are they lacking that might be stopping them? That's the situation that you try to figure out over the course of all the calls and texting you make.

Participants explained that they make many calls, texts, and emails to students. Over the course of this communication, they build a relationship with the student and support their academic success.

Theme Three: Teachers Believe Algebra I is a Challenging Content Area for Student Achievement

A recurring theme throughout interviews in this study was the unique nature of Algebra I. Participants believed its content is challenging and the accompanying assessment that students are required to pass before high school graduation adds levels of complexity not present in many online courses. Participants shared how Algebra I as a course can be challenging for students, due both to content and assessments.

Tertiary Themes

The theme *Teachers Believe Algebra I is a Challenging Content Area for Student Achievement* has two tertiary themes: (a) content; and (b) assessments.

Tertiary Theme One: Algebra I Content

According to participants, Algebra I is a challenging course. The content specifically poses difficulty for many students. Ivan said, “Algebra one is difficult. I'm just gonna throw it out there.” He proclaimed it to be, “a pretty intensive curriculum.” Participants shared that the content is hard, and the curriculum is intensive. The requirements for success in Algebra I are rigorous.

Participants noted that Algebra I online requires students to learn, process, implement, and apply content in order to be successful. Sally explained that “in the virtual environment, students...have to take it in, they have to process it, they have to implement it and they have to apply it in order to be successful and that could be a challenge.”

Participants were in agreement that Algebra I is more difficult than other content areas students may take online. Ivan noted:

It's very hard for all the students, I would say, compared to other subjects. It's a lot more rigorous. I mean, well, for one, math is generally a subject where they have to practice and drill, and redo, and reach out for help.

The content requires a great deal of critical thinking from students. Sally said that it contains, “higher level thinking, questions, process, topics.” Juan noticed that the way the content is presented affects student success: “It's just the way the material is presented to them, it wasn't successful or wasn't helpful for, for that student.”

Participants reiterated the need for students to retain the content in order to master the material. They found that retention of content and ability to apply it is a struggle in Algebra

I. Sally said the struggle is for students to, “just retain, understanding the material and being able to apply it when necessary.”

Participants shared how they have attempted to decrease the difficulty of the Algebra I content through their actions. Juan noted ways the Algebra I teachers have attempted to make the content more accessible to students of all backgrounds.

Our team has done a really good job of going through and making sure that terminology where one specific group of our population would understand, and others are completely lost and then taking those vocabs out and making it more universal for those minority students.

Participants described ways they seek to ensure students are able to master Algebra I content. Mark described how he ensures students can master the rigorous content.

So we talk about that extra practice. And that's why I talk to them about those examples, that extra practice. If we're skipping over one of these three, if we're skipping over notes, if we're skipping over extra resources like videos, if we're skipping over tutoring, then we might be missing out on a key piece to what's gonna make that connection with your brain.

Participants specifically mentioned Algebra I vocabulary as a challenge. The terms and phrases that are the foundation of the course are often unfamiliar to students. Mark advocated for a focus on vocabulary.

I focus a lot on vocabulary as they're going through their lessons. And I tell the students, I say, I do a lot of tutor sessions, where I find out that the student can do the

work. It's the words that are stopping us. So we really, really need to understand these words and focus on the words before we get to actually doing the math.

Participants indicated their belief that the content of Algebra I is challenging. They shared ways they strive to make the content accessible and achieve student success.

Tertiary Theme Two: Algebra I Assessments

Participants described the challenges that accompany the assessments for Algebra I. Participants confirmed that regardless of a student's path toward the end of the course, if they are a public-school student in Florida, they must pass the End of Course Exam. Sally stated, "I think that's their journey, but it has to somehow end at that same level of assessment." Mark said that he communicates the end goal frequently, sharing that they must pass the state exam.

I tell them, "We're, we have to get your knowledge base to a certain level to pass that state exam. Otherwise, you know, everything that you did in this class doesn't really mean anything yet until you get that, that state exam passed."

Sally affirms the fact that, even though in virtual learning students may be able to progress through a course at different paces and some modifications may occur, the final assessment and expectations remain the same.

But there is a harsh reality is that these students take the same ACT. They take the same end of course exam...there's no [way], when you're talking about modifying or, or even like explaining or giving them a different, uh, approach to it.

Interview data finds that teachers believe the required Algebra I assessment for students in the state of Florida is challenging, but it creates a common goal for all students; they must master the content in order to pass the End of Course Exam and graduate. Participants communicate regarding this assessment and use it to motivate students.

Theme Four: Teachers Believe Family Involvement Impacts Student Learning in Virtual Education

This study revealed the impact of family involvement on student learning in virtual education. Participants shared their belief that family involvement is vital to student success online. Ivan said:

We can help with the material. The family has to be there to give them that daily push and support and keep track of them. Sometimes that doesn't happen and I see students, who can otherwise succeed, stall in classes or eventually withdraw, that I feel like if I only got a chance to work with them a couple times things could have worked out. So, it's really frustrating.

Participants shared their observations on how demographics affect a student's family involvement and noted how involvement effects student success. Several participants use family members as a strategy to support students.

Tertiary Themes

The theme *Teachers Believe Family Involvement Impacts Student Learning in Virtual Education* has three tertiary themes: (a) family demographics; (b) the effect of family involvement on student success; and (c) family involvement as a strategy to support students.

Tertiary Theme One: Family Demographics

Participants in this study shared their beliefs on how a student's demographics affects the level of family involvement in their education. Participants found that a student's ethnicity affects their family support. Mark shared, "I do understand things like family support with certain ethnicities and a little more guidance and coaching with other ethnicities. Just 'cause different cultures have that different support system and how they interact with it." Amber specifically noted that Asian families have high levels of family involvement.

Anyone coming from India or any of the surrounding areas there, anywhere in Asia, that whole area ends up having really top scores. Like they're your "A" students and I can tell that a big part of that is the families. The families are more involved, they always do well, no problems, education is always first. And so they, they strive and they always do well. So I have noticed that versus, on the other hand, if there's anyone coming from poorer areas, because the family has to work more the parents are a little more hands off and the students tend to not do as well.

Participants discussed how a students' socioeconomic status affects family involvement. Ivan found that many students are from low socioeconomic environments and have little family support.

So, I do have more students [who] are in, like, a lower socioeconomic status than not. I have more people who are, you know, families are not there for full support. Which is fine. I mean, that's how I was raised, so nothing bad, but just reality.

According to participants in this study, a student's demographic background will affect the level of support and involvement provided by their family.

Tertiary Theme Two: The Effect of Family Involvement on Student Success

A finding in this study is that teachers believe family involvement affects student academic success. Participants shared that many students lack family support, and this impacts their motivation and progress through Algebra I. Sally shared that some parents have limited belief in the efficacy of their student regarding their ability to succeed in Algebra I, noting that "you hear parents say that they don't understand it and they never did and so they sometimes have that same expectation for their students."

Several participants noted that many of their students are completing Algebra I independent of family support. Ivan said:

I do have a lot of students who have parents who work 40 hours. They're not there to support right away. The kids are doing it by themselves for the most part, without a lot of supervision. Like a good portion of them.

Mark similarly stated that many students are independent as they complete coursework and may lack parent support.

A lot of them are you know, parents are single parents or parents work. So they're kind of left home to do the work on their own and when there's not someone in the room with them, you know, a lot of times it's, you know, back and forth to get it done. And I've actually had some parents bring their kid to school with a laptop, just so they know what's getting done.

Ivan revealed that “many of my African American students struggle at first because they need extra support creating routine and their parents are busy.” He further shared,

For my African American students, for the most part, I mean, again, I think that runs together more with socioeconomic status...Sometimes the parents are really busy, student's not 100% sure if they want to do the homeschool or not, and you know, sometimes they need that extra support when it comes to, making schedules, and coming up with routines. So, a lot of the times they really do struggle at first.

Participants found that often, it is the less motivated students who lack parent support. Ivan made reference to this when he said, “they're at home without parental support, or anyone watching over them. That's easy for motivation to go really low, or just to avoid, you know, contact with teachers.” Overall, participants noted the correlation between the level of family involvement students receive and their performance in online Algebra I.

Tertiary Theme Three: Family Involvement as a Strategy to Support Students

Participants found value in family involvement and used it as a strategy to support their students. They believed that involving a family member and having them advocate for their child's learning would positively impact the student's academic achievement. Juan shared a common experience he has when encouraging his students to work. When a student fails to respond, he communicates with the mother.

I have some where I have to call two or three times, sometimes even I have to reach out to Mom. We go through a pattern of the student doesn't work for a week, so I have to call Mom that following week and say, "Hey, it's me again. You know, we were doing so well.

Participants believed that family involvement positively affects students. Ivan acknowledges that students would benefit from family support when he says that, "I have a lot of students who could use support, you know, more than what they probably have." So, he attempts to involve any family member possible in a student's learning.

I definitely ask their family. I try to find alternative family members that are actually focusing on that. And if they have an auntie, or they have a grandma, or someone who's really watching over them, I try to find that person. You know, who is that person's, like, personal role model? You know, who are they gonna actually listen to, or want to, like, please? You know, like, try to figure that information out.

Mark affirmed that parents affect student success in Algebra I. He shared how he takes initiative to involve parents and provide specific steps they can take to remain aware of their child's progress.

So that's where the motivation comes in with getting parents involved...one of the things I do when I initially talk with the student and a parent is I ask the parent to please check their grade book at least once a week. And I also send out a progress report every Monday so that they can see the last time something's been submitted. That the grade reflects the progress report and also that the grades are where we wanna be as a whole. Then I can let the, the parent know, "Well they're not reaching out for help or they are reaching out for help and this is, this is the best we can do. Your student is, is trying as hard as they can, and they're motivated and they're working."

Participants seek to involve families in their child's academics. They believe this will support student success.

Theme Five: Teachers Believe Frequent and Consistent Communication is Vital in Virtual Education

Data from interviews in this study revealed teachers' belief in the importance of communication in virtual education. Participants shared that they communicate through text, calls, and email frequently. They communicate with students, as well as families, and seek to be explicit as they describe the expectations for their course. They share exactly what is required to be successful in online Algebra I. Participants found great value in consistent and explicit communication within the online learning environment.

Tertiary Themes

The theme *Teachers Believe Frequent and Consistent Communication is Vital in Virtual Education* has four tertiary themes: (a) frequency of communication; (b) communication with the student; (c) communication with the family; and (d) communication of expectations.

Tertiary Theme One: Frequency of Communication

Participants in this study mentioned that students in a virtual learning environment do not encounter their teachers face to face. As a result, participants shared that frequent communication is key to academic success. Juan joked, “I like to say I bother my kids.” Participants are constantly engaging students, pleading for work to be submitted as evidence of their learning and progress in the course. Participants said they send many reminders to students, encouraging them to submit assignments and reach their weekly goals. Sally stated:

I've sent them a lot of reminders. So, one of the things I've done either on Saturday or Sunday morning...[is to] send them a little text...it's encouraging, but it's also saying, hey, wake up, you know. (Laughs) I haven't seen your work.

Participants said that these reminders maintain student engagement. When a student does not see their teacher face to face in a brick and mortar classroom every day, communication is essential. Communication is extremely important in online learning according to participants. Ivan said:

So, contact for those kids is even more important. So, I tend to see that they have, like, an issue sometimes with finishing the classes on time, where they would want to.

Because of that communication gap. So that's a big thing.

Frequent communication was described and supported by participants as important to online learning.

Tertiary Theme Two: Communication with the Student

In addition to the frequency of communication, participants described their communication specifically with their students. Participants indicated their belief that effective communication helps students succeed. Amber stated, "I'm really able to understand a lot of [students], do not have problems with communication. And I think that really helps the students as well." Participants shared the challenge it can be to communicate with students at times. Mark said that virtual education is not face to face, so it can be difficult to connect with some students.

Some students feel a little isolated and their anxiety means that they don't wanna reach out... since there's no face to face, it can take a little bit longer to break down that wall of, you know, trying to make that connection.

Similarly, Ivan shared that it can be a challenge in virtual learning to have students interact with their teachers frequently. Some students may avoid their teacher. Ivan said, "they do tend to have like more avoidant tendencies sometimes and not reaching out for help. I think that's the biggest issue is just not feeling comfortable reaching out for help." Participants highlighted the implications that virtual education has on communication. Ivan further noted

that virtual education can lead to greater challenges for communication than traditional school environments, sharing that “in a public-school environment, I feel like students have, probably the same amount of motivation as any of my students online. But the only difference is that they like are forced to interact with their teachers every day.” Ivan continued on to discuss the student’s perspective as they hesitate to communicate with their teacher. They may believe interacting with their teacher is a sign that they are struggling with the content and fear demonstrating the struggle.

The biggest challenge is allowing students to recognize that [reaching out to their teacher] is not a sign of weakness. They think that they don't have to do that for the other classes, and they're not falling behind, and since that's happening in math, oh, they must not be good at math.

Participants revealed the implications that diversity has upon communication. For example, Sally shared a situation where one of her students did not understand the mathematics concept because they came from a background that made communication with the teacher challenging. “With the greater diversity...when I'm saying X, she's thinking U, that's a problem, because it creates that communication, shouldn't be online, you know?” Sally was explaining a mathematics problem using vocabulary in English, while the student had previously learned the concept in another language. The confusion stemmed from language differences.

Participants felt that communication with diverse students may be challenging for a variety of reasons. Ivan shared a few factors: “My diverse students, maybe they only have a house phone that they use, or maybe they share their cellphone with their mom when they're

at home. There are definitely challenges there.” Participants cited that it can be difficult to communicate with a student if their access to a phone or computer is limited. Participants’ experiences confirmed the importance of communication with students.

Tertiary Theme Three: Communication with the Family

Participants shared that communication with a student’s family is also part of their routine in the virtual teaching environment. Mark asks parents to review their student’s gradebook and progress report consistently and communicate with him.

One of the things I do...is I ask the parent to please check their grade book at least once a week. And I also send out a progress report every Monday so that they can see the last time something’s been submitted. The grade reflects the progress report and also that the grades are where we wanna be as a whole.

Participants find that communicating explicit and consistent progress reports to the family supports student success.

Participants shared that family involvement and communication is important, especially in the Spanish and African American communities. It is beneficial if parents know what is expected, and parents can be used as an ally for positive reinforcement. Parental praise can motivate minority students. Mark notes:

I’ve had some students that won’t do anything if their mom doesn’t know that it’s gonna happen. And that deals a lot with the Spanish community. Getting the family involved. Letting mom and dad know what’s going on, and the mom and dad really negotiate with the student to get things accomplished. But also that praise too. So

when they do well and a parent knows that they do well and they praise that student, that student seems to do more work. I know that can be across the board, but it seems like it's really, really helpful in the Spanish community and even in the African American community.

Findings in this study indicate that communication with a student's family is part of the virtual education experience.

Tertiary Theme Four: Communication of Expectations

While participants shared their perspective on communication broadly, they also specifically emphasized the importance of communicating expectations. Participants described how they explicitly communicate their expectations for student success in online Algebra I.

Sally communicates explicit expectations of weekly work to her students during conversations.

Almost every conversation I have with my students, I tell them what they need to do, what their next assignment is, what their next three assignments is [*sic*] depending on the kid. And then if it's someone who I know...are [*sic*] likely to continue not working then I give them very specific goals.

Juan noted specifically that students with moderate motivation levels need structured plans and to be given explicit expectations. He says that with some guidance, these students are able to be successful.

It's our job too to say, "Hey, I expect this, this and this." Not just, "Hey, just four assignments every week. I expect this and this and this, specific assignments." They tend to get back on track...with the little bit of guidance, they got it.

Sally is very clear in what she expects from students. She expects students to show their work and learn the process. She explains, "I want them to show their work. I don't want you to like, no one expects you to pop up with an answer, but if you can look at the process and getting there, that's the key." Mark also requires students to show their work and take notes. He has high expectations but makes them clear and connects them to student success. He notes the impact this has on his students: "I guarantee that I probably give them more work than they're used to. Because like I said, a lot of them don't take notes. They don't wanna use resources. But I try to make notes mandatory for every student."

Participants reiterated that communication is essential in the virtual learning environment. Juan believed that you must communicate expectations for success and that minority and ELL students struggle if expectations are not clear.

It all boils down to communication. As long as you're communicating what's expected, as long as you're communicating what needs to be done in order to be successful... It's really hard for not just, the minority students, but the ELL students, which we've been increasing that load, to have to come in and see an English format. Juan also uses communication of high expectations to motivate students. He finds that challenging students will motivate them and that it is important that students know you are there to help and care for them. In this regard, Juan shared,

That little push kind of motivates them, and just that motivation... Just them knowing that you're there and you actually care about what they're doing and how they're doing and what their process is. I feel that that motivates them to keep going, or if not at least contact you and ask you to help.

Communication of clear expectations is essential to student success in online Algebra I according to participants in this study.

Theme Six: Teachers Believe There are Challenges Communicating with English Language Learners

A finding of this study relates to participants' experiences communicating with English Language Learners (ELLs). They found language barriers to exist within communication between the teacher and their non-English speaking students and families. Specifically, participants found a large population of Spanish speaking students and parents in the virtual learning environment in the state of Florida. Participants shared how language barriers can be challenging for student learning, especially concerning content vocabulary.

Tertiary Themes

The theme *Teachers Believe There are Challenges Communicating with English Language Learners* has three tertiary themes: (a) language barriers; (b) Spanish speaking students; and (c) Spanish speaking parents.

Tertiary Theme One: Language Barriers

Participants indicated the existence of language barriers between themselves and their students, and the students' families. They noted that it is difficult to teach a student who does not speak the English language. Explanation of mathematics concepts can be difficult when there is a language barrier. Juan shared this example:

There was a student that spoke Russian and he spoke zero English and we tried, we got that first DBA [Discussion Based Assessment] done. We were, we were making stretches and...It just proved to be too, too hard for him. He, he wasn't able to communicate. He wasn't able to express his answers...it was, it was really sad to let that student go.

Juan found it upsetting to see students fail because of a language barrier, describing it as "really frustrating to see that happen because you know they're successful, you know they're smart kids." It was clear that participants found that language keeps some students from successful completion of Algebra I in a virtual learning environment.

Sally shared an example of a time when a student's language and vocabulary affected her learning: "The challenge of we're calling it something else while she normally calls it something else." Participants stated that online learning requires a strong reading ability, so it may be challenging for ELL students. Ivan said that "ELL status is, is big because, with the independent learning style on the online learning they do a lot more independent reading, and taking notes by themselves, and having a strong reading ability in English is really important."

The virtual district in the study has a Spanish translator to communicate with parents. Participants shared that the district attempts to narrow the effects of a language barrier. Amber noted this as a challenge, even though “in the virtual atmosphere, we do have someone that speaks primarily Spanish that can intervene and go back and forth with anything that you need to know.” The district acknowledges the language barrier and has taken efforts to reduce the effects for Spanish speaking students. However, participants still revealed the challenges posed by a language barrier in virtual education.

Tertiary Theme Two: Spanish Speaking Students

According to participants, the Spanish speaking student population is large and growing in their virtual school district. While a language barrier may exist among students speaking other languages, participants referenced Spanish most often. Sally shared that many of her students are ELL or Spanish is spoken at home, and there is a growing number of Spanish speaking students in her virtual classroom.

I do have a lot of students where they're not primarily speaking in English in their homes. I have quite a few, I think that has increased...I have more students who are Spanish speaking at home or their parents are.

Amber believes her students are diverse, and some speak only Spanish.

I got a mix I think of everybody, which was nice. Being in the virtual world I felt I had more of that mix, so I have students from everywhere. I have students that struggle with language, for example some that only speak Spanish.

Juan speaks Spanish and can review mathematics concepts in Spanish with his students and help build connections between the Spanish and English languages. He noted that this has been helpful because “we've been able to go over concepts in Spanish and connect them to their English roots.” He really finds value in connecting Spanish and English mathematics vocabulary to support the learning of his Spanish speaking students. Juan noted that there are similarities between the languages that can be helpful to point out to his Spanish speaking students: “There is some comparison. I know the languages sound terribly different, but there's some things that we do get the same and in math a lot of the vocab is the same.” Amber also is able to translate some Spanish which benefits her students.

Fortunately, even though I don't speak Spanish, I took enough classes of Spanish where I can-- you understand it. I know how to use Google Translate so I can make it work in order to say enough so that they can understand. So I am fortunate in that I have that.

Participants revealed the growing population of Spanish speaking students at the virtual school district during the interviews.

Tertiary Theme Three: Spanish Speaking Parents

Consistent with the large and growing population of Spanish speaking students found by participants, many parents speak only the Spanish language. Juan estimated the proportion at “60%, a little bit more than half, [of] the parents speak Spanish.” Participants explained that it can be a challenge to communicate with parents who don't speak English.

Teachers may use various techniques to attempt translation, so they can communicate with families. Amber said:

I have students that speak Spanish and most Hispanic, usually the only issue I run into there would be the parents speaking only Spanish and the students having to either translate or using Google Translate to translate for the parents.

Participants found that Spanish speaking families may not be highly involved in their student's learning and this results in concerns with grades and procedures. Ivan said:

I don't speak enough Spanish perfectly to communicate with parents...The families tend to not know exactly where their kids are at, or what they need to be doing at a level of detail that I think is appropriate. So they tend to have more issues with grades or going through the procedures the right way.

Participants revealed that it can be a struggle to communicate with Spanish speaking parents. They attempt to communicate and use the district's translation services, but sometimes are unsuccessful. As Mark described:

The parents don't speak English. So then when it comes to that motivating aspect, sometimes I might need to get some help or another teacher or we do have someone that helps out with speaking Spanish and stuff like that. We try to communicate that way as much as possible...As far as the students that don't speak English too well, those tend to be moved to teachers that speak that language.

As noted previously, participants attempt to involve students' families, but they shared that communication with Spanish speaking families can be challenging.

Theme Seven: Teachers Believe Strategies can be Implemented to Support Student Success
in an Online Learning Environment

Participants testified to providing many supports to their students and believing this will support student academic success. They shared various strategies implemented in order to increase student achievement. Participants sought to minimize the challenges posed by Algebra I through instructional strategies geared toward student learning. A large part of what they shared focused on their students. Participants discussed how the level of support a teacher provides affects a student's experience. Ivan stated, "I think it's really both the positive and negative experiences kind of come from the same idea, which is like how much support can I give them? Are they open to it?" Participants sought to provide instruction that met the needs of each unique student. It was evident that they try to go above and beyond to support student success.

Tertiary Themes

The theme *Teachers Believe Strategies can be Implemented to Support Student Success in an Online Learning Environment* has five tertiary themes: (a) additional time; (b) student focused support; (c) resource provision; (d) differentiation; and (e) student learning style focused.

Tertiary Theme One: Additional Time

The first strategy to support students mentioned by participants was providing additional time to students. Some teachers even provide extra tutoring sessions. During these sessions, Mark provides individualized instruction and asks to see their notes:

So when I do a tutor session, I usually have my students sometimes text me or email me their notes, so I can see that they've taken the time to get the vocabulary, the steps to solve certain topics, and then at least one example for each topic.

Participants believed that minority students may need more time with their teacher receiving instruction. Amber said, “you need to make sure to allot more time for [minority students] so, instead of 15 minutes you actually do like 30 minutes to an hour, depending on what it is that they need.” Often minority students are those that don't receive all of the time and teaching they need. Amber continued on to say:

I feel like some students, they don't fully fall under the crack, but it ends up being those minority students, is what I find that kind of get left behind in the sense that you can't give them enough of what they need.

Participants shared that spending additional time with students, providing instruction or tutoring, is one way they support their students' achievement in Algebra I.

Tertiary Theme Two: Student Focused Support

Participants overwhelmingly shared their efforts to ensure that the support they provide was focused on the individual student. They acknowledged that every student is different. Some are verbal learners and others are visual learners and need it written out.

Amber stated that she tries to differentiate for her students. She spends time one-on-one with them, provides resources, models concepts and skills, and conducts tutoring.

I know every student's different, with their understanding, what they do. You have your virtual or that become visual learners and you have the ones that have to have everything written out, and so I try my best in the classroom to do whatever is best for them.

Participants shared that they try to gear their teaching to the student's current needs. Most students know basic mathematics skills, but they must engage in online learning by taking notes, using resources, and asking for help in order to be successful. Mark says:

Once I get them engaged in learning, meaning that they take notes, they use resources, they ask for help. Once I get them to do that, then the math kind of comes secondary. 'Cause most students can add, subtract, multiply and divide. It's just adding in those different topics.

Participants said they try to build upon what motivates each unique student. Some students are motivated by real world connections to mathematics. Mark states, "one thing that I try to do is talk about math in the real world."

Participants discussed how they provide support to minority students, believing that minority students are often more visual. It is helpful for virtual teachers to be able to reframe their instruction. Amber shared:

They're very much more visual. They may not know something when you say it, if I ask them a question, they have no idea what I'm talking about but if I print it out on the board all of a sudden, 'Oh, I know how to do that.' So just being able to reword

things or look at things from a different angle or work backwards, depending on them is, is always a good way to go. Rather than, no that's wrong, just move on.

African American boys were mentioned specifically, as students in need of coaching.

Coaching support may mean teaching them how to be successful in school. Mark shared:

And trying to support African Americans, they seem to need that, that coaching a little more, especially the boys...coaching support to show them what to do next, help them understand notes and stuff like that. I think a lot of that comes from growing up in schools that don't have that type of support or in a homeschool situation.

English Language Learners (ELLs) were also highlighted by participants. They found that it is important to provide written instruction for ELL students. Mark shared an example:

I've actually had this one student who was great at math. Understood everything I said, but had a hard time speaking it back. And we would use my virtual office so that they could do the work on the board, and they could kind of navigate their words to that, what they're writing on the board. So that's helpful when, English as a second language student is, give them the opportunity to show you the work rather than always talk about it. And then we can connect the words with the actions and go from there.

Once a student receives individual support and finds success, participants found they are more positive about Algebra I. For example, Ivan says:

My happy experiences working with students, with diverse students, is when they realize that they have support. Their teachers aren't gonna get mad at them when

they're reaching out for help, even if it's multiple times in a week, when they start going on that train.

Tertiary Theme Three: Resource Provision

Another strategy utilized by participants to support students was by providing resources. Participants notice when students are struggling and attempt to provide resources specific to the student's needs. Ivan finds that successful students in Algebra I online find structure and use the provided resources. He shared this view as follows:

I think once they realize how to tackle the online learning, the resources that they have, and setting goals for themselves, then their motivation levels go up pretty high.

I think without that structure they sometimes lose track of it.

Participants provide resources to support students and help them when they are frustrated with assignments. Juan gives students resources when they struggle.

Some things I do is the last conference that we went to, we were doing a Google Text, which sending out this text, the kids are able to click a link and they're able to see not just their assignments but specific resources to those assignments because maybe they're not doing the assignments not because they're lazy, but because it's too hard, because they tried and it didn't go well...So, this tells them, "This is what you need. These are the links. These are the resources that go along with it. Is there anything I can do to help?"

Resources can be given in many formats. Participants use online resources such as those Juan mentioned, and they also provide strategies that will support student success.

Teachers provide resources to support student success. Mark described the resources he provides.

So then I tried to support that with handouts. I send out note-taking strategies, test-taking strategies. I send out concept maps for linear equations and the formulas, exponential equations and the formulas. Scatter plots for statistics. So some of the tougher things to engage I try to send out a concept map, at least that has the formulas.

He also teaches students test taking strategies.

Now the other thing I do is I talk about test-taking strategies. Talk about how, of course we wanna find the right answer, but sometimes we might need to narrow down the answer a little bit, especially if it's a multiple-choice thing. So as we're engaging our notes, we're looking at the question and we're noticing things. We might notice an answer that just doesn't fit, and let's get rid of that, so that, maybe we can narrow it down to two answers. And then we can let those notes really move us in the right direction to make our best guess. Engaging the test-taking strategies and our notes to move towards a best guess is different than just giving up.”

Participants described the resources they provide to support student success.

Tertiary Theme Four: Differentiation

Differentiation refers to providing instruction that is based upon each student's individual needs. Differentiated instruction is adjusted to match the student's current instructional level. Participants described how they adjust their instruction to meet the

student's level of understanding. Sally shared that this is her optimal teaching strategy, explaining, "in my utopia...I would love to teach students what they know and based on what they have experienced. That would be ideal." In the virtual learning environment, participants are able to differentiate instruction for every child based on their needs. Ivan said:

So, literally every student can be modified for without worrying about how it's gonna conflict with another student. So, this is a little easier to say. I mean, it's kind of like how I deal with every student. It's just understanding what their needs are.

Participants shared the need for online teachers to be able to adjust their instruction to meet the needs of the student. Amber explained:

So being able to quickly, to make changes to what you're doing so that you can see what the student truly knows or doesn't know without having any barriers...I think is something that I try to do and I make sure I'm ready for it at all times.

Ivan noted that strategies to engage students may differ depending on the student's grade level. "Each grade level has its own concerns, and strategies one could try to start implementing, and just ways to talk with the kids." Participants indicated that they use differentiated instructional strategies to support their students' success in Algebra I.

Tertiary Theme Five: Student Learning Style Focused

Participants shared that they support students in means that are specific to their individual learning style. They focus on the learning styles of their students, and also learn

about their students' methods of learning. Many say they are visual but are actually hands on learners. Mark shared:

When I talk to a lot of these students, we talked about learning styles. So rather than getting into the diversity end of it, I talked to students about how they learn. And most students will tell me that they're visual learners. As we do things visually, I find out that a lot of them are actually hands-on learners.

Participants stated that they are flexible so that students succeed. They will be available when students can meet and will provide instruction for their learning style. Amber shared a particular experience with a student:

I had one student who actually spent all summer in India...I would make sure, even if our hours are 8 am to 8 pm, I can be flexible to make sure it worked for them. I know they were more visual so every time we would schedule our calls and we would go into the virtual office so they can go over anything they wanted to do. And you would plan ahead for these so that we took into account the time difference.

In a virtual learning environment, it is important that instruction is provided in various formats, both verbal and visual, participants explained. Amber said:

I usually notice that you have to make sure to go over things a lot slower, so the student, for example, they definitely know their skills when it comes to mathematics but they may not understand something if you say it.

Sally shared another example when a student's learning style was apparent. Once this was accounted for and instruction occurred visually, the student found success.

I was talking about a math problem and I was, like, I was using $y = mx + b$ and so I'm talking, I'm like, you know slope-intercept form is $y = mx + b$, we're working on how to graph lines and was talking about that and all of a sudden she said, wait, what is x ? She said, is that u ? (Laughs) Then I was thinking, sometimes we take it for granted that...those letters mean something else. And I was like, huh! You know, so I ended up, it just threw me into shock. I'm like, wait a minute and she was like, what is, what is that? Then I was like, let me text it to you. So, so I sent, I sent $y = mx + b$ to her in text and then every question or every equation after that, during that conversation, I sent it to her in text and she felt more comfortable with it.

Participants shared that they use a student's learning style as a strategy to support the student's success.

Theme Eight: Teachers Believe Virtual Education is a Unique Learning Environment

Interview data from this study illustrated the unique learning environment found in virtual education. Participants highlighted both the benefits and the challenges that accompany teaching and learning in an online environment. There are both positive and negative experiences in virtual teaching. As one participant put it, there "is always some good with some bad" in online instruction.

Tertiary Themes

The theme *Teachers Believe Virtual Education is a Unique Learning Environment* has two tertiary themes: (a) benefits; and (b) challenges.

Tertiary Theme One: Virtual Education Benefits

Participants proclaimed that many benefits are found in virtual education. They shared that students are able to move at a pace that is appropriate for their learning, and that teachers are able to provide individualized instruction to their students. Participants also advocated for the quality of the online course program and found many positives for students in virtual education.

Participants held that students receive instruction online in an individualized format that positively influences students. As Mark shared, “I've worked within the virtual environment, it's all pretty much one on one, and I think that that benefits a lot of students.” Ivan also mentioned the deep level of instruction afforded in an online environment, noting that “here we really do check for understanding...I would say it's more of a rigorous way than ever taking like any kind of test, where you're not, it's not a one on one scenario.” Participants shared that students with unique needs are served beneficially in the online learning format. Students who may not be able to attend a traditional school are able to learn from a virtual instructor successfully. Mark stated:

I think that, unlike the brick and mortar, you can focus on students that need that bedside manner, and that learning disability or something like that and need someone there with them. But I think online learning really gives an opportunity for students to move quicker or move slower if they need it.

Juan agreed, noting that the pace a student progresses through Algebra I online can be based upon their understanding.

I believe it's, it's more of an advantage, in the online setting, just because in a brick and mortar, in any other district if you get through a concept and you don't understand, what happens? You move on to the next because the rest of the class has to move on to the next. We have that really nice sweet spot where, "well, you didn't understand? Let's, let's go over it. Let's try it again. Let's not move because, especially in Algebra..." I like to call it, like, a 'staircase' class. Everything in chapter one and two, you need it to build on in three and four and five, so why are you not gonna get something and then just keep pushing through and make the class harder for yourself when this outlet lets you really go back, master, make sure that you're understanding, and then moves you forward? And I feel like that that's an advantage that this district has in order to not just get these minority students and these ELL students through but get them through with the knowledge that they need or should have gotten if they understood the language and if they weren't a minority.

The Algebra I curriculum is a strength of virtual education according to participants. It is unique to online courses. Mark shares how the curriculum is a benefit to students taking virtual courses.

These online programs, it really, with that interactive online program, with a student being able to click on interactive links, see videos or audio, or interact with, graph sliders that move graphs around based on values and stuff like that. I think that's a very good hands-on, live action textbook [as opposed to] where students used to maybe not read their textbook, and just watch what the teacher did on the chalkboard or on the white board, and then try to learn directly from that, but never engaged any

of their examples in their textbook. I think the online program gets them to do more of that, and I think that's a good thing.

Tertiary Theme Two: Virtual Education Challenges

Participants found unique challenges that accompany virtual education. Some challenges were within the organization or district, while others arose from student factors or backgrounds.

The virtual school district in this study is an organization serving many stakeholders. Participants noted that policies affect instruction. Amber stated, “the big problem that I still find with the classroom, is when politics get involved and we're told what we can and can't do in the classroom.” The district has policies that affect teaching and learning, according to participants. One such policy mentioned by participants is that size of each teacher's class. When classes are large, teachers may limit the time they are able to spend with each student. Amber shared:

I know the biggest problem I face with Algebra I in the virtual world... We have all these students and I feel like there's certain students who need more time for it. With how many students we have, it's very hard to work with some of them more, with more time each week. And they need it, so trying to find that balance is definitely hard.

Participants find it challenging to provide ample time for every student to truly master the Algebra I content and achieve academic success.

Students who are participating in online learning for the first time present challenges as they become accustomed to the new format. Ivan stated that “a lot of first time online learners...they're trying to figure stuff out. They might have gaps in knowledge from previous courses, or whatever it might be. But there are some like unique challenges there.” Another group of students that present challenges to instruction include students who are taking online courses as they travel or focus on sports or performing. Mark said that in the virtual environment:

some students are taking this class because they're, they're travelers, you know?

Either it's actors or artists, I've had musicians...so getting them focused on doing their schooling when all they really care about is doing their art can be another hindrance.

Participants revealed that challenges to learning were posed when instructing diverse students and students from low socioeconomic backgrounds. Ivan explained his experiences when teaching online was particularly challenging with certain students.

I've had not so great experiences working with diverse students when that support can't happen, where I call, we try to figure it out, they can't do it for some reason.

Maybe the only computer they work on is at a public library. Maybe they're just, like, against the whole concept of it, or they've already shut down. Trying to get in touch with parents sometimes makes those situations really rough too, because, to be fair they're very busy, but it's also rough to try to get every party on the same page. You know, it takes a village.

Ivan continued on to say that students from low socioeconomic environments may not have the technology needed for tutoring for success in Algebra I online.

Sometimes diverse students often get Chromebooks, which is a great budget choice, except for the fact that you can't run [the tutoring system]. So, that's really rough, right? For a lot of our extra tutoring options we have they all use [one system] only. So maybe I can find an alternative way to work with them, but you know they, they kind of lose access to a lot of, you know, good extra features.

Mark advocated for greater support for students regarding long-term planning. He found that virtual learning was challenging for diverse students when they did not have support or understand the virtual education format. He stated:

I feel like, with diverse students especially, is that since they don't have as big of a social, like, network of people who are willing to help them...one of the biggest problems is the long-term planning...The lack of that long-term understanding of how the online framework works makes students, like, it kind of sets them up for failure sometimes because they don't know what to expect.

While participants support the many benefits found in virtual education, they also acknowledged the challenges present in teaching online.

Conclusion

Throughout this chapter, the researcher presented the findings of this phenomenological study that explored the lived experiences of Algebra I teachers in a virtual learning environment. Interviews provided data on the experiences of five participants who shared their stories. In order to answer the research question that guided the study, a thematic analysis of the interviews was conducted by the researcher. The study's findings

were organized into eight themes. The eight themes were further organized into tertiary themes. Supporting data for each tertiary theme were provided in this chapter. The participants' verbatim descriptions were used so that the researcher accurately represented their experiences.

The first finding of this study was that teachers believe student characteristics are a primary determinant of their success in virtual education. Participants shared that their students' characteristics had a correlation with their academic success in online Algebra I. Participants described their students' demographics, levels of motivation to successfully complete the course, prior knowledge they possessed upon the start of Algebra I, and the pace at which students completed the course. This study found that teachers believe each of these characteristics impacted a student's success in online Algebra I.

A second finding of this study is that teachers believe they have a strong impact upon student success in a virtual learning environment. As participants described their background, it was revealed that it is an advantage when participants shared a background with their students. Teachers' positive beliefs and enjoyment in teaching also positively affects student achievement. Participants all found that building a relationship with their students is one of the ways they most impact student success. Relationship building allows teachers to impact student success to a large degree.

This study's third finding notes that teachers believe Algebra I is a challenging content area for student achievement. Interview data reiterated consistently the rigorous nature of the course content and the difficulty experienced by many teachers. The

challenging assessments that accompany Algebra I were also discussed, confirming teachers' belief in the demanding expectations of the course.

A fourth finding in this study highlighted the impact of family involvement on student learning in virtual education. Participants' experiences led them to believe that a student's demographic background has a correlation with the level of family involvement they receive. Participants believed that greater family involvement supports student success, while a lack of family involvement may relate to less motivated students. Participants found that involving a student's family is an effective strategy to support student success in online Algebra I.

Fifth, this study found that according to teachers frequent and consistent communication is important in virtual education. Participants stated that communication is frequent, and it must occur with both the student and the family. Specifically, it was found that communication of expectations is necessary for student success. Frequent communication with students and their families, providing explicit expectations, is the suggestion posed as beneficial in this study.

The sixth finding revealed during this study is that teachers find there are challenges that arise when teachers communicate with English Language Learners. Language barriers exist between teachers and students or families. This can result in miscommunication or misunderstandings. Specifically, it was revealed that there were a significant number of Spanish speaking students and parents in the online district where participants are teaching. This large Spanish speaking population is growing, and while there are some strategies to alleviate the language barriers, participants found it still to be quite a challenge.

The study's seventh finding reviewed strategies implemented to support student success in an online learning environment. Teachers believe these strategies positively impact student achievement. Participants mentioned five different strategies they use to support students. These include providing additional time for students who need instructional support, focusing their support on the student's unique needs, providing resources, differentiating instruction, and focusing on the student's learning style.

A final finding of this study indicated the unique nature of virtual education. Online learning has many benefits that support student achievement. However, there are also challenges present that result from the unique format that accompanies virtual learning.

CHAPTER FIVE: DISCUSSION

Introduction

The concluding chapter of this phenomenological research study provides a review of the statement of the problem and the methodology. This is followed by discussion of the findings, organized by each theme. The findings are then considered within the frameworks presented by Moustakas (1994) and Bolman and Deal (2013). The study's limitations are presented. Finally, implications of the findings and recommendations for future research are addressed.

Statement of the Problem

The United States has a long history of educational inequity. There is an academic achievement gap that exists between minority students and their non-minority peers (Sousa & Armor, 2016). The academic achievement gap is defined as persistent differences in achievement among diverse groups of students as indicated by scores on standardized tests, grades, levels of educational attainment, graduation rates, and other data (Ravitch, 2007). The academic achievement gap has been noted in subgroups such as English Language Learners, students with disabilities, students from poverty, and students with minority backgrounds (Klein, 2016). Although national educational policy has sought to narrow the academic achievement gap, it is persistent and must be addressed because public education affects the future of our nation (Fullan & Quinn, 2016).

Virtual education is a growing platform for learning, with nearly 300,000 students enrolled across the United States (Miron et al., 2018). Achievement data from students

receiving their education virtually demonstrates the existence of an academic achievement gap in this learning environment (Miron et al., 2018). Yet, there is not a great deal of high quality research surrounding aspects of virtual education (Molnar, 2017). Student learning is affected by race, socioeconomic status, and disability (Lynch & Oakford, 2014) but there is little research on how these factors affect learning in virtual education. There is a critical need for research that explores the lived experiences of virtual education teachers related to their experiences instructing minority students.

Review of Methodology

A descriptive phenomenological research design was used for this study (Creswell, 2013; Ary et al., 2013). This research design was utilized to make meaning from the perceptions, perspectives, and understandings of virtual teachers in relation to the academic achievement gap. The following research question guided this study:

What are the lived experiences of Algebra I virtual education teachers, as they relate to the instruction of minority students?

Discussion of Findings

This study identified and presented eight themes of the phenomenon with supporting data throughout Chapter Four. The eight themes included: (a) teachers believe that student characteristics are a primary determinant of their success in virtual education; (b) teachers believe they have a strong impact upon student success in a virtual learning environment; (c) teachers believe Algebra I is a challenging content area for student achievement; (d) teachers

believe family involvement impacts student learning in virtual education; (e) teachers believe frequent and consistent communication is vital in virtual education; (f) teachers believe there are challenges communicating with English language learners; (g) teachers believe strategies can be implemented to support student success in an online learning environment; and (h) teachers believe virtual education is a unique learning environment. In addition, twenty-seven tertiary themes arose from the eight major themes. The following section offers a description of the findings organized by theme, as they connect to research and theory. It is followed by discussion of the tertiary themes within the theoretical frameworks presented by Moustakas (1994) and Bolman and Deal (2013).

Summary and Interpretation of the Themes

Theme 1: Teachers Believe Student Characteristics are a Primary Determinant of Success in Virtual Education

The first finding of this study was that teachers believe student characteristics are a primary determinant of student success in virtual education. Participants acknowledged that minority students, English Language Learners (ELLs), and students from low socioeconomic backgrounds often struggle in online Algebra I. These findings align with research that recognizes the academic achievement gap in the United States public education system. A student's background can often predict his or her academic achievement on standardized assessments (Strand, 2014). Minority students, ELLs, and students from poverty are more likely to have academic achievement gaps with their peers (Klein, 2016; Lynch & Oakford, 2014). Student achievement data demonstrates support of the study's findings that there is a discrepancy in the performance of students from diverse demographic groups (Sousa &

Armor, 2016). The findings of this study further reveal that the academic achievement gap exists in virtual education as much as in the traditional school environment.

According to participants, a student's motivation level impacts their academic achievement as well. This finding aligns with findings that report that developing students' self-motivation is a helpful method to support their online learning (Barnard-Brak, Lan, & Paton, 2010; Schunk & Zimmerman, 2007). This finding reveals that teachers ought to strive to build and increase student motivation to achieve as they engage in the course. Online learners and teachers work primarily in the individual and interpersonal planes of development where cognition, affect, behavior, motivation, beliefs, attitudes, and values of the student guide their instruction (Rogoff, 2003). Teachers can use this plane of development to build characteristics that support learning within their students through their one on one communication with each student.

This study found that teachers believe the prior knowledge students possess when they enter Algebra I online will affect their ability to be successful in the course. Students who have received foundational instruction in algebraic thinking in traditional school settings have demonstrated higher performance in Algebra I (Stoelinga & Lynn, 2013). Teaching prerequisite skills to students prior to taking Algebra I is beneficial toward student success in the course (Loveless, 2008). Students who are better prepared with a solid foundation in algebraic thinking will be more likely to achieve success in online Algebra I (Loveless, 2008). Although data supports the achievement gap, what is most interesting in the study's findings is the participants' open willingness to acknowledge the impact of diversity upon achievement. Participants were authentic in their acknowledgement of how demographics

impact achievement. This study found that teachers believe students' characteristics largely determine the likelihood that they will find success in Algebra I in an online learning environment.

Theme 2: Teachers Believe They Have a Strong Impact Upon Student Success in a Virtual Learning Environment

Data from this study indicated that teachers believe they impact student success in a virtual learning environment. Participants found that their background, beliefs, and ability to build relationships influences their students' achievement. This finding confirms the notion that the teacher "trumps virtually all other influences on student achievement" (Stoelinga & Lynn, 2013, p. 11). Teachers have an undeniable impact on the success of students in their classroom.

Participants shared a great deal from their background and past experiences. They believed that sharing demographics or background characteristics with their students was beneficial to student success. There is some research that supports the benefits of shared background characteristics between teachers and students (Goldenberg, 2014). Research has also found a strong connection between teachers' personal experiences and their professional beliefs about cultural diversity (Fives & Gill, 2015). As participants' beliefs were revealed during interviews, they affirmed that beliefs will influence teacher instructional practice, and practice will influence belief (Handal, 2003).

As data evidenced, relationship building is paramount to student success in virtual education. Participants found pride in their ability to connect with students. Virtual educators must use skills to engage and motivate students (DiPietro et al., 2008). The ability

to form strong relationships is a necessary skill of an effective teacher. Teachers who are “deeply invested in their students’ lives and communities” can achieve greater results in the classroom (Boucher, 2016, p. 104). Participants’ belief in the power of relationship building is supported by research.

This study emphasized that teachers believe strongly that they impact their students’ achievement. High quality teachers who implement instructional best practice are vital to educational achievement (Darling-Hammond & McLaughlin, 2011). Teachers undeniably affect student success.

Theme 3: Teachers Believe Algebra I is a Challenging Content Area for Student Achievement

The third major finding of this study noted that teachers believe Algebra I is a challenging content area. Participants highlighted how difficult the content is for many students and discussed the difficulty of the End of Course exam that all students in the state of Florida must successfully pass in order to receive their high school diploma. The U.S. Department of Education has long acknowledged the challenges present in Algebra I and proclaims it to be the “gateway” to advanced high school mathematics and science (U.S. Department of Education, 1997). And, the National Mathematics Advisory Panel (2008, p. xii) stated that “although our students encounter difficulties with many aspects of mathematics, many observers of educational policy see Algebra as a central concern.” The study’s findings are validated: Algebra I is a challenging content area for students.

This finding leads to accompanying questions. Why is Algebra I so challenging? Are the standards too rigorous or the assessment too difficult? Is there a failure to build a

foundation in algebraic thinking within students in their earlier educational experiences? Though those questions are outside the scope of the current study, this finding supports the need for continued research into the reasons behind Algebra I's data-based reputation as a challenging content area.

Theme 4: Teachers Believe Family Involvement Impacts Student Learning in Virtual Education

This study found that teachers believe family involvement impacts student learning. Involving stakeholders in a child's education has a positive effect on achievement. There are many studies in the traditional school setting that have shown the positive effects resulting from school and family partnerships, and the positive outcomes family involvement has on student achievement (Anderson, 2000; Drake, 2000). The substantial body of research on family involvement led to legislative intervention supporting the school and home partnership (U.S. Department of Education, 1997). The Individuals with Disabilities Education Act (IDEA, 2004) significantly increased the role of parents or guardians in their child's education. No Child Left Behind (NCLB, 2002) furthered the commitment to family and school partnership, requiring much communication and engagement. NCLB required schools to develop a formal parental involvement plan and educate all staff on the value and contributions of families as partners.

It is not surprising then, that teachers, including virtual teachers, are aware of the importance of family involvement and actively seek to engage families in their child's education. They attempt to develop creative ways of supporting family involvement. Epstein (2001) identified types of involvement that need to be present to have successful

partnerships between the school and family. Several of these are noted in virtual education. These include: communication, learning at home, decision making empowerment, and collaboration (Epstein, 2001).

Culturally responsive pedagogy is a strategy used to narrow the achievement gap that embraces a student's home environment and cultural background (Ebersole et al., 2016). It supports the involvement of the family in a student's education. To support maximum student achievement for all students, especially minority students, teachers need to build strong connections between the home and school environments (Ford et al., 2014).

Although virtual education is a different learning platform than traditional public schools and the methods for family involvement may differ, teachers believe its importance remains. Teachers in the virtual environment involve families through consistent communication: texts, calls, email, support videos, and more. They ask parents to monitor their children and to engage in learning. Often, they will ask parents to provide incentives for academic success or consequences for lack of completed work. The beliefs of teachers in this study proclaimed that parental involvement in virtual education is critical to the academic success of online learners. Collaborative partnerships between teachers and families are invaluable in a child's learning.

Theme 5: Teachers Believe Frequent and Consistent Communication is Vital in Virtual Education

A fifth finding of this study notes that teachers believe frequent and consistent communication in virtual education is vital to student success. Participants championed frequent and consistent communication with students and families. Research on best

practices in virtual education also supports frequent communication (iNACOL, 2011). The International Association for K-12 Online Learning (iNACOL) standards and The Southern Regional Education Board (SREB) guidelines both advocate for consistent communication. The iNACOL standards support frequent interaction and communication between student, teacher, and families (iNACOL, 2011).

When communicating, participants repeatedly mentioned the importance of sharing clear expectations with students and families. This understanding is a known best practice for instruction. Students need teachers to hold high expectations that are clearly communicated in order to achieve (Good, 2014). Data from this study reinforces the importance of communication in virtual education. In order to narrow the effect of the distance between a virtual teacher and student (Wolcott, 1996), communication must occur often, consistently, and contain specific instructions to support student academic success.

Theme 6: Teachers Believe There are Challenges Communicating with English Language Learners

Participants in this study experienced challenges communicating with English Language Learners (ELLs). They found an existing language barrier with ELLs and noted the prevalence of Spanish speaking students and families. Although teachers may only have a student's selected race to verify their status as ELL, and Hispanic race does not necessarily mean a student is an ELL, teachers frequently referred to students as ELLs if there was a noticeable language barrier present. National demographic data indicate that ELLs represent the fastest growing student population in the United States (Nutta, Mohktari & Strebels, 2012). Multimedia learning has been associated with effective pedagogy for ELLs (Taylor,

Watson, & Nutta, 2014). Therefore, it has been theorized that virtual learning has a positive impact on the academic success of ELL students (Lopez, 2009). However, this study found that there are challenges communicating with students learning English that place a barrier between them and academic success.

Much of the modern discourse on language development for ELL students has its origins from the work of Jim Cummins (1984). He suggested a distinction between language acquisition for social use and academic purposes. He used the term *Basic Interpersonal Communication Skills* (BICS) to describe language skills needed for social situations (Cummins, 1984). ELL students may use BICS while interacting with peers, shopping at the store, or any other social interaction where others do not speak their same language. Context is often embedded in BICS and the language is undemanding. Cummins (1984) labeled the language needed for success in educational settings *Cognitive Academic Language Proficiency* (CALP). CALP is the foundational language necessary for a student to meet academic demands in a classroom and is dependent upon the instruction a student receives in the classroom (Cummins, 1984). Cummins found that, while many children develop BICS within several years of immersion in a new language, CALP may take between five to seven years to develop.

Germane to this study, mathematics is impacted by language. Academic vocabulary and language impact how students interpret abstract mathematics ideas (Engler, Jeschke, Ndjeka, Ruedi, & Steinmüller, 2006). Students from different cultures may interpret and express mathematics concepts differently when solving problems (Engler et al., 2006).

One of the reasons that this study highlighted the challenges of communicating with ELL students as central to the lived experience of virtual education teachers in Algebra may be the unique nature of the virtual learning environment. Students may be more isolated because of the distancing effect (Wolcott, 1996). ELL students may not interact as frequently in social or academic settings with their peers as in a traditional school environment. It may be more difficult to build BICS and CALP, leading to increased or more noticeable challenges communicating virtually. Parents may not have had exposure to language in a social or academic setting if they arrived in the United States past their high school years. Communication with ELLs is an undeniable challenge in virtual education.

Theme 7: Teachers Believe Strategies Can Be Implemented to Support Student Success in an Online Learning Environment

Another significant finding of the study was that teachers believe they can implement strategies to support student success in virtual education. Participants provided additional time, focused their support on the individual student, provided resources, used differentiated instruction, and focused on student learning styles. These strategies have been verified as beneficial to students in virtual settings (iNACOL, 2011).

The International Association for K-12 Online Learning (iNACOL) standards advocate for support services for students and practices that adapt to meet diverse student learning styles (iNACOL, 2011). Individualized, one-on-one instruction with scaffolding is effective in supporting students (Archambault & Crippen, 2009). The student focused, individualized support participants describe in this study is precisely what has been suggested to support students in their learning.

Participants implemented these student focused supports and sought to provide instruction that is at the students' current instructional level. Learner-centered instructional practices are essential to virtual education (Wolcott, 1996). When instruction is focused on the learner, teachers are able to align teaching with the student's instructional level through scaffolding. The scaffolding used by teachers promotes student progression toward learning (McLoughlin, 2002).

Interesting to note is that feedback was not mentioned as a way to support students. Teachers need to monitor and provide feedback frequently and consistently in the online learning environment (Liu & Cavanaugh, 2012). Perhaps teachers included the feedback they provide as part of the frequent communication to students and parents.

It has been confirmed that students at risk for failure in online courses benefit from support materials such as guided notes and resources, tutoring, and consistent communication (Watson et al., 2009). This study's findings support the notion that students benefit from specific actions and strategies taken by their teacher. Although the study's first finding is that student characteristics are a primary determinant of student success, participants continue to believe they can change or improve student learning with the implementation of effective strategies. This finding supports teachers' belief in growth mindset, that every child can demonstrate growth with concerted effort (Dweck, 2006). While teachers may believe their students' demographics affect achievement outcomes, they also believe in their ability to impact educational outcomes. Teachers believe that despite a student's challenges to learning, they can make a difference in the achievement of their pupils.

Theme 8: Teachers Believe Virtual Education is a Unique Learning Environment

The final major finding of this study acknowledges the unique learning environment within virtual education. Participants discussed both the benefits and challenges associated with virtual learning. Virtual education has the ability to provide individualized support to students based upon their unique learning needs. Students can receive one-on-one instruction. The increased presence from instructors in an online learning format is needed for students to successfully learn (Zhan & Mei, 2013). Teachers have the opportunity to focus on the student more virtually than in a traditional classroom with many students if they are provided necessary time.

While participants did not go in depth in their description of the curriculum for Algebra I they are provided and tasked to implement, they refer to it positively. It was found that the course is of a high quality because it met the standards for a quality virtual course (Southern Regional Education Board, 2001). The curriculum provides a template for teachers to use as they gear their instruction toward their students. The curriculum was found to be a strength within the virtual learning environment at this district.

Findings also indicate that virtual education has challenges. Similar to any traditional school, virtual school districts set organizational expectations through policy. Policy often affects classroom and instructional practices (Coburn, Hill, & Spillane, 2016). Teachers and students in a virtual learning environment are impacted by organizational policy, as participants mentioned in this study. Data from this study also demonstrates the challenges presented to virtual instruction by students' demographic factors and lack of access to appropriate technology. Certain student subgroups are found to be more challenging to

instruct online (Strand, 2014). Findings from the interviews reveal the unique nature of teaching Algebra I in an online learning environment and the complexities that accompany teaching and learning in virtual education.

Theoretical Re-Interpretation

According to Moustakas (1994), the final steps to data analysis involve written textural descriptions and structural synthesis. The textural description throughout Chapter 4 of this dissertation provided detailed insight into the meaning that participants have experienced about the phenomenon. The textural portrayal provided content through quotes and verbatim passages, organizing the participants' experiences into themes. The researcher used the invariant themes to identify detailed insight into the meaning of experiences. But, the textural description did not include the essence of the phenomenon (Patton, 2002). In this section, the researcher will expand on the textural description and develop a structure of the experience. Creation of a structural description will require the researcher to find "deeper meaning" (Moustakas, 1994; Patton, 2002). Development of structural synthesis contains the true meanings of the experience and the deeper meanings for the participants (Patton, 2002).

The structural synthesis is written within the frameworks provided by Bolman and Deal (2013). The model presented provides four different perspectives through which organizations can be understood. Each of these perspectives provides a useful lens from which to analyze experience within a broader context. Although this research study focuses on the experiences of individuals, each of their experiences is situated within the constraints

of one virtual school district. This organization and the essence of their experiences is more deeply understood within the framework presented by Bolman and Deal (2013).

Structural

When viewed from the structural frame presented by Bolman and Deal (2013), the virtual school district in this study is an organization that inherently runs based on many of the assumptions in this frame. The school exists to reach goals for student completion of courses and student achievement. A strategic plan documents the goals, objectives, and strategies to achieve the goals. The division of labor has teachers responsible for groups of students, content areas, or other realms; administrators that each lead specific areas within the district; a curriculum development team to provide instructional materials; and many other departments responsible for various aspects of the organization. Coordination of these efforts is necessary in order to ensure a functioning system that works to reach established goals.

Much of the participants' experiences involving communication are part of the division of labor of the organization. The expectation is that teachers communicate with their students frequently. Communication is monitored and tracked, and administrators report when expectations are not met. Teachers tend to appreciate the clear guidelines for communication. "Teachers seemed to prefer clarity of expectations, roles, and lines of authority" (Bolman & Dean, 2013, p. 48). Division of labor has teachers as the direct line to students and families, and frequent communication is policy written in the Standard

Operating Procedures of the district and included in the teacher evaluation model (Florida Virtual School, 2015).

The structure of the organization isolates teachers based upon content area. All Algebra I teachers are in one schoolhouse under one instructional leader. Participants' experiences were similar in many ways as a result of the organization of the virtual school district. They are experiencing the same policies and procedures, a similar student population, and one administrator.

In an effort to increase student success, teachers have created resources, tweaked the curriculum to make it more accessible, and collaboratively negotiated challenges with the content of Algebra I. The essence of participants' experience is that they are proud of the work they have done to support students. However, it would be valuable to see what solutions to the achievement gap could be created if other departments, such as curriculum, were involved in the collaboration.

There is ambiguity in goals within the organization (Bolman & Deal, 2013). While this research study focused on the achievement gap and teachers' experiences instructing minority students, this purpose is not one of the goals listed in the virtual school district's strategic plan. Although the organization prides itself on remaining student focused, there is little discussion of diversity in the student population or of narrowing the academic achievement gap between minority and non-minority students. Participants in this study were open and honest in their responses, but it is evident that they do not consider the impact of the academic achievement gap consistently. They mention diversity, language, and other aspects that impact the achievement gap, but the researcher's interpretation is that they did

not go beyond a surface level on many topics. There did not seem to be a great deal of emotion at the inequity present in student achievement. The most broadly communicated goals of the organization focus very little on inequities, so teachers do not focus on them with intensity. They are striving toward frequently communicated organizational goals and focus on achieving these.

The structure of the organization has contributed to many of the benefits and challenges of virtual education revealed by the participants in the study. The way that students learn through online modules and content, with frequent communication, instruction, and assessment from their teachers is a benefit to learning virtually and in all learning. Student instruction is individualized and targeted to student needs. The organization's separate curriculum department ensures the instructional materials are standards-aligned and rigorous. However, the online aspect of the learning makes it more challenging to achieve true relationships and can interfere with communication.

Human Resources

The human resource frame finds that organizations exist to serve human needs and that people and organizations need each other (Bolman & Deal, 2013). The virtual school district hires teachers to meet the needs of the organization by providing instruction to students. The findings of this study regarding teacher background and beliefs reveal the type of individuals the organization is hiring. Although only 22% of the teachers at the district are minorities, 80% of the participants of the study identify as a minority. The district has some teachers that are diverse and mirror their minority students, but far fewer than are represented

in this research study. There may be an attempt to have diverse teaching employees at the virtual school district, but currently only about one-fifth of the teachers are minority.

Teacher beliefs can also be viewed from the human resources frame. Several participants stated their job satisfaction and passion for virtual education. In this case, the organization and teacher are mutually meeting each other's needs. Participants also shared their beliefs about minority students. They found that student characteristics are a primary determinant in student success. This belief is a long-standing assumption: minority students or students from poverty perform poorly compared to non-minority, affluent students. The employees at the virtual school district believe that demographics determine success; as a result, this belief is perpetuated as reality. Teacher beliefs affect teacher actions, which affect student actions, which affect student achievement (Handal, 2003).

The human resource frame highlights trainings provided to employees for professional growth (Bolman & Deal, 2013). None of the participants in this study mentioned professional development related to diversity or minority students. It is crucial for an organization to hire the correct people, but it is equally important that current employees are provided professional development to support their success and help achieve organizational goals. It is essential to build teacher capacity relative to diversity and achievement if they are to embrace the strategies that will narrow the achievement gap (O'Hara & Pritchard, 2008).

Another aspect of hiring relates to this study's finding that there are challenges communicating with ELLs. Participants noted that speaking a students' first language is beneficial for their education. This benefit was noted specifically for Spanish given the

prevalence of students who speak Spanish as a first language. Only one of the five participants in the study was fluent in Spanish. If a similar low percentage of Spanish speaking teachers is apparent across the district, hiring practices in the school district have failed to provide a sufficiently diverse cadre of teachers. Bolman and Deal (2013) state that diversity is an asset. This finding suggests that, in regards to hiring, the district needs to consider increasing their efforts to hire teachers who reflect their students' demography, especially teachers who are Spanish speaking.

Teachers at the virtual school district may also feel they lack empowerment, a necessity in encouraging effectiveness within the human resources frame (Bolman & Deal, 2013). They are expected to execute the curriculum provided by a separate department. Participants mentioned ways that they had modified curriculum; in reality, they created extra resources or provided tutoring sessions. From a curricular perspective, they implemented the curriculum they were given. Thus, teachers may feel they lack the autonomy to make curricular decisions that are in the best interest of their students. A lack of autonomy hinders elimination of the achievement gap (Crocco & Costigan, 2007).

A final factor in the virtual school district's failure to narrow the achievement gap within the human resources frame is the lack of incentives for teachers. Many possess an internal drive and find purpose in their profession. For those who do not, education lacks financial incentives and it is difficult to find opportunities for promotion. "Consistent with core human resource assumptions, high-performing companies do a better job of understanding and responding to the needs of both employees and customers" (Bolman & Deal, 2013, pp. 133).

Political

As Bolman and Deal (2013) suggest, analysis of the organization and the achievement gap from a politically framed view may provide insight into why the gap persists. The political frame views organizations as a jungle or contest (Bolman & Deal, 2013). Within the virtual education environment, there is competition for students. Other organizations are constantly competing for the same students as the district in this study. This competition inherently influences the policy, procedures, and culture of the organization. Accordingly, the virtual school district in this study emphasizes their commitment to what is best for each student. In a competitive environment, focusing on the student is a strategic way to attract clientele.

The Florida Department of Education (FLDOE) is a governing body that is an overarching political ecosystem. FLDOE determines the funding structure at the district. The virtual school district is funded based on student completions in each course as determined by the FLDOE. FLDOE also controls the Algebra I standards and the corresponding assessment required for high school graduation. This study confirmed the challenging nature of Algebra I content and assessment. The political frame provides explanation for these challenging standards. Likewise, the FLDOE determines the language of the Algebra I End of Course exam. The assessment is administered in English. This impacts the achievement of ELL students and support this study's findings.

Participants in the study mentioned student pace as a factor in student success. Pace is monitored so that students are finishing courses appropriately to earn funds for the completion. Student data are monitored consistently. The political frame also impacts the

number of students in each teacher's classroom and affects allocation of resources such as time.

Finally, the curriculum for Algebra I is impacted by the political frame. The virtual school district in this study has a separate department for curriculum development. Subject matter experts ensure curriculum is standards-aligned. The curriculum is delivered to teachers to implement. Participants did not discuss their opinions on this process. They seem to view this process as natural while in traditional brick and mortar schools, teachers lesson plan and provide daily instructional outlines to administrators. The unique curriculum provision at this virtual school district is a political process.

Symbolic

Analysis of the organization and the achievement gap from a symbolically framed view provides insight into why the achievement gap persists at the virtual school district in this study (Bolman & Deal, 2013). Specifically, the findings of this study note that teachers tend to naturalize Algebra I. They state that it is challenging for students and have assimilated Algebra I into a category where student achievement will be difficult. Algebra I has taken on a symbolic role as a difficult course where student success is a monumental feat.

Participants also described a school culture where there is a monolithic curriculum that teachers must implement. The curriculum embodies a symbolic position as it is the universal method to provide instruction. Teachers are delivered the curriculum and must make accommodations for diverse students independent of what they are provided. In their discussion, teachers did not mention strategies included within the curriculum to support

their instruction of diverse students. Curriculum that promotes teacher development in addition to student learning is characterized as *educative curriculum material* (Davis & Krajcik, 2005). The focus of *educative curriculum material* is to support teachers' pedagogical content knowledge and provide instructional strategies that support student learning. The curriculum at the virtual school district does not include how culture impacts learning or provide culturally appropriate suggestions to support students impacted by the academic achievement gap. Its symbolic role within content instruction has not expanded to include provisions for diverse student populations.

The school district culture has also contributed to the actions of the participants and findings of this study. The culture prides itself on its commitment to make the student the center of every decision. Teachers embrace this commitment as the foundation of their actions while they implement strategies to support student success. It is also a reason they find relationship building so essential and commit to involving students' families. They are focusing on the student as the organization has instructed. Examination of the shared experiences of the study's participants from the symbolic frame adds insight into the academic achievement gap in virtual education.

Study Limitations

Although the sample size of five participants achieved saturation (Creswell, 2013), there are limitations within the findings of the study. Limitations in this study included the recruitment of the participants, the participants' demographics, the participants' homogenous district of employment, the virtual interview format, and the positionality of the researcher.

The initial limitation to this study was the participant recruitment. Purposive and criterion sampling methods were used in this study to select participants (N = 5) (Creswell, 2013; Ary et al., 2013). From the virtual school district's population of 44 Algebra I teachers, participants were selected using the following inclusionary teacher participant criteria: (a) state certification in mathematics instruction; (b) two or more years' experience teaching Algebra I in the virtual learning environment; (c) employment at the selected virtual school district in Florida; (d) currently teaching Algebra I. There were 32 remaining teachers who were sent an email by a representative from the Analysis, Assessment, and Accountability department inviting them to participate in the research. The email stated the title of the study: The Mathematics Achievement Gap in Virtual Education. Teachers then voluntarily self-selected to participate in the study. They may have been attracted to or dissuaded from the study based on the title and insinuated subject matter. This step in the recruitment process may have influenced the teachers willing to participate in the study, leading to the study's second limitation.

The second limitation to this study was the diverse demographics of the participants. Four of the five participants identify as a minority, and three mentioned coming from low socioeconomic backgrounds. However, this is not representative of the virtual school district where they are employed. Only 22% of the teachers in the district are minorities, and within Algebra I, only 20% identify as a minority. The participants in this study are not representative of the demographics of teachers at the virtual school district as a whole. Given the differences in lived experiences between different demographic groups, it is possible that

the lived experience of this group of participants does not accurately represent the lived experience of all teachers within the study's population.

Because all of the participants in this study were employed at the same virtual school district, it is difficult to generalize the findings. The experiences and perspectives shared by the participants in this study would most likely vary for a different sample population from a different virtual school district (Ary et al., 2013). Drawing conclusions about district policy and procedures regarding minority students at other virtual schools is difficult. Interviewing participants in different districts may provide additional data that would then allow for transferability.

The virtual medium of the interviews may have affected the study's findings. Interviews completed via Skype for Business exclude the opportunity for body language observation. The short length of several of the interviews may have resulted from this format as well. Face to face interviews would be preferred but the location of participants across the state of Florida and the virtual nature of the study led to interviews online, possibly impacting research findings.

Finally, the positionality of the researcher may have affected the participants' responses during the interviews. Although the researcher is not the administrator for Algebra I, as an Instructional Leader, she is in the same position title as the participants' direct supervisor. This supervisory status may have led participants to refrain from sharing negative experiences or perspectives.

Implications of the Findings

The results of this study confirm and extend much of the research on the achievement gap and virtual education. Findings indicate that there are many actions that can be taken by teachers and policy makers to support diverse students in an online learning environment. These findings suggest implications for the field of virtual education, virtual teachers, and policy makers. The researcher in this study suggests the following recommendations and implications based on the conclusions of this study. Implications are offered for virtual education teachers and virtual education policy and procedure.

Implications for Virtual Education Teachers

Research has consistently affirmed that teacher quality and implementation of instructional best practice has significant implications on student achievement (Darling-Hammond & McLaughlin, 2011). Consequently, conclusions from this study result in the following researcher recommendations for virtual education teachers:

1. Teachers need to seek to build strong relationships with students and their families in order to create a collaborative partnership in the child's education. Building relationships will encourage consistent communication and can ultimately positively impact student achievement.
2. It is suggested that teachers make communication a top priority in their instructional tasks. Teachers should prioritize communication that is frequent and consistent with students and families.

3. Teachers can make their expectations for success in virtual courses explicit. High and clear expectations should be communicated to students and families from the initial conversations and communications and reinforced throughout further and continued communications.
4. Developing students' motivation to achieve is a key strategy for teachers to implement. Online learners and teachers work primarily in the individual and interpersonal planes of development where cognition, affect, behavior, motivation, beliefs, attitudes, and values of the student guide their instruction (Rogoff, 2003). Teachers can use encouragement and growth mindset strategies to build motivation and inspire student progress and achievement.
5. It is valuable for teachers to know their students' prior knowledge and skills in mathematics from the start of Algebra I. To gain prior knowledge, teachers can assess their students, providing a diagnostic to gain information regarding their knowledge and skills. This will allow teachers to provide instruction that is truly focused on the needs of the individual student.
6. Teachers implementing evidence-based strategies is likely to increase the success of students who are part of subgroups where an academic achievement gap exists. This study suggests that teachers provide additional time and additional resources to such students. It also supports instruction that is focused on the individual students' skills, differentiated to their unique learning needs and learning style.
7. It is essential that English Language Learners are explicitly taught the academic language necessary for their success (Cummins, 1984). Teachers should ensure

academic vocabulary is provided and ELL students are given many opportunities to use CALP in the classroom environment.

8. Challenge the naturalization of Algebra I as a difficult content area for students. Incorporate the strategies of growth mindset so that consistent progress is celebrated, and students' abilities are not viewed as static (Dweck, 2006).
9. Providing teachers preparation and professional development in the following ways may increase levels of success: (a) diversity; (b) building collaborative partnerships with students and families; (c) instruction of English language learners; (d) frequent and consistent communication; and (e) evidenced-based strategies to support diverse student success. Access to quality professional learning experiences prepares educators to support students and meet the needs of the diverse student population taking online courses (Darling-Hammond, 2005).

Implications for the Implementation of Virtual Education Policy and Procedure

Virtual education is a relatively new and growing field that has the potential to reach a vast number of students across the United States and worldwide. Many of the practices employed by teachers are dependent upon the decisions made by the district or organization. Therefore, it is imperative that research on best practices are considered for the implementation of policies and procedures for virtual education instruction. The following recommendations for virtual education policy and procedure are offered:

1. The division of labor at the organization ought to allow for greater collaboration and coordination of efforts. Instructional staff should have more involvement in areas

such as curriculum development so that resources for students impacted by the academic achievement gap are designed by a diverse group of professional educators with vast perspectives on how minority students achieve in the virtual learning environment.

2. Include increasing the achievement of minority students in the strategic goals of the organization.
3. A framework or policy for frequent and consistent communication with students and families that is successfully and fully implemented will lead to more success for students. The communication policy should be monitored by administrators and district level staff.
4. Challenges communicating with English Language Learners has been acknowledged in this study. Expanding translation services for students and families will increase the opportunity for positive communication among teachers, students and families.
5. Provide appropriate preparation to all educators involved in the instruction of students affected by the academic achievement gap. Implementation of strategies to support student subgroups impacted by the academic achievement gap is the responsibility of educators across multiple levels of a school district. All involved educators must be versed in supporting minority students and the implications their actions have upon the academic achievement gap. Trainings can include coordinating services and resources to support struggling students (Archambault & Crippen, 2009).
6. Provide appropriate professional development to all teachers and other professionals involved in the instruction of diverse students relating to: (a) diversity; (b) building

collaborative partnerships with students and families; (c) instruction of English language learners; (d) frequent and consistent communication; and (e) evidenced-based strategies to support diverse student success.

7. Successful hiring practices at virtual school districts include consideration of diversity and teacher demographics and background characteristics. A diverse teacher population is beneficial to students and the organization (Bolman & Deal, 2013). This study's finding that many Spanish speaking students and families are taking advantage of online learning opportunities may justify a practice that considers bilingualism as a factor for hiring. Teacher beliefs and core assumptions about diverse students should also be examined during the hiring process.
8. The Florida Standards for Algebra I and End of Course exam would benefit from review. Consideration of the Florida Standards for Algebra I related to minority students would prove valuable. Examination of the Algebra I End of Course exam and its impact on student subgroups is vital. Because of the challenging nature of Algebra I content and assessment, policy makers ought to ensure that they review standards, curriculum, pedagogy, and assessments to ensure cultural responsiveness. Otherwise, schools and systems run the risk of teaching Algebra in a manner that inequitably increases the challenge for minority students and further entrenches the achievement gap.
9. Efforts to provide students early exposure to algebraic thinking and building prior knowledge and skills will support student success. Prerequisite skills should be taught and assessed, and elementary mathematics must be emphasized, with early

intervention provided to students who struggle or fall behind (Loveless, 2008).

Provide instructional tools or assessments to allow diagnostic assessments of students' prerequisite skills.

10. Adopt evaluative procedures that progress monitor the academic achievement of diverse students. School-level interventions in virtual education are essential (Archambault & Crippen, 2009). Virtual school districts that focus on progress monitoring of all subgroups will affect the achievement gap. Data analysis of student subgroups should occur and be communicated with teachers and administrators. An initiative to increase awareness of discrepancies in academic achievement among student subgroups, and to show growth and narrow the academic achievement gap is needed.
11. Allocate appropriate resources to execute policies and procedures that support the academic success of diverse students in virtual education. Resources may include time, funds, personnel, and curriculum enhancements.
12. Reframe the current view of the curriculum as the universal method of instruction and allow greater flexibility in the use of instructional materials to support students' academic achievement. Include educative curriculum materials that provide research based best practices for the virtual instruction of diverse student populations (Davis & Krajcik, 2005).
13. Maintain a focus on making decisions in the best interest of children but expand the mission to include students specifically impacted by the academic achievement gap.

Recommendations for Future Research

It is recommended that further studies be conducted to explore the achievement gap in virtual education. Future researchers should consider the following:

1. As a result of the study's limitations such as recruitment procedures and methodology, it is suggested that a study be conducted that includes participants that are more representative of the virtual school district, as well as more representative of the population of virtual educators across the country. A more representative sample will provide insight into the instructional practices used by less diverse teachers with their minority students.
2. A study that examines the lived experiences of participants across multiple virtual school districts will provide greater ability to generalize findings.
3. A study that focuses on the lived experiences of teachers instructing English Language Learners in a virtual learning environment is suggested.
4. A survey-based research study that includes quantitative analysis may be conducted to address broader questions of the correlation between race, class, or socioeconomic status and virtual instruction. Such research could include questions that garner more information on teacher inherent bias, researcher-based best practices, and other areas of interest such as teacher preparation programs.
5. A further study could use quantitative measures in selecting participants so that voluntary selection does not result in a non-representative sample of participants.

6. Research on the reputation of Algebra I as a challenging content area would prove beneficial. It would be helpful to decipher why students and teachers perceive this specific content area as a challenge academically.
7. In this study, participants only touched upon the curriculum they are provided by the curriculum development department at the virtual school district. A study that explores the impact of the provided universal curriculum upon student subgroups affected by the achievement gap would add greater understanding to the way diverse students are instructed in an online learning environment.

Conclusion

A phenomenological research method was used to examine the lived experiences of Algebra I teachers in a virtual learning environment in this study. As noted in the literature, the United States has a long history of educational inequity. An academic achievement gap between minority students and their non-minority students exists (Sousa & Armor, 2016). Virtual education is a growing platform for learning, with nearly 300,000 students enrolled across the United States (Miron et al., 2018). Achievement data from students receiving their education virtually demonstrates the existence of an academic achievement gap in this learning environment (Miron et al., 2018). Student learning is affected by race, socioeconomic status, and disability (Lynch & Oakford, 2014) but there has previously been little research on how these factors affect learning in virtual education.

This study is unique because it exposes the beliefs, perspectives, and experiences of teachers who instruct minority students daily in their virtual classrooms. Participants were

authentic in their rich description of their lived experiences. They revealed their mindsets and beliefs and acknowledged the challenges that accompany the instruction of student subgroups impacted by the achievement gap.

The researcher in this study: (a) contributed to the literature on the experiences of virtual education teachers; (b) delivered a foundation for research on the achievement gap in virtual education; (c) initiated research on the lived experiences of virtual Algebra I teachers; and (d) added original research on virtual education, authentic to her experience.

Suggestions have been presented for virtual education teachers, as well as policy makers.

Virtual teachers need to consider the importance of implementing evidenced-based strategies to support student academic success. Providing ongoing professional development and using policy statement to champion action that will narrow the achievement gap is important to virtual education. The actions of virtual teachers and policy framework for virtual education must reflect the critical importance of narrowing the academic achievement gap in virtual learning environments and providing an equitable education for every student.

APPENDIX A: UCF IRB APPROVAL LETTER



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Determination of Exempt Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138

To: Sara Glover

Date: September 10, 2018

Dear Researcher:

On 09/10/2018, the IRB reviewed the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
Project Title: The Mathematics Achievement Gap in Virtual Education
Investigator: Sara Glover
IRB Number: SBE-18-14328
Funding Agency:
Grant Title:
Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

This letter is signed by:

A handwritten signature in black ink, appearing to read "Gillian Morien".

Signature applied by Gillian Morien on 09/10/2018 10:45:37 AM EDT

Designated Reviewer

APPENDIX B: INFORMED CONSENT



EXPLANATION OF RESEARCH

Title of Project: The mathematics achievement gap in virtual education.

Principal Investigator: Sara Bigalke Glover, Doctoral Candidate

Faculty Supervisor: Suzanne Martin, Ph.D.

You are being invited to take part in a research study. Whether you take part is up to you.

- This research projects seeks to answer the following questions:
 - What are the lived experiences of Algebra I virtual education teachers, as they relate to the instruction of minority students?
- Participate in an interview and answer a few demographic questions. The study will take place in Skype for Business (or through other similar conferencing software). The demographic survey will be emailed and conducted through Qualtrics.
- The expected duration of the interviews will be one hour and will take place during the 2018-2019 school year.
- A follow-up interview will take place as part of the member-checking process in qualitative data analysis. This follow-up interview will be conducted to clarify participant's responses and elicit further response if needed. This follow up interview will take approximately 10-30 minutes.
- Recording of interviews will occur via Skype (or similar conferencing software) for each session. All sessions will be password protected. All recordings not signed for use in publications or future teacher professional development will be destroyed one year after the conclusion of the study.
- Any tapes that the researcher would like to share will only be used with your written expressed permission, and no school or student names or information will be shared. After transcription, all identifying information will be deleted.

You must be 18 years of age or older, have certification in mathematics, be an employee at the school site, have served a minimum of two years teaching Algebra I at the school site and have teaching responsibilities to take part in this research study.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints, please contact Sara Bigalke Glover, Doctoral Candidate at 407-470-8700 or by email sa654797@knights.ucf.edu or Dr. Suzanne Martin, Faculty Supervisor at 407- 823-4260 or by email at suzanne.martin@ucf.edu.

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review

Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901.

APPENDIX C: BRACKETING INTERVIEW

Sara: Got it.

Speaker 2: [inaudible 00:00:02] I guess I'll let you go for a long time. Okay, are you ready?

Sara: Yep.

Speaker 2: Okay. So Sara, can you explain your educational background and the route that you took towards becoming a teacher?

Sara: Sure. So, I guess I could start way back when. I went to public education for elementary and high school. I went to a Baptist middle school. I had a great education, a really excellent education here in the state of Florida, and I loved my high school experience. It was really diverse. I grew up in an area that was definitely very white and affluent, but my high school was diverse. It was many races, mainly white and African American, but really all races, and also, too, economic classes, so it was a great education.

Sara: I then went to college at Northwestern University in Chicago. I loved it. It was amazing. Again, it broadened my horizon to the rest of the world. People were from all across the country and the world and my professors were from around the world and I majored in communications and political science. A lot of my political science courses got me thinking about kind of human rights and justice and really thinking about what it means to live in a world where people are different. I was planning to go to law school. I had taken the LSAT and was ready to go to UF Law and I had done everything except finish the application and was at a Martin Luther King Jr. Day job fair at Northwestern and came across the Teach for America booth and they were just talking about, "Come commit two years to teach in really rural or urban environments." I don't know, it clicked and it was kind of like, "This is what I want to do. That night, I filled out the entire application, submitted it, and was ready to go.

Sara: My Dad had said to me, I could go to Northwestern University, but only if I didn't become just a teacher because it was a lot of money, and so this was my way of kinda being like, "Well, Teach for America's prestigious, so I can still do it and I'll only do it two years and then I'll go to law school." It was kinda my way of being like, "My dad will still approve." Yet clearly, I'm still an education and that didn't happen. So, yeah, then to get certified, Teach for America works with you and I did a five-week institute in Los Angeles that summer. Four of us together taught summer school to about 12 Hispanic students in Compton, the LA Unified School District, and then came back and then I did teacher certification courses through Dominican University at night while teaching full-time, and I did take several of the Illinois state tests to make sure I was certified to teach in Illinois, in Chicago. So, yeah, that was kind of my background and how I ended up in education and I've never looked back. As a kid, I played with my dolls and played teacher and I've always loved teaching and children and I think it was natural and I'm glad that I ended up in the right spot.

- Speaker 2: Okay, you shared a little bit, but can you describe your experience working in the public-school system?
- Sara: Sure. So, I started off in Chicago public schools for two years. I taught second grade at Henderson Elementary, in ... Oh, what's it called? I can't remember the name of the area, but it was Chicago South Side, near 55th and Damon, and it was a extremely tough, tough environment. My students were all African American. Many were several years below grade level already, in second grade. They were wonderful, though. So, I taught two years there in Chicago, and then I moved back home. I'm from Orlando and I had an amazing education in Orange County Public Schools and wanted to kinda be a part of that here in Orlando, so I started teaching at Ivy Lane Elementary, which is Title I, high poverty, very high African American population. I taught second grade there for one year and then I taught fifth grade for two years there, and I departmentalized in math and social studies one year and then taught all the subjects, all the others.
- Sara: After that, I became an elementary math coach at Lake Weston Elementary in OCPS, and then I moved on to be an assistant principal at another ... All of the schools, up until this point, they were Title I, highly African American, although Lake Weston did have a high Hispanic population as well. Then, I became a principal in OCPS for three years and in a school that was about 50% ... It was very, very diverse. Half of the school was extremely affluent and from a white, middle to upper class neighborhood, and the other half was from Pine Hills, and it's an area of Orlando that has high poverty, a lot of crime, and the majority of those students were African American. So, yeah, my experience in public education has been ... Let's see. How many years have I done it? I think it's 14 now, maybe 15, and most of my experience is Title I, high poverty environments, really trying to ensure that every child has the opportunity to achieve a really quality education like I had.
- Speaker 2: So, it seems that you grew up in a very affluent neighborhood, but experienced as a student a very diverse high school, and then as a teacher and a principal, you had both of those same experiences. Did you see a difference as an administrator, teacher, and student, working with students from a diverse neighborhood?
- Sara: Definitely did. As a student in my younger years, I just think I enjoyed it. I enjoyed meeting people that were different. I feel like they taught me a lot and I was just learning. I love learning. As a teacher, I remember feeling overwhelmed a lot with a lot of the challenges, especially on the South Side of Chicago, and even Ivy Lane when I was in the classroom, there were ... In the environments that I was in, I felt like I wanted to ... It was not that I was being told to, I wanted to make sure every child was fed, they were clothed, that they were learning above all, but that their basic needs were met before, and that ... Yeah, I wanted them to know they were safe and loved and wanted to provide as much as I could. I mean, as a teacher I took kids to Washington D.C. and wrote letters to get it all funded and I tried to make

sure kids got to ... I did owl pellets as a kid, so in my mind kids at Ivy Lane should do owl pellets, too.

Sara: So just really, as a teacher it was less about race or learning; it was more about, "I love these kids and I want them to have the opportunities." I really felt like it was my job to do all of that and to do everything. When I became a coach, I felt ... I still loved kids and wanted them to have the same opportunities, but it did feel less ... I was less stressed about it, in a way that I felt like you were kind of ... Each role you go up, you go one distance away from students, which is difficult.

Sara: As an assistant principal, I definitely felt like I wanted to make sure every child's need was met and continued that on, just making sure that a lot of the things they were getting affluent schools, that we were getting at our schools that did not have PTA. I partnered with a lot of churches and they became our PTA and my mom and her friends became our PTA, and there a lot of the times I was focused on the teachers, really making sure the teachers were getting what they would get at other places and I've always kinda said, "A happy teacher's a better teacher, and that's better for kids." So as I became an administrator, a lot of the focus did seem to be kinda on teachers, as well as still kids.

Sara: My perspective about just what it was like to be in an environment that was high poverty and high minority group status ... I don't think I've ever stopped to reflect too much on how I perceived it. It's just what I've done. I know that I felt like I was called to be in places where not everybody who was gonna be a hard worker and want the best for kids might want to be. I felt like I wanted to go where I was really needed, and so I kinda didn't reflect too much about the 'why' and was more of like, "Here's the work that needs to be done to get these kids learning." That's kinda what I did.

Speaker 2: So switching gears, can you describe your current research on the achievement gap, and any job-related work you have in terms of that?

Sara: Sure. So, my research, honestly throughout this doctorate program, has really all focused on the achievement gap. I have lived it. Like I said, I had the best education and within even the same district and the same school that I went to, there are other individuals who received a poor education for various reasons, and then I just ... Especially those first two years teaching on the South Side of Chicago, I just remember thinking, "These kids are coming to me in second grade and they're pre-primer reading level." I mean, I had a few who didn't know the alphabet. I mean, things like that, and it just was such a contrast to the world that I had grown up in, and my friends have kids that go to preschools where they're reading by the time they exit, and I just ...

Sara: Yeah, I feel like I've lived it there. I've lived it ... In my most recent place where I was a principal, I definitely lived it. I feel like that school was the epitome of the

achievement gap: half country club/white, half Pine Hills/African American, and you look at the test scores, you look at their grades, you look at their data, and it is who's achieving and who's not achieving. I was often pushed to put all of our gifted students into one class, but that would have been segregation and I just philosophically did not believe in that, and it was just such a reminder each and every day of the fact that where students come from, the neighborhood they come from, whether they were living right by the school or if they were bused in from Pine Hills, that was not in every case, and I'm talking very generalized because it is not true for every child, but for many of them that was gonna determine their test scores.

Sara: I was at an ESE Center school and most of our students that were getting stacked for exceptional education were African American males and that's heartbreaking and I would never want to leave a school where that is the case, but it was the reality. Yeah, I've seen it and I've lived it. I feel like I didn't answer your question. Was there more?

Speaker 2: Just can you go a little deeper on your current research or what you have been researching related to the achievement gap?

Sara: Yeah, so my current research, honestly it's confirmed that there is an achievement gap. I've learned that, and I realize that calling it 'the achievement gap' kind of is maybe ... It focuses on the deficiency and maybe we should call it other things. However, as practitioners, we still use the phrase 'achievement gap', so keep using that, but really it has its roots in historical oppression and segregation and it is part of the history of the United States, that we have created this gap. There's been policy throughout our entire history that has led to this, and granted we have ... In my research, I've also done a lot on NCLB and ESSA and we have policy now to change it, but even with this legislation, it's not changing. It's still ...

Sara: I mean, graduation rates are lowest in high poverty areas and our minority students are performing far below our non-minority students across the country, and math specifically. A lot of my research has to do on math and Algebra I and there's just stark differences in the performance of students based upon their race, their socioeconomic status, their disability status, even gender is one we're studying a lot as well and it's just ... The reality is there is an achievement gap in our country and it's not closing.

Speaker 2: Have you taken any coursework specifically on diversity?

Sara: I believe in my teacher certification program at Dominican, we did one course that was somewhat on diversity. Part of Teach for America, part of our training in that five-week institute, there was a lot on DCA, diversity, community and achievement. We had to do tons of reading on that and we did a lot of self-reflection. I was also a curriculum specialists two summers and a core member advisor another summer for

Teach for America where I lead sessions on diversity, community, and achievement, so although I've not taken, or maybe taken, one course that was specifically for this, I've done a lot of reading and a lot of self-reflection.

Sara: My favorite things about the DCA course, or the ... Teach for America really encourages us to kinda follow the DCA competencies, which are ... Let's see if I can remember them correctly. One of them is assume positive intent. Assume that the person that you're interacting with, no matter how different than you, has good intentions. What are they? They're so good. I love them. I can't think of them right now. I'll think of them at some point. I have them beside my desk and probably need a refresher, but the point is: these competencies were taught to me and then I taught them three other summers to other Teach for America core members and whether I can remember them or not, they've become part of how I interact with other people that are different from me because I am a white, Caucasian female who grew up in an affluent environment. In the environments where I've taught and been an administrator, many people that are different than me. So, yeah.

Speaker 2: Okay, so along the same lines, have you gone through any professional development concerning the achievement gap specifically, outside of your practical experience of just seeing it in your school?

Sara: Yeah. Well, I did go to Harvard one summer and it was focused on ... I went twice, but one of the summers was focused on urban leaders and there was a great deal of professional development for working in high poverty schools and urban environments and the achievement gap was discussed and part of many of our sessions. I've done a lot of trainings on CHAMPs and Conscious Discipline and those really have to do with behavior, but inherent in behavior has been a lot of achievement gap because if students aren't behaving, they're not learning, and so a lot of times you can get to the core of a behavior by addressing their needs, and once we've worked on the behavior, you can really focus on their learning. So throughout those trainings, it's definitely been a part of the achievement gap.

Sara: I've also been to a lot of, through my years, just training on curriculums and data and data analysis, and a lot of that is looking at the gaps in student learning, like, "Where do you see it? What subgroups? Is it race? Is it gender? Where is it happening?" So, that may not be necessarily titled 'the achievement gap', it's what you're looking at and it's what you're analyzing. It's what you're really trying to eliminate or narrow.

Speaker 2: Okay. Do you think that the teachers that you work with now share the same knowledge level that you do on diversity and achievement gap?

Sara: Oh, goodness. So now, and I probably should have mentioned this earlier ... Now, I currently work for a virtual school district and the teachers that I work with now ... I'll be honest, no. They come from across the entire state of Florida and some of

them have Title I experience and some of them mentioned working with students with exceptionalities and high poverty areas, but many of them do not. Many of them come from maybe areas that are a bit more rural, some of them ... a lot of them are come from private schools as well, and a lot of our private schools tend to be less diverse. I believe my teachers have a good heart and love all their children, regardless of race, gender, or disability, but do I think they have the same level of knowledge and experience? No.

Speaker 2: So now that we know you work in a virtual education setting, can you describe your experience within that role?

Sara: Yes. So I've worked at this virtual school district for about a year, year and a month, and when I initially took the job, even though my experience previously has all been elementary, I took a job overseeing high school and one group of music for middle school, which was new for me. I worked over world history and music, and I really learned a lot. Honestly, I had come from a place where I felt like I was a successful principal and was productive. I kind of knew what I was doing, I was leading a school, and I kind of had to have a lot of growth mindset with myself when I took this role, because I didn't understand the virtual environment for a little while and I didn't understand working with high school students and a lot of the reasons why they took virtual classes.

Sara: But I can say now, 13 months later, I really, really loved it. I loved getting to work with older students, I loved getting knowledge of an organization that is teaching in a new and novel way. I loved learning about the different platforms for instruction. Blackboard and our discussion-based assessments, and use Zoom so we can see face to face with all of our students, and really, it's been eye-opening to see the reaches that education has. I mean, we had students in hospital beds, in countries around the world, and it really is providing a quality education for all of them across the globe.

Sara: And I've also, I enjoyed getting to know high school teachers. They're different than elementary teachers, but they're great and it's been good. But then since last spring, I'm back in elementary as a ... I oversee the fourth grade at the virtual school district, and I'm loving that too. We're expanding and growing and have new curriculum, and I love working with these teachers. They all have good hearts and love kids, and like I was saying, I may not fully believe they have as much knowledge of the achievement gap, they still really do care.

Sara: And again, we're just teaching kids. A lot of our population for elementary is homeschool students, whereas in high school, because of the Florida statute that requires all students to take a virtual course before they graduate in the state of Florida, we have a large percentage that is our public school students, and so it's different student groups, different parent groups, which makes my job as an

administrator different. I'm an administrator over the fourth grade. It's still been good.

Speaker 2: Okay, so you are an administrator then with your virtual school. What are exactly are your roles and responsibilities?

Sara: Okay, well, I oversee teachers and teacher evaluation. I visit their class times on Tuesdays and Thursdays. I interact with a lot of parents. I follow up with parents when their students are not working or not attending, because there is a lot of kind of getting them gathered. I do data analysis of our students and how they're performing. A lot of it is focused on if they're working or not, because we don't have standardized tests in the program that I'm in. And over world history, there wasn't any standardized tests as well. But I do determine if they're working and if they're behind and how they're doing. I do a lot of communications, I spend a lot of time again kind of working with teachers, evaluating them, do their informal and formal observations.

Sara: I do monthly walkthroughs with them where I spend 30 minutes and we go through all their kids and kind of talk about where they're at in their classrooms. This year, with all the new curriculum, I'm spending a lot of time doing curriculum feedback and development, and just learning about it. Let's see ... I'm the administrator in elementary that is over professional development, so I work with our professional learning specialists for the whole virtual district to incorporate what is going to be best for elementary. I'm kind of a liaison, as well as over professional learning communities for elementary.

Sara: I'm also on a calibration team for teacher evaluation for all of the school district, where we're training new administrators on how to evaluate teachers in an online learning environment. I was part of a pilot program at one point when I was in the high school really looking to see if we could get kids who were being withdrawn and getting them re-engaged to complete courses. I don't know, I do a lot of things.

Speaker 2: I see that.

Sara: I answer email ...

Speaker 2: So working with virtual teachers, what do you think their main roles or responsibilities are?

Sara: Well, the cliché thing would be to serve students and families. They spend a lot of time, they respond to phone calls and emails, they teach live lessons in high school and class time in elementary, they teach basically where they're teaching live with students. They are doing discussion-based assessments, several of those for every student in every course where they're on the phone or in Blackboard doing visual DBA. They do grade, and grading takes a lot of time. They have, within 48 hours they

have to grade and give feedback to every assignment that's turned in, so they spend a lot of time grading.

Sara: They're also creating. They're creating class time slides and live lesson slides, as well as a lot of times they're creating things to help their students, whether it be resource guides or study guides or weekly checklists of what to do. They're trying, especially in elementary, they're constantly creating new things to try to be helpful for their students. And then they're also getting to know the curriculum that's new in elementary and high school unless they have a new course release, they get to know it pretty quickly and it stays for a little while.

Sara: And yeah, again, responding to families, and a lot of teachers do kind of mini-tutoring sessions with families, and yeah, lots of stuff.

Speaker 2: Okay. Can you now describe your experiences or background working with the Algebra One course?

Sara: So I don't have experiences with Algebra One. I have had one conversation with an Algebra One course developer in our curriculum department, and she was really helpful in kind of explaining a lot of what goes into creating an algebra course, but I'll be honest and I don't remember too much of it and probably did not take good enough notes, because this was a while ago and I was just kind of learning. I do know the administrator ... there's two administrators over Algebra One at my virtual school district, and I know both of them just from meetings, but I don't know either of them well. I'm looking forward to learning. Right now, I know about the data and I know that the data shows there's a big achievement gap, and I also know the data shows that our student retention numbers that start the course and then withdraw or drop it are really high. Or no, our retention numbers are low, because kids are withdrawing.

Sara: And the teachers there, I don't know much about them either. I know when I spoke to the administrator, he mentioned that many had been there quite a while, but he may be felt there might be some turnover soon but he wasn't quite sure. So ...

Speaker 2: Do you know how many teachers teach that course?

Sara: I believe it is somewhere around 70, but I could be off. I'm going to find that out when I get my sample ready or look for participants.

Speaker 2: Okay ... Now when looking at virtual teachers, how do you feel ... I probably should've asked this earlier, but how do you feel that virtual teachers should be serving minority students?

Sara: That's a really good question, and kind of the crux of my research is what should they be doing. I'm kind of finding out what are they actually doing ... I believe

students need differentiation. I think some students, for any type of diversity, minority, disability or anything, they need learning to be accessible to them. So in a virtual environment, that may mean tutoring sessions, getting on the phone, getting into Blackboard which is kind of our online classrooms, doing Zoom with students, extra time. There may need to be some one on one.

Sara: I know a lot of students when they go into their classes, it's really easy to be in that class and pay no attention because no one is staring at you. You have your headphones on, and you can daydream all you want. So maybe some one on one sessions, where teachers are really able to give feedback to students automatically and face to face, voice to voice, just not 100% in person. But I think they may need to be using different teaching strategies to students that may learn differently.

Sara: One of the things about a virtual course is that our curriculum is kind of created like, "Here's how we teach Algebra One," however there may be other strategies and other methods that might best work for a student. So teachers need to be able to have the ability to kind of look outside the curriculum that students are working through to help them master the content. I also think there's a key to relationship building that may be different. If you are teaching students that are different than yourself, you need to be skilled at building relationships. You have to start there. It cannot simply be, "Alright, let's go do this algebraic equation." It needs to be, "Let's start with the relationship."

Sara: So a child who is maybe very different than you and may have had a life that'd be considered difficult by others, they trust you, that they want to learn from you, that they believe that you are there to help them and that you care. I think that's huge.

Speaker 2: Now how much autonomy do teachers have when they are delivering the curriculum for Algebra One?

Sara: Okay, so they don't have much autonomy as far as I know. At least in world history, it was, "Here's the curriculum that's been developed. Students work their way through this curriculum." However, they do have autonomy during live lessons, during discussion-based assessments, DBAs, they have plenty of autonomy to hold tutoring sessions, to make phone calls, to work with students individually. So the curriculum as it's presented online, it's really difficult to change. We can change it and there's always product review, and it always is being updated and changed, but to actually go in and change it as it's being delivered in the moment is really difficult.

Speaker 2: So is the administrator who oversees Algebra One, do they monitor tutoring offerings, DBA offerings, or student participation?

Sara: Not really sure if they monitor tutoring. I believe because algebra has an EOC and a course exam that they do tutoring, but I can learn more. The administrator does oversee the live lessons and discussion-based assessments and provides a lot of

feedback when they're doing their formal and informal observations about student participation.

- Speaker 2: Now one more question about the actual Algebra One course. Do you know how many students are taking this course for the first time as opposed to students who are repeating the course?
- Sara: That is a really good question, because the percentage of students who repeat is extremely high. That's another good question I should find out the answer for my dissertation. Remind me of all this please.
- Speaker 2: You got it. What do you expect to find in this study, and give us feedback of why you have those expectations.
- Sara: Okay. I'm honestly ... Well, I'm looking to just find what teachers are doing. I think I'm expecting to find that teachers feel they don't have as much control over the curriculum. I think that's something that they want to differentiate more, but they feel kind of constrained. I think a lot of teachers also always want to do what's right and what's good, and it's almost like they're afraid to differentiate and they're afraid to do certain things, and so I kind of want to find out what would hold them back. I think I'm going to find some teachers who are doing really excellent things for kids. I think I'm going to hear some best practices and some great strategies, and I hope to share that. Yeah, I hope to share what I learn about some great stuff.
- Sara: I also ... I think I might find some teachers that lack awareness of minority students, and maybe the achievement gap there. I mean, I think there are going to be some that are just unaware of diversity and that things they do need to teach differently for each child. I think I'm going to find some teachers really strong in relationship building and others that maybe aren't.
- Sara: I expect to honestly just kind of learn. I don't think I have a solid, "This is what I'm expecting and this was my hypothesis, and this is what I'm going to get out." I really just think that I want to learn from teachers, I want to hear some of the best practices, I want to hear some of the gaps, and hear kind of where they are with this, what is their awareness of the achievement gap in this virtual environment.
- Speaker 2: Do teachers have demographic data on the students that they have?
- Sara: They do, but they have to go in to look it up, so it will require an extra step on their part.
- Speaker 2: Okay ... do you have any known biases or expectations that could alter your findings or your interpretation of your findings?

Sara: I do have some biases, and I think they are, I like teachers that work hard, so if they come across as laissez faire and kind of whatever, that's a bias. I have a bias towards teachers in a positive way that really love on kids, and that can be a downfall, because sometimes teachers really, really, really love kids, but they may not be doing what's best for the kid. They're almost like they lower their expectations, so I think that's just something I need to be aware of in myself is that when teachers are talking about how much they love kids, you also need to consider are they holding kids to high expectations for learning.

Sara: I think I'm curious to see if I have any biases about virtual teachers versus brick and mortar teachers, because it's a unique teacher who says "I want to ..." Most teachers, not all, some go straight into virtual, but most teachers started in brick and mortar and a lot of them leave for reasons such as it's better for their family or they didn't want to handle the classroom management in a brick and mortar, and I hope I don't have any biases toward virtual teachers, and I don't think I do because I've worked with so many who are phenomenal ... I just hope that if I encounter a teacher who seems to have ... I just hope I don't encounter any for the wrong reasons, but I may, and so I just need to be aware of my biases if that occurs.

Speaker 2: Okay. Do you have any final comments that you want to share that maybe I didn't touch upon?

Sara: I am excited to learn from this study. I think one of the things about me is I'm a people person, and I love people. I love talking to people, I love learning from people. I think that's why I'm ecstatic to do a qualitative, phenomenological study, because I'm going to really get to know people and their perspectives and kind of why they teach how they do and how they treat minority students and how they teach them. So no, I guess I'm just excited to learn and eager to see what's found. That's it.

Speaker 2: Do you want a recap of something or the highlights of the interview, or you think you're good?

Sara: I think I'm good.

Speaker 2: Okay. Very good.

Sara: Thank you.

Speaker 2: Thank you.

APPENDIX D: PEER-DEBRIEFER INSTRUCTIONS

Dear Peer Debriefers,

Thank you for agreeing to assist me with my dissertation study.

To ensure reliability and validity of the data collected, I am using several qualitative methods. One of those methods is using a peer de-briefer. I have 5 total participant interviews. I have completed analysis and attached them here. I have purposefully left off my dissertation overview as I do not want to influence your interpretation of the data.

I've attached files that includes the following:

1. Original transcript
2. **Excel file of my analysis of the original transcript:**
Column A – exactly what they said from the transcript (Significant Statements)
Column B – My inference based on their words/mannerisms (Components of Meaning)
Column C – Organizing Components of Meaning
Column D – Describing the Phenomenon (Theme)
3. Data analysis procedures from my dissertation [Colazzi (1978) method]
4. Dissertation Interview Protocol

MY steps:

1. I selected important phrases from the data transcript
2. I put those phrases into a spreadsheet (Column A) exactly as they appeared in the transcript
3. I then assigned meaning to them (Column B)
4. I then coded each of the components and organized them into relevant meanings (Column C)
5. I assigned overarching themes to each of the components (Column D)

What I need YOU to do:

1. Read the Excel spreadsheet and provide feedback by doing the following for EACH line:
 - a. Read Column A and Column B.
 - b. Based on what you see in Column A, do you agree with the meaning assigned in Column B?

- c. Now look at Column C.
 - d. Do you agree with the component of meaning in Column C?
 - e. Do you agree with the theme in Column D?
2. Provide comment/feedback in Column E. If you do/don't agree. If you don't agree, WHY, and what do you think is a better match?
 3. Use the original transcript if you need context or more information.

If you have any questions, comments, concerns, please let me know. Thank you!!!!

Sara Glover

APPENDIX E: DEMOGRAPHIC SURVEY QUESTIONS

What is your current position title?

How many total years' experience teaching do you have?

Identify all content areas and courses you have taught.

How many years have you taught at your current virtual school?

In what areas are you certified?

Describe your route to teaching certification.

What is your highest level of education?

Approximately how many students are currently in your classroom?

How many of these students are in a racial minority group?

How do you determine if a student is a member of a minority group?

What is your age in years?

What is your race?

What is your gender?

APPENDIX F: VALIDITY CHECKING EMAILS TO PARTICIPANTS

Good afternoon!

Thank you again for participating in my research! A critical part of the study is ensuring that you have the opportunity to review the transcripts from the interview and comment on them for their accuracy and completeness. To facilitate this process, I have attached the transcript here for your review. **I ask that you please review. If you wish, please feel free to make comments or additions using track changes.** Track changes will allow me to quickly identify areas where you have made suggestions/edits/comments/additions etc. **If you do not have any changes, please respond to this email indicating such.**

Again, your insight is valuable and I so appreciate your time!

If you have any questions, please just let me know. Have a great rest of your week!

Sara Glover

Good afternoon [redacted]!

I hope that all is well. It has been a while since we met for the interview for my dissertation, but I have been working on various aspects of it in preparation for the next steps.

A critical part of the study is ensuring that you have the opportunity to review the findings. I have attached the essential structure (summary) of the findings here for your review. ***Is this summary consistent with your experience? If you wish, please feel free to make comments or additions using track changes. If you do not have any comments, please respond to this email indicating such.***

Again, your insight is valuable and I so appreciate your time!

If you have any questions, please feel free to contact me. TGIF!

Sara Glover

APPENDIX G: CODING

Organizing Units of Relevant Meaning (Colaizzi Step 4)

African American population
Algebra I content mastery
Algebra I content mastery- assessment
Algebra I content mastery- curriculum
Algebra I content mastery/rigor
Algebra I curriculum- vocabulary
Algebra I importance
Benefits to online learning
Benefits to online learning- engaging curriculum
Challenge all students
Challenges- access to technology, low parent support
Challenges- access to technology
Challenges- Algebra I content
Challenges- Algebra I requirements
Challenges- communicating with student
Challenges- communicating with students
Challenges- distractions
Challenges- diverse student long term planning
Challenges- family involvement
Challenges- first time online students
Challenges- high socioeconomic status
Challenges- lack online learning understanding
Challenges- language
Challenges- long term planning
Challenges- low student communication
Challenges- many factors affect success
Challenges- pace in course
Challenges- student pace
Challenges- student perspective of online class
Challenges- time for each student
Changing demographics
Communication with students
Communication- diversity
Communication- frequency
Communication of Expectations
Communication- reminders
Communication- teacher/student
Communication with minority families
Communication- with minority students
Communication with parents- frequent

Content accessibility
Content format
Curriculum expectations- testing
Demographics affect student success
Differentiation
Diverse students
Expectations for online learning
Expectations for progress
Face to face instruction is beneficial
Family involvement- importance
Family involvement- ethnicity affects support
Family involvement- lack support
Family involvement- low socioeconomic students lack support
Family involvement- poorer students perform worse
Focus on learning process
High home school population
Home school population
home school population growing
Language barrier
Low socioeconomic status affect learning
Minority online course enrollment reasons
Minority student background
Minority student performance
Minority student support- time
Minority students need more time
Minority students struggle
Minority students struggle- lack parent support
Online content mastery
Online course enrollment reasons
Online learning benefits
Online learning benefits to minority students
Parent expectations
Parent involvement
Parent involvement affects student success
Parent involvement for struggling students
Politics affect teaching
Positives and negatives in online learning
Prerequisite skills and vocabulary
Race not affect instruction
Relationship Building
Relationship Building- goal setting
Resources to support students

Resources to support students
Spanish speaking families- low support
Spanish speaking parents
Spanish speaking parents/translation
Spanish speaking student support
Spanish speaking students
State testing required
Strategies to support ELL students
Strategies to support struggling students
Student ability
Student demographics affect success
Student learning style
Student motivation
Student motivation- growth mindset
Student motivation- home school students
Student motivation varies
Student perspective
Student success- expectations
Student success factors
Student success strategies
Student support strategies- differentiation
Student support strategies from teacher
Student support strategies- learning styles
Student support strategies- motivation
Student support strategies- resources
Student support strategies- tutoring
Student understanding- misconceptions
students first
Students lack prerequisites
Support for families needed
Support students with verbal and written instruction
Teacher background
Teacher background benefits students
Teacher belief in high student expectations
Teacher choice for Algebra I
Teacher gathering info on student
Teacher gathering prior knowledge of student
Teacher passion for online learning and students
Teacher passion for students
Teacher passion for virtual education.
Teacher support strategies
Teacher support strategies- motivation

Translation services

Describing the Phenomenon - Themes (Colaizzi Step 5)

Phenomenon	Corresponding Overarching Theme
African American Students	Student Demographics
Algebra I Content Mastery	Algebra I Content
Algebra I Content- Assessment	Algebra I Assessment
Algebra I Curriculum	Algebra I Content
Algebra I Importance	Algebra I Content
Benefits to online learning	Virtual Education Benefits
Challenge all students	Communication of Expectations
Challenge- Access to Technology	Virtual Education Challenges
Challenge of Algebra I Content	Algebra I Content
Challenge Communicating with Students	Communication with Students
Challenge of Distractions	Virtual Education Challenges
Challenge- Student Long Term Planning	Virtual Education Challenges
Challenge of Low Family Involvement	Family Involvement- Effect on Student Success
Challenge- Online Learning	Virtual Education Challenges
Challenge- socioeconomic status	Student Demographics
Challenge - Language	Language Barriers
Challenge- Long Term Planning	Virtual Education Challenges
Challenge- student communication	Communication with Students
Challenge- outside factors	Virtual Education Challenges
Challenge- student pace	Student Pace
Challenge- student perspective	Student Motivation
Challenge- time for each student	Virtual Education Challenges
Changing Demographics	Student Demographics
Communication	Communication
Communication- diversity	Communication with Students
Communication- frequency	Frequency of Communication
Communication of Expectations	Communication of Expectations
Communication- reminders	Frequency of Communication
Communication- teacher/student	Communication with Students
Communication with minority families	Communication with Family
Communication- with minority students	Communication with Students
Communication with parents- frequent	Frequency of Communication
Content accessibility	Communication of Expectations
Content format	Algebra I Content
Curriculum expectations- testing	Algebra I Assessment

Demographics affect student success	Student Demographics
Differentiation	Strategies- Differentiation
Diverse students	Student Demographics
Expectations for online learning	Communication of Expectations
Expectations for progress	Communication of Expectations
Face to face instruction is beneficial	Virtual Education Challenges
	Family Involvement- Strategy to Support Students
Family involvement- importance	Family Involvement- Demographics
Family involvement- ethnicity affects support	Family Involvement- Effect on Student Success
Family involvement- lack support	Family Involvement- Demographics
Family involvement- low socioeconomic students lack support	Family Involvement- Demographics
Family involvement- poorer students perform worse	Teacher Beliefs
Focus on learning process	Student Demographics
Home School Population	Language Barriers
Language barrier	Student Demographics
Low socioeconomic status affect learning	Student Demographics
Minority online course enrollment reasons	Student Motivation
Minority student background	Student Demographics
Minority student performance	Student Demographics
Minority student support	Student Focused Support
Minority students need more time	Strategies- Time
Minority students struggle	Student Demographics
	Family Involvement- Effect on Student Success
Minority students struggle- lack parent support	Algebra I Content
Online content mastery	Student Motivation
Online course enrollment reasons	Virtual Education Benefits
Online learning benefits	Virtual Education Benefits
Online learning benefits to minority students	Family Involvement- Effect on Student Success
	Family Involvement- Effect on Student Success
Parent expectations	Family Involvement- Strategy to Support Students
	Family Involvement- Strategy to Support Students
Parent involvement effects motivation	Virtual Education Challenges
	Virtual Education Benefits
Parent involvement affects student success	Student Prior Knowledge
	Teacher Beliefs
Parent involvement for struggling students	
Politics affect teaching	
Positives and negatives in online learning	
Prerequisite skills and vocabulary	
Race not affect instruction	

Relationship Building
 Relationship Building- goal setting
 Resources to support students
 Spanish speaking families- low support
 Spanish speaking parents
 Spanish speaking parents/translation
 Spanish speaking student support
 Spanish speaking students
 State testing required
 Strategies to support ELL students
 Strategies to support struggling students
 Student ability
 Student demographics affect success
 Student learning style
 Student motivation
 Student motivation- growth mindset
 Student motivation- home school students
 Student perspective
 Student success- expectations
 Student success factors
 Student success strategies
 Student support strategies- differentiation
 Student support strategies from teacher
 Student support strategies- learning styles
 Student support strategies- motivation
 Student support strategies- resources
 Student support strategies- tutoring
 Student understanding- misconceptions
 Students First
 Students lack prerequisites
 Support for families needed
 Support students with verbal and written instruction
 Teacher background
 Teacher background benefits students
 Teacher belief in high student expectations
 Teacher choice for Algebra I
 Teacher gathering info on student
 Teacher gathering prior knowledge of student
 Teacher passion
 Teacher support strategies
 Teacher support strategies- motivation

Relationship Building
 Relationship Building
 Strategies- Resources
 Spanish Speaking Parents
 Spanish Speaking Parents
 Spanish Speaking Parents
 Spanish Speaking Students
 Spanish Speaking Students
 Algebra I Assessment
 Student Focused Support
 Student Focused Support
 Student Prior Knowledge
 Student Demographics
 Strategies- Student Learning Style
 Student Motivation
 Student Motivation
 Student Motivation
 Student Motivation
 Student Prior Knowledge
 Communication of Expectations
 Student Prior Knowledge
 Strategies- Student Focused Support
 Strategies- Differentiation
 Strategies- Student Focused Support
 Strategies- Student Learning Style
 Student Motivation
 Strategies- Resources
 Strategies- Time
 Student Prior Knowledge
 Strategies- Student Focused Support
 Student Prior Knowledge
 Virtual Education Challenges

 Strategies- Student Learning Style
 Teacher Background
 Teacher Background
 Teacher Belief
 Teacher Belief
 Relationship Building
 Student Prior Knowledge
 Teacher Belief
 Strategies- Student Focused Support
 Strategies- Student Focused Support

OVERARCHING THEMES

Frequency of Communication
Communication with Student
Communication with Family
Communication of Expectations
Student Demographics
Student Motivation
Student Prior Knowledge
Student Pace
Language Barriers
Spanish Speaking Students
Spanish Speaking Parents
Algebra I Content
Algebra I Assessment
Teacher Background
Teacher Beliefs
Relationship Building
Virtual Education Benefits
Virtual Education Challenges
Strategies- Time
Strategies- Student Focused
Support
Strategies- Resources
Strategies- Differentiation
Strategies- Student Learning Style
Family Involvement-
Demographics
Family Involvement- Effect on Student
Success
Family Involvement- Strategy to Support
Student

Theme	Sub-Theme
Student	Demographics
	Motivation
	Prior Knowledge
	Pace
Teacher	Teacher Background
	Teacher Beliefs
	Relationship Building
Algebra I	Content
	Assessments
Family Involvement	Demographics
	Effect on Student Success
	Strategy to Support Students
Communication	Frequency of Communication
	Communication with Student
	Communication with Family
	Communication of Expectations
Language	Language Barriers
	Spanish Speaking Students
	Spanish Speaking Parents
Strategies to Support Student Success	Time
	Student Focused Support
	Resources
	Differentiation
	Student Learning Style
Virtual Education	Benefits
	Challenges

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