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Returning to School after a Pandemic and the Lived Experiences of Rural High School Mathematics Teachers on Student Success

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A Dissertation by

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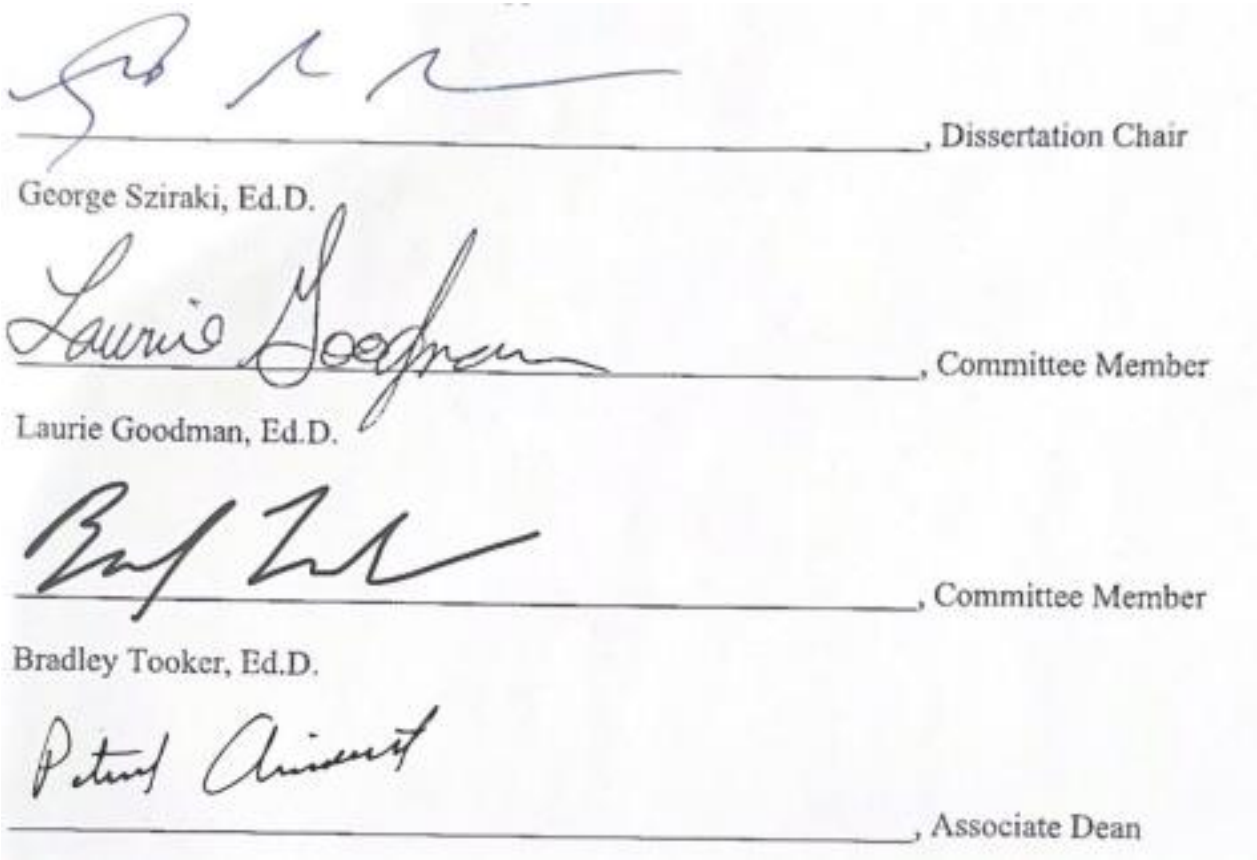

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Believe in yourself. Dream. Try. Do good.

– Mr. Feeny

ABSTRACT

Returning to School after a Pandemic and the Lived Experiences of Rural High School Mathematics Teachers on Student Success

by Joshua Saúl Silva

Purpose: The purpose of this qualitative phenomenological methodology investigation was to examine and describe rural mathematics teachers' lived experiences on the effects of the COVID-19 global pandemic on freshman students returning to school after being online for 2 years through the lens of Bandura's theory of self-efficacy and serves as part of a thematic dissertation with each researcher focusing on different educators in the K-12 school system.

Methodology: Through qualitative methodology utilizing one-on-one interviews of nine rural high school freshman mathematics teachers with 5 or more years of experience before, during, and after the COVID-19 global pandemic, data was analyzed using the theoretical framework of Bandura's theory of self-efficacy utilizing the variables: academic achievement, behavior, mindset, and social connections.

Findings: Data analysis from interviews with 9 rural high school freshman mathematics teachers from different school districts in San Bernardino County, California resulted in findings that align with Bandura's (1977) theory of self-efficacy. The teachers showcased that their students' self-efficacy and development were influenced by the environment impacted by the COVID-19 pandemic. All participants reported their student's performance was impacted due to COVID-19 and more support was needed to assist their students.

Conclusions: These findings have significant implications for school districts and administrators to support and grow rural freshman student self-efficacy beliefs based upon data from rural high school mathematics teachers. The results are intended to inform district and school site leaders how self-efficacy beliefs are impacted by Bandura's four sources of psychological information, and how to utilize this knowledge at the leadership level to provide better support for their students to develop resiliency and well-being throughout their high school career.

Recommendations: It is recommended that further qualitative research be conducted to continue to expand the understanding of rural high school student's self-efficacy and the impact self-efficacy has on students. Further research should be conducted on African American/Black teachers in rural areas. In addition, further research should be done with quantitative data comparing rural vs urban districts post pandemic. Lastly, further research should be done utilizing a qualitative research design in urban areas and how the COVID-19 global pandemic impacted their student population.

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CHAPTER I: INTRODUCTION

The COVID-19 global pandemic has impacted the lives of rural students and their education in terms of their academic content and their rigorous learning opportunities (Anderson, 2020). With the world shutting down rapidly to protect the lives of others, many people were impacted by the loss of family members and/or friends. As of January 2023, John Hopkins University of Medicine has stated 676,600,000 global cases of COVID-19 have been confirmed with nearly 7,000,000 deaths. Similar to other organizations, education was impacted by the pandemic caused by COVID-19 with the closure of schools. The COVID-19 global pandemic required educators to change and restructure their livelihoods to try and reach their students (Kuhfeld et al., 2022).

Due to the closure of schools, teachers needed to stay connected with students with the move to online instruction (Iglesias-Pradas et al., 2021). The move to online instruction was difficult for students in the rural population due to the difficulty of access to the internet and the need for adequate technological equipment necessary for activities (Carius, 2020). For students to get the help they needed during distance learning, systematic feedback between the teacher and the student was a must (Bobliev & Vihrova, 2021). Feedback was critical in making sure students know where they are in their standards and what they needed to grow in their learning (Mullikin, 2020). However, due to the difficulties of access to the internet for rural students and the absence of a teacher for guidance, students were unable to learn their subjects as effectively as they could have (Carius, 2020).

Mathematics teachers in rural high schools had much to say about their experience during the pandemic. Many math instructors claimed the standards-based

math material was not engaging enough to maintain students' focus and attention and their students required something alternative (Wolfe et al., 2022). Previous mathematics teacher education was based on decades of research on what was the best way to teach students inside transitional classrooms, which already was challenging before the COVID-19 global pandemic (Ruef et al., 2022). Nearly all secondary math teachers said they had to reteach or go over arithmetic lessons from earlier grades before going into grade-level standards (Wolfe et al., 2022). Mathematics teachers in California mention they are looking at their observations and self-created classroom tasks, assignments, or projects to improve their student's academic performance due to the learning loss due to the COVID-19 global pandemic (Makkonen & Burr, 2022).

Studies demonstrate an equity disparity for students in rural areas versus students in urban areas during distance learning because of the COVID-19 global pandemic (Belay, 2020; NSBA, 2023). Educational equity implies, regardless of who they are or where they attend school, every student should receive the support they require to reach their maximum academic and social potential. The unequal learning opportunities for the rural population during distance learning occurred due to the decline in the rural economy and population leading to inadequate funding for schools, the digital divide for students to access learning resources, and restricted availability of excellent early care and education initiatives (Arsen et al., 2022). This inequality was further exaggerated in mathematics because rural students' mathematics performance was extremely low even before the COVID-19 outbreak (Mukuka et al., 2021). School officials expected having students return to school would have a positive impact on their mental health, but it did not (Długosz, 2022). Therefore, understanding how high school mathematics teachers

perceive the pandemic-affected students, can provide information for making informed decisions regarding how to respond to their academic and mental health needs.

Background and Context

The COVID-19 global pandemic reshaped aspects of society, with education being one of the most impacted domains. As countries grappled with the challenges posed by the spread of the virus, educational systems were forced to navigate disruptions and crises that have never been dealt with before. It is important to explore what has occurred between the COVID-19 global pandemic and education and the implications for teaching, learning, and the future of education worldwide.

Background on COVID-19 Global Pandemic and Education

The COVID-19 global pandemic impacted education across the world. The World Health Organization declared COVID-19 to be a worldwide pandemic on March 11, 2020 (Baker, 2022). By the end of the month, principals, superintendents, and governors closed schools across the nation. Students were forced to be away from school, but teachers still needed to instruct their students (Akar & Erden, 2021). There were a wide variety of methods teachers chose to teach their students during the pandemic. Due to the closure of schools, teachers connected with students often utilizing one of three methods: in-class teaching with social distancing, teaching with a hybrid classroom model of in-person learning at school and remote instruction at home or moving to distance learning (Iglesias-Pradas et al., 2021). Although COVID-19 is the most recent disaster to affect education, there have been other scenarios in the past which have impacted education.

Crises in Education

Throughout history, education systems have faced crises, ranging from natural disasters to pandemics to acts of violence. Each of these crises has left a mark in the world of education. Hurricane Katrina, the 1918 Influenza Pandemic, and school shootings are examples that highlight the disruptions and trauma experienced by the education sphere. Researching the historical contexts of these crises provides an insight on the resilience and adaptation of everyone involved while in the face of adversity.

Hurricane Katrina's Effects on Children

Children affected by Katrina experienced higher levels of anxiety, behavioral issues, depression, and posttraumatic stress disorder (DiMenna, 2021). The information on the effects of Hurricane Katrina begins in 2006 and data about the effects of COVID-19 are only from 2 to 3 years of information. Hurricane Katrina caused a drop in students who attended college post hurricane due to the learning loss (DiMenna, 2021). Similarly, one out of five school-age children either did not enroll in school or only partially attended (Wade, 2015). Furthermore, there are other topics that discuss what Hurricane Katrina had an impact on, such as the equity gap between low-income families versus higher income families and how younger students bounced back easier than high school students (DiMenna, 2021). This crisis was the most recent natural disaster to affect education in lieu of COVID-19.

Education During the 1918 Influenza Pandemic

The 1918 Influenza Pandemic, more commonly known as the Spanish Flu, caused many shutdowns of schools across the world. There were certain cities that resisted public health officials and kept their schools open because they were worried about their

student's educational, social, and developmental needs (Ager et al., 2020). However, the data necessary to understand students' needs were not collected back during the 1918 Influenza Pandemic. The public health officials focused on learning in the classroom under the supervision of a teacher, the importance of daily play, and the need for access to health and meal programs schools offered (Aldeman, 2021). There were differing opinions between school officials who wanted students to attend schools amid the Spanish Flu versus other school leaders who wanted students to stay home and remain safe. Although school officials had widely polarized opinions, both parties were looking out for the benefit of the child (Markell, 2020).

School Shootings and Trauma in Education

On April 20th, 1999, two students killed 12 other students and one teacher while injuring many others at Columbine High School in Denver, CO. In lieu of this tragedy and many other school shootings, research sensitive to the experiences of victims of mass violence has been created to assist those who are traumatized (Hawkings et al., 2013). A total of 304 fatal school shootings since the Columbine incident and the number is still rising (Lynch, 2022). Those who experienced a school shooting used antidepressants at a higher rate in the years after the attack, with significant decreases in student enrollment, and a decline in average test results of students (Rossin-Slater, 2022).

COVID-19 and K–12 Education

Many articles have been released about COVID-19 and the K–12 Education system, but some of the earliest references discuss distance learning, what changes need to be made to increase learning amid the pandemic, and the tools used to help students.

With the closure of schools and the introduction of numerous limitations due to the COVID-19 global pandemic, distance learning became increasingly important.

Distance learning is an effective form of learning that can be offered, regardless of the location and time in modern times (TelliS & Altun, 2020). The authors also mention distance learning allows students access to education electronically and teachers can incorporate various tools into the teaching and learning process. The term *distance learning* describes how subject matter is taught and learned using a variety of apps and internet capabilities (Zhou et al., 2020).

There needed to be changes made to how students learn more during online teaching from their respective teachers (Zhou et al., 2020). The teachers' instruction needed to be more effective for the students. The tools used for distance learning varied from educational content where students could explore through learning programs but achieve at their own pace. Alternatively, students were able to learn synchronous lessons led by their teachers using virtual meeting platforms, such as Zoom or Google Meets (Schleicher, 2020). Distance learning was thought to be the most ideal way to tackle COVID-19 and as a solution for continuing education in many countries (TelliS & Altun, 2020).

Theoretical Foundations

In the landscape of education, a multitude of theories and frameworks have emerged to provide insights into teaching, learning, and outcomes in education. resilience theory, mathematics framework, psychological trauma theory, social disruption theory, Matthew effect theory, situational crisis communication theory, and theory of academic achievement are a few theories that each offer unique perspectives on different aspects of

education. From understanding resilience in overcoming adversity to exploring the impact of societal disruptions on educational systems, these theories provide information for guiding educational practices and policies.

Resilience Theory

Resilience theory refers to the ability to adjust to difficult or demanding life events, particularly through mental, emotional, and behavioral flexibility and adjustment to external and internal demands (American Psychological Association, 2022). Several models of resilience have evolved over time. Hart and Blincow (2007) indicate there are components, they refer to as Noble Truths, that are central to resilience theory: accepting, conserving, commitment, and enlisting. The authors further state five compartments—basics, belonging, learning, coping, and core self—are the starting place to build resilient capital with children and young people. Greene and Greene (2009) explored resilience theory to comprehend how people and communities react to natural catastrophes pose enduring developmental obstacles to individual and societal well-being. Rutter (2012) mentioned after all types of environmental adversity, some exposure to stress may be followed by increased resistance to stress later on in life, which is more commonly known as a steeling effect.

Mathematics Framework

The mathematics framework has been developed in California to complement and integrate the Common Core State Standards for Mathematics. The California Department of Education (2013) Mathematics framework is divided into three sections: methodology, philosophy, and curriculum. Methodology is based on the Algebra Project 5-Step Curricular Process. Philosophy is about students creating their own understanding.

Curriculum is about common core content and the standards of mathematical practices 1 through 8. By the California Common Core State Standards (2013), there are eight standards of mathematical practice students must use in their K–12 career. They make sense of problems and persevere in solving them, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of structure, and look for and express regularity in repeated reasoning (California Department of Education, 2013).

Psychological Trauma Theory

Psychological trauma is damage to the human psyche due to traumatic events that may involve a singular event or multiple events (Tahan et al., 2021). Traumatic events include a wide variety of experiences. Learning, behavior, and social, emotional, and psychological performance can all be affected by trauma exposure (Kuban & Steele, 2011). When looking to assist traumatized patients, there need to be four crucial understandings: Recognize the broad effects of stress and the ways to heal; the capacity to identify trauma's distinctive symptoms in patients, families, and staff; be able to incorporate trauma understanding into practices, policies, and procedures; and purposefully preventing retraumatization (SAMHSA, 2014).

Social Disruption Theory

Social disruption theory deals with individuals whose social lives undertake significant transformation (Rhama, 2022). In sociology, the phrase *social disruption* is used in relation to a community. Social disruption discusses something in a community or area that was commonplace is fading away and something new is coming from the ashes

(Beck, 2016). Social disruption is often thought to occur through natural disasters and rapid shifts in the economy, technology, and demographics. Frustration, democratic disconnection, fragmentation, polarization, and escalation are five social symptoms that are frequently brought on by social disruptions (Itten, 2018).

Matthew Effect Theory

The Matthew effect is the theory that looks into a pattern about those who begin with an advantage are able to gain more of an advantage over time versus those who begin with a disadvantage become more disadvantaged over time (Dannefer, 1987). The effect is summarized as "the rich get richer while the poor get poorer." In education, early success in obtaining reading skills typically resulted in later reading success as the student matured, while students who experienced difficulty in reading revealed problems with acquiring new skills persist for a lifetime (Kempe et al., 2011). When students need to read to understand their subject matter, their reading difficulty created difficulty in almost all other subjects.

Situational Crisis Communication Theory

For a situational crisis to be valid, the organization must be threatened, the threat must be unanticipated, and the organization must be forced to respond quickly (Amaresan, 2023). Coombs (2007a) stated the population fits into three areas: the victim cluster, the accidental cluster, and the intentional cluster. Situational crisis communication theory creates an outline for crisis communication. It is up to the organization to decide how the organization will react to the situation. Because the organization has the main understanding of the crisis, the members in the organization need to be proactive on how its population will respond (Coombs, 2007a). Situational

crisis communication theory has connections with higher education fields and businesses but has not been studied in relationship to K–12 education.

Theory of Academic Achievement

Walberg's theory of academic achievement investigates the psychological traits of students and how their psychological environments affect their educational results in terms of cognitive, behavior, and attitude (Reynolds & Walberg, 1992). Walberg's theory of academic achievement has nine key variables that influence educational outcomes: student ability or prior achievement, age or developmental level, motivation, quantity of instruction, quality of instruction, classroom climate, home environment, peer group, and exposure to mass media. Each of these variables has an impact on a student's educational background and how they achieve K–12 academic success.

Social Learning Theory

Bandura's social learning theory (1977, 1986, 1997) has a connection to K–12 education, specifically with the students. The theory of self-efficacy is built upon the principles of social learning theory. Most human behavior is seen and then learned through observation; by observing others, one can develop an understanding of how new behaviors should be carried out and create a plan of action for future behaviors. Bandura explains with any given experience, there is a positive or negative that will either punish or reward the effort (Bandura, 1977). When the action or experience rewards a behavior, the behavior is likely to continue as the result of reinforcement (Rotter, 1966). Bandura's social learning theory has four principles: mastery experiences, vicarious experiences, verbal persuasion, and physiological arousal.

Theoretical Framework

The theoretical framework used in this study was Bandura's theory of self-efficacy (1977, 1986, 1997). This theory was selected for this study after comparing other theories, including Maddux and Meier (1995). Self-efficacy refers to an individual's belief in their ability to adopt the behaviors necessary to produce particular performance achievements (Bandura, 1977, 1986, 1997). In simpler terms, self-efficacy refers to confidence in one's ability to have control over their own motivation, behavior, and social environment. Bandura's theory of self-efficacy (1997) investigates four principles: academic achievement, behavior, mindset, and social connections.

Academic Achievement

Academic Achievement is about students' academic successes in K–12 education, but also their failures. In the general form, successful academic experiences will increase self-efficacy beliefs in education while experiences of academic failure will lower their belief in succeeding.

Behavior

Behavior is about how one develops, learns, evaluates, and models their own behavior by observing others, influencing one's self-efficacy beliefs. If one sees another similar to them, or they connect with, be academically engaged and respectful in the classroom, one will be more inclined to perform those same actions. Similarly, if one sees another being disruptive and disregarding education, one will adopt those behaviors.

Mindset

An individual's mindset can convince or dissuade themselves of their own capabilities through encouragement or criticism from a credible source. This credible

source can be family, close friends, or an authority figure like a teacher. When the source offers encouragement, the individual is more likely to complete the task. When the source discourages the individual, the individual is not likely to complete the task.

Social Connections

Social Connections are about one's relationships with the people around them; it is possible to have close relationships, like family and friends, or more distant relationships, like people known casually. Social Connections can be correlated with self-efficacy where the more social connections an individual has, the higher their self-efficacy is. The fewer social connections one has, the lower their self-efficacy.

Rural Schools During the Pandemic

All schools are categorized using an "urban-centric" categorization approach based on their size, population density, location, and proximity to a city, which is broken down into the categories of city, suburb, town, and rural (NCES, 2007). Furthermore, all rural institutions fall under the category of high-need schools (2U, Inc., 2023). This does not mean rural students do not perform as well as their counterparts; the students have different school and life experiences that make them work harder to become successful (Bailey, 2021). Statistically, rural students are shown to perform well on assessments; however, their school experience can be completely different from that of their suburban or urban peers in several ways. Alpago and Alpago (2020) examined the socioeconomic effects of the COVID-19 global pandemic and discovered the use of technological options for education varies by geographic location and among people from various economic backgrounds.

The move to online instruction was difficult for students in the rural population due to the difficulty of access to the Internet and the lack of adequate technological equipment necessary for activities (Carius, 2020). These students believed they were not capable of learning mathematics effectively without the help of a teacher and had issues completing their work in lieu of not connecting with their teachers (Mukuka et al., 2021). Because these rural students lacked access to the internet and did not have a teacher available to guide them, these students could not learn their material as effectively (Carius, 2020). Lastly, the academic challenges faced by low-income students are largely caused by an opportunity gap (Hurst, 2020).

Mathematics Education During and After the Pandemic

Students need to be taught content by teachers, regardless of the method chosen by the school (Iglesias-Pradas et al., 2021). Mathematics students who received in-person instruction with the social distancing method did better academically than the students who received distance learning instruction (Urtel, 2008; Xu & Jaggars, 2014; Myers et al., 2021). In the remote learning setting, mathematics teachers who used a synchronous approach were available to assist students and helped minimize the possibility of students experiencing confusion with learning math on their own (Simorangkir et al., 2021).

Online computer-based asynchronous instruction in mathematics was not effective (Myers et al., 2021). When the students returned following the pandemic, there was an evident achievement gap due to students not learning as efficiently during the 2 years of distance learning. Mathematics teachers returned to foundational mathematics to help students improve their mathematical skills to reduce the learning loss prior to returning to the standard high school mathematics curriculum (Dept. of Education).

Gaps in the Research

Rural students were some of the last to receive support to adequately work from home like their counterparts (Ramsetty & Adams, 2020). These students required the same help as urban and suburban students, but they were dismissed and pushed aside. Rural students are not given enough attention in efforts to improve academic achievement levels (Tieken, 2014). There is limited research on high school mathematics; most of the research done is based on middle school mathematics (Myers et al., 2021). There is little research available on how mathematics performance in rural schools was affected negatively by the pandemic.

More research could be done on rural students at the secondary level and how they performed in their academic achievement pre-pandemic from the years of 2017–2019 compared to the 2020–2021 school year or any school year beyond the 2019–2020 school year (Scott, 2022). The effects of not getting enough support to work from home could have affected these students' learning loss in the following years. Therefore, further research would support the academic achievement of rural students to ensure these students enjoy the same success as their urban and suburban counterparts by creating more educational equity.

Summary

The COVID-19 global pandemic had dramatic effects on education from Kindergarten through High School. Mathematics teachers found students taught online often had significant learning loss. Rural students were some of the last to receive support to adequately work from home during distance learning (Ramsetty & Adams, 2020). Furthermore, without ease of access, rural patients were left to manage their own mental

health issues and only sought care during times of crisis (SIUMed, 2021). There is a need for more research on how the COVID-19 global pandemic impacted education in rural high schools by looking at what teachers are saying about their students in terms of academic achievement, behavior, mindset, and social connections.

Statement of the Research Problem

During the COVID-19 global pandemic, rural students were some of the last to receive support to adequately work from home like their counterparts (Ramsetty & Adams, 2020). These students required the same help as urban and suburban students, but rural students were unable to get the help necessary to succeed due to access to education (Guzmán Rincón et al., 2021). Rural students are not given enough attention in efforts to improve academic achievement levels (Tieken, 2014). Students from low-income backgrounds lacked the resources and tools necessary to excel academically in a remote setting (Dorn et al., 2020).

Compared to their classmates in lower poverty schools in suburban areas, students in higher poverty schools tended to be two or more grade levels below (Curriculum Associates, 2020). The analysis found the average student lost more than one half of a school years' worth of math knowledge, with some district averages falling by even greater amounts (Vázquez Toness & Lurye, 2022). This was a result of the technological problems students were experiencing; the most challenging parts of online learning were the internet connection and power failures (Bringula et al., 2021). The authors further mention students had negative emotions about mathematics due to having to learn online by themselves. The effects of not getting enough support to work from home could have affected these students' learning loss in the following years (Vanbuskirk, 2022).

There is limited research on high school mathematics; most studies are on middle school mathematics (Myers et al., 2021). The limited studies about rural schools showed there was a disparity between students who had internet access to get online versus students who did not have consistent access to the internet and either did not continue to sign on or had to travel from their homes to gain strong enough internet access to continue their education (Myers et al., 2021; Urtel, 2008; Xu and Jaggars, 2014). With insufficient resources and little family support, economically underprivileged students who attempted to learn at home fell further behind their financially stable peers, widening the already present performance gaps (d'Orville, 2020). Additionally, the households of these students were likely to suffer from food insecurity, housing instability, and employment losses (García & Weiss, 2020). Many studies discuss the educational challenges experienced by low-income students, but none directly discuss disadvantaged rural students.

Although some articles and reports exist regarding what elementary teachers experienced during and after the pandemic, little research is available regarding their perspective on how the pandemic impacted the students they teach. More research is needed on rural secondary school students and how they performed academically in the pre-pandemic years 2017–2019 compared to the 2020–2021 pandemic period, and post pandemic years (Scott, 2022). Further, research can provide evidence to support the academic achievement of rural students to ensure these students enjoy the same success as their urban and suburban counterparts by creating more educational equity. Understanding the perceptions of rural high school mathematics teachers regarding how the pandemic affected the children when they returned to school, can provide information

and insights to better understand the problems they encountered. According to qualitative data, students encountered technological, personal, domestic, assessment, pedagogical, consultation, and exam anxiety challenges (Bringula et al., 2021). Gaining a more complete view of their experiences can help better address the challenges of successfully instructing rural high school mathematics students in the post-COVID-19 global pandemic school environment.

Purpose Statement

The purpose of this phenomenological study was to determine high school freshman mathematics educators' perceptions of the impact on rural, socioeconomic disadvantaged high school freshman students returning to school after being online for 2 years due to the COVID-19 global pandemic with regard to academic achievement, behavior, mindset, and social connections.

Research Questions

The following research questions guided this study's research:

1) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to academic achievement?
2) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to behavior?
3) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to mindset?

4) How do high school freshman mathematics teachers in rural districts describe the impact on students of returning to school after being online for 2 years with regard to social connections?

Significance of the Problem

The COVID-19 global pandemic was a major disruption to U.S. education. Low-income students in California have been impacted by the pandemic and its associated disruption of education (Piers et al., 2021). A student-centered approach that prioritizes connections with families and students is necessary to address students' learning loss. If there are no actions to assist returning students, they may never catch up and their learning loss will become permanent. The results of this study could inform mathematics instructors and school leaders related to the problems children encountered in math when they returned to school; then, school leaders can use those findings to help guide the development of instructional strategies and remedial curricula. Dynamic learning models have indicated, in the absence of intervention, small learning losses over time can result in significant disadvantages (DiPrete & Eirich, 2006).

The equity impact from the pandemic impacted some student populations, particularly low-income students and English Language Learners, who are slipping behind other student populations (Pier et al., 2021). Many places in the US, including Texas, California, Colorado, Tennessee, North Carolina, Ohio, Virginia, and Maryland, have observed learning losses (Unicef, 2022). For instance, in Texas, 66% of third-grade students scored below grade level in math in 2021 as opposed to 50% of students in 2019. (Unicef, 2022).

Along with students' academic achievement, there was a mental health crisis among these students. During the pandemic, more than one third of high school students reported having poor mental health, and roughly half reported feeling depressed or hopeless (Gad, 2022). Although all students may have been affected during this time, students from lower socioeconomic status have higher mental issues, specifically anxiety and depression, due to their limited access to obtain the necessary tools to assist them (Alibudbud, 2021; Gad, 2021). The decline of academic learning and social-emotional well-being in high school rural students highlights the need to improve school conditions and accelerate student learning throughout the nation.

The current information on the COVID-19 global pandemic impacting the world of education is still fresh and evolving. There is a need for research to be done on the population of rural communities and how they were affected by the pandemic. Studies examined the significance of social investment tactics to improve educational equity and resilience (Engzell et al., 2021). This study looks at high school students in rural communities and how their teachers perceive their education was affected by the COVID-19 global pandemic. The gaps in the literature highlight the need for more research in rural areas and high school students; the research that has been conducted has primarily focused on middle school and higher education students, mostly in urban and suburban school districts.

Mathematics coordinators will be able to use the results of the study to influence their pacing guides and how they instruct teachers on how to assist students and minimize their learning gaps. Although not specifically in their subject, English Coordinators will be able to use the information as English teachers also witnessed similar learning losses

and mental health effects due to their students not having access to the internet and technology. Carius (2020) discussed that students who have an adult available to support their learning could do better in their studies. Superintendents of rural districts will be able to use the study to inform their programs to assist teachers and students alike effectively.

Definitions

This section includes definitions of terms used throughout the research, providing clarity and context for understanding the analysis and findings.

Academic achievement: From content standards, academic achievement represents the academic knowledge, behaviors, and skills students are expected to learn and demonstrate in a performance task (Bandura, 1997; Department of Education, 2022; Logan et al., 2017).

Achievement gap: The disparity in academic performance and results between different groups of students (e.g., income, race or ethnicity, and gender, in terms of grades, standardized test scores, dropout rates, college completion rates) is known as an achievement gap (Ansell, 2004; Mesrobian, 2022).

Behavior: Behavior is a way of learning, allowing people to learn from the experience of what others are doing and evaluating their own behavior; within the classroom, students are academically engaged, respectful, and/or disruptive and learn those beliefs by observing their peers (Bandura, 1997; Bicard & Bicard, 2012; Chafouleas et al., 2009).

COVID-19. A contagious respiratory illness caused by a virus called SARS-CoV-2 in known as COVID-19. The symptoms range from mild to severe illness (CDC, 2022).

Distance learning. The form of education in which the main elements include physical separation of teachers and students during instruction and the use of various Internet technologies (e.g., email, Zoom, Google Meets) to facilitate student–teacher and student–student communication is commonly called distance learning (CDE, 2023; Simonson & Berg, 2016).

Educational equity: Educational equity is reached when each child receives what they need to develop to their full academic and social potential and graduate prepared for success after high school (CPE, 2016).

Freshman: In the United States, freshmen are defined as ninth graders who are in their first year of high school between the ages of 14 to 15 years old (Loo, 2018; Willens, 2013).

Freshman Integrated Math 1 students: This student includes any freshman mathematics student who was in an Integrated Math 1, or equivalent class (CDE, 2015; Khan Academy, 2023; Park Ridge-Niles SD 64, 2018).

High school. In most school systems in the United States, a 4-year secondary school (i.e., high school) serves students approximately 13 through 18 years of age designated freshman, sophomore, junior, and senior (UNESCO, 2012).

Impact: An effect, change, benefit, or contribution to the economy, society, culture, public service, health, environment, or quality of life can be termed an impact (Barnes, 2015, as cited in Hutchison, 2019; REF, 2020).

Integrated math: Integrated math is defined as a method of teaching mathematics that incorporates a variety of strands, such as algebra, geometry, trigonometry, and

functions, into each year of secondary school (California Department of Education, 2013; Hodgen & Sturnman, 2010; Seely, 2004).

Integrated Math 1 teacher: This teacher is an educator who taught a minimum of one section of Integrated Math 1, or an equivalent class, prior, during, and post distance learning (California Department of Education, 2013; Khan Academy, 2023).

Mindset: The positive impact words have on someone creates a mindset; for example, telling a child they are capable and can face any challenge ahead of them can encourage and motivate them by growing belief in their own ability to succeed (Ackerman, 2018; Bandura, 1997).

Pandemic. A pandemic is a worldwide outbreak and the spread of a new disease affecting many people (CDC, 2021).

Pre-COVID: In the COVID-19 era, any time prior to March 13, 2020, before lockdowns, masks, and social distancing can be called pre-COVID (CDC, 2023; Merriam-Webster, 2021).

Rural school: A rural school is any school (a) not in an urban area, (b) with a school location code of 32, 33, 41, 42, or 43 assigned by NCES, or (c) situated in a part of the state the state government body has designated as rural (NCES, 2021; OESE, 2022).

Social connections: Social connections include close relationships (e.g., family or friends) or more distant relationships (e.g., acquaintances) that support one another (Ackerman, 2018; Bandura, 1997).

Trauma. Exposure and/or contact with adverse experiences (e.g., abuse, neglect, household concerns, community worries) create trauma (Bartlett & Smith, 2019).

Delimitations

The delimitations of a study are the boundaries the researcher sets in terms of the study (DiscoverPHDs, 2020). In the United States, there were 4,007,908 teachers in 2023; this includes all K–12 public and private schools, plus adult education and career/technical schools (Staake, 2023). To delimit the study for the 2022–2023 school year, there were 1,413,345 math teachers currently employed in the United States (Zippia, 2022). Delimiting this study to public high school math teachers reduced the number to 19,861 mathematics teachers in California. To delimit the study even further, the researcher chose to limit the study sample to rural public high school mathematics teachers in California with 6 or more years of teaching experience. The teachers would have been in the profession prior, during, and after distance learning. The researcher limited the study sample further by looking at teachers from rural districts who taught a minimum of one course of Integrated Math 1 (or equivalent) to freshman students.

Organization of the Study

This study is organized into five chapters. Chapter I introduced the study and provided background information, a statement of the problem, significance of the problem, definitions of terms relevant to the study, and delimitations present. Chapter II presents extensive literature on self-efficacy and how it relates to rural high school math teachers. Chapter III presents the methodology of the study. This includes the research design, constructs of the instrumentation, population, sample of the study, and criteria for the selection of participants. Chapter IV provides the findings of the study, which includes a detailed analysis of the data. Chapter V summarizes the study, draws

conclusions based on the findings from the analyses of data, suggests implications for action, and provides recommendations for future research.

CHAPTER II:

REVIEW OF THE LITERATURE

This chapter presents the history of education, crises in education, and the development of self-efficacy in students in education. This study references the work of Bandura's (1997) social learning theory to showcase self-efficacy in students. This chapter also includes a discussion of rural high school students, low-income students, and mathematics teachers. This chapter concludes by discussing what happened to students and teachers before, during, and after the COVID-19 global pandemic.

Background

Education systems worldwide have experienced disruptions throughout history, with the most recent being the COVID-19 global pandemic. The pandemic brought immediate challenges, such as school closures and transitions to remote learning. Understanding the overlap of COVID-19 and the various crises in education and their impacts will assist policymakers, educators, and researchers alike.

COVID-19

The Coronavirus Disease 2019, abbreviated to COVID-19, is the official name given by the World Health Organization (WHO). Caused by SARS-CoV-2, the novel coronavirus surfaced in Wuhan, China in 2019. After the outbreak was identified in Wuhan, it quickly spread to other regions in China and across international borders (WHO, 2023). By early January 2020, COVID-19 had reached countries around the world, causing concern. On March 11, 2020, COVID-19 became so prevalent the WHO designated it as a global pandemic that affected many people, which led to public health responses (CDC, 2023; WHO, 2023).

Countries from around the world implemented different public health responses to stop the spread of COVID-19. In early March 2020, the U.S. government issued a lockdown of 2 weeks to "flatten the curve" to stop the spread of COVID-19 as cases were spiking (Scott, 2020, para. 1). From this lockdown emerged the first public health response to implement social distancing measures to prevent the spread of COVID-19. Soon after, the Centers for Disease Control and Prevention (CDC) announced a new mask-wearing guideline and recommended all people wear a mask when outside of the safety of their homes (CDC, 2023). After doctors and scientists learned more about the spread of COVID-19, they instituted widespread contact tracing and testing to identify and isolate infected people to assist the efforts of healthcare systems and ensure the safety of the public (CDC, 2023). However, even with these responses to COVID-19, healthcare systems became overwhelmed with the vast numbers of people infected by the virus.

As the COVID-19 global pandemic grew, personal protective equipment (PPE; e.g., gowns, gloves, masks, body bags) grew scarce as the hospitals were overrun with patients (CDC, 2023). During these shortages, medical professionals discovered COVID-19 could spread through the air and was likely being spread by people who showed no symptoms of the illness. Soon after, the U.S. Department of Health and Human Services and the U.S. Department of Defense launched an initiative to produce a vaccine that could combat COVID-19. The initiative helped fund the development of potential vaccine candidates, including the Pfizer-BioNTech and Moderna mRNA vaccines, which helped stop the spread and mortality of COVID-19 (CDC, 2023; Yale Medicine, 2023).

In the realm of education, many states in the United States began to implement *shutdowns* on March 13, 2020, to prevent the spread of COVID-19. Shutdown was the

adopted word that described the social movement that required educators and other professionals to work remotely, often from their homes. Educators, specifically, moved to remote/distance learning to ensure that they were able to teach, assist, and interact with their students. Furthermore, school administrators and educators worked incredibly hard to ensure students were still obtaining their education. COVID-19 was one of the latest crises to impact education in the 21st century.

Crises in Education

Education is a crucial social pillar that influences almost every element of an individual, from intelligence to social skills. However, a number of crises have impacted education throughout history and presented problems for the consistency and quality of learning. Global conflicts, natural catastrophes, health epidemics, and socioeconomic inequality are just a few of the crises that have repeatedly put the strength of educational systems to the test and forced those involved in the field of education to find creative solutions (Quinn & Kumar, 2014; SAMHSA, 2017). This section explores how these crises and disruptions impacted educators, students, and society. This section further demonstrates how resilient the education system is by describing the history of these crises and their effects on education.

Hurricane Katrina's Effects on Children

Hurricane Katrina, occurring in 2005, was one of the most catastrophic natural disasters in modern history and had serious consequences on many different members of society, including children. Hurricane Katrina caused children in the Louisiana area physical and psychological hardships due to displacement, hazardous environments, and trauma. Children experienced elevated rates of posttraumatic stress disorder, anxiety, and

depression due to the disaster. Furthermore, the disruption of healthcare services exacerbated the mental stress on children (Abramson et al., 2010).

Along with a lack of clean water, proper nutrition, homelessness, and psychological stress, Hurricane Katrina impacted education by damaging schools, resulting in students having limited access to basic necessities. Many of the schools in the region suffered severe damage, which resulted in them being unusable for an indefinite amount of time while they were being repaired (Bienvenu, 2023). The hurricane's destruction resulted in the closing of nearly all public schools in New Orleans and the displacement of over 50,000 students (U.S. Government, 2005).

This disaster not only disrupted student learning, but also disrupted their social and emotional development. Students struggled to deal with the traumatic experience that fell upon them (Fothergill et al., 1999). Many students were unable to get the help they needed because their sanctuary area of school was taken from them. The lack of a stable environment for education had long-term effects on academic achievement, with many students not able to continue with their education trajectory due to these setbacks (Peacock & Girard, 1997). The disaster further strained families to be a supportive aspect of their children's learning. Because families could not provide the same education for their children, children experienced a loss of education for years to come (Petruccelli, 2006).

Education During the 1918 Influenza Pandemic

The 1918 Influenza Pandemic, more commonly known as the Spanish Flu, was one of the most devastating global epidemic crises of the 1900s. The pandemic, caused by the H1N1 influenza virus, impacted millions of lives across the globe and caused

significant issues in many aspects of society, including the world of education. As society dealt with the rapid spread of the H1N1 virus and its lethal effects, education faced challenges in attempts to maintain a learning environment that ensured the safety and well-being of students and educators alike (Barry, 2005).

The 1918 Influenza Pandemic had a serious impact on education at all levels, from kindergarten to university. Similar to the COVID-19 global pandemic, one of the responses to the 1918 Influenza Pandemic was to temporarily shut down schools in hopes of stopping the spread of the virus. These closures varied in duration based on the local policymakers and were mainly used as a preventative measure to help stop the spread of the virus (Markel, 2010). With these school closures, many schools attempted to implement distance learning measures. Even though their technological resources were far more limited than they are today, educators explored different methods of instruction for their students, such as sending assignments through the mail or using radio broadcasts to reach students (Rich, 2020). However, the attempt to educate students was limited by the technology of their time (CDC, 2018).

Along with these issues, the 1918 Influenza pandemic showcased existing educational inequalities in many communities around the world. Access to education was unfairly distributed, with students in rural areas or from lower socioeconomic backgrounds having limited or no access to educational resources and opportunities (Riley, 2020). Furthermore, similar to Hurricane Katrina, the closure of schools disrupted students and their educational trajectory, especially for students preparing to graduate high school or students transitioning between different levels of education (Spinney, 2017).

Educators during the 1918 Influenza Pandemic faced difficult decisions in balancing education for students and public health concerns. In many cases, the response to the 1918 Influenza Pandemic was based on the wants and needs of local populations, where educational institutions based their decisions on the severity of the outbreak in their area (Markel, 2010; Spinney, 2017). The 1918 Influenza Pandemic left a lasting impact on education systems, especially for the importance of being prepared for the unexpected. This crisis required discussions about the importance of education in times of emergency and the need for instruction to be adaptable. Lastly, the educational inequalities highlighted during the pandemic led to greater awareness of equity and fairness in education and resources.

Education Post September 11, 2001

On the morning of September 11, 2001 (9/11), a series of four coordinated terrorist attacks by the extremist group Al-Qaeda targeted the United States. These attacks targeted major landmarks in the United States and claimed the lives of thousands of people in the nation, which left a lasting impact on the nation. Multiple commercial airliners were hijacked, and terrorists intentionally targeted the North and South Towers of the World Trade Center in New York City and the Pentagon in Virginia with these airliners (History, 2023).

The World Trade Center collapsed shortly after the attacks due to the impact. Citizens on the fourth hijacked plane, intended for the U.S. Capitol or the White House, fought back against the terrorists and ultimately crashed the plane into an empty field in Pennsylvania, near Washington, D.C. (National Park Service, 2023). These attacks resulted in the tragic deaths of nearly 3,000 people, making it the deadliest foreign attack

on U.S. soil. This moment in U.S. history reshaped the nation's foreign policy and security along with the education system (Hartig & Doherty, 2021).

The events of that tragic day caused changes in educational policies and curriculum to promote global awareness and counteract extremist ideologies (Lane, 2011). The world of education recognized there was a sense of urgency to address the issues at hand in terms of terrorism, cultural diversity, and tolerance due to the tragic events of 9/11. To ensure students were more aware and understanding, the curriculum was changed to provide students with historical, political, and social contexts to explain the lead up to the attacks and their aftermath (Colbert-Lewis, 2012).

In the immediate aftermath of 9/11, many schools were temporarily closed due to the terrorist attack and families were displaced due to the damage. These closures damaged student's learning opportunities (Gershoff et al., 2010). Along with educational damage, many children suffered from psychological trauma due to the attacks and the ongoing media coverage of that continued for years after the attacks (Garfin, 2020; Substance Abuse and Mental Health Services Administration, 2020). These students were unable to remain focused on their academics. As a result of compounding trauma, students did not do well academically in the coming years after 9/11 (Gershoff et al, 2010)

School Shootings and Trauma in Education

School shootings, incidents where guns have been discharged on school grounds, have been happening for quite some time, causing stress on society in America. The events of school shootings have left lasting trauma on the survivors of the event, their families, educators, and society (Abrams, 2023; Rossin-Slater, 2022). In turn, education

has had to adapt and deal with the potential of a school shooting occurring at their site (Alexander, 2021)

United States has had a long history of school shootings. The first U.S. K–12 school shooting was in 1853 when Matt Ward pulled out a gun and shot Mr. William Butler (Ricca, 2022). Since 1853, school children have been traumatized by gun violence in the safety of their schools. Some of the deadliest school shootings happened at four schools around America: Columbine High School on April 20, 1999, Sandy Hook Elementary School on December 14, 2012, Parkland High School on February 14, 2018, Robb Elementary School in Uvalde on May 24, 2022 (Gamio & Hubler, 2022).

These school shootings have been causing lasting trauma in a place where students are supposed to feel safe. Children exposed to school shootings develop trauma differently and in more pronounced ways because they have a connection to the victims and because they lost their trust in their school's ability create a safe environment for them (Rossin-Slater, 2022). This frequency of school shootings in the United States is cause of concern for the education system and the trauma being experienced by students.

School shootings leave lasting effects on everyone involved, extending beyond physical harm. School shootings are known to lead to posttraumatic stress disorder, anxiety, and depression among everyone who experiences or witnesses the events (Homonoff et al., 2020; Rossin-Slater, 2022). Along with trauma in students and adults, academics suffer due to these school shootings. These shootings are decreasing the enrollment of freshman students. Relatedly, students are scoring worse on their math and English standardized tests (Beland & Kim, 2016). With the decrease of enrollment, school shootings impact the future of these students' lives. Students exposed to school

shootings are less likely to graduate high school and continue their education after high school (Rossin-Slater, 2022); furthermore, they are less likely to be employed in the future and will have lower earnings in their twenties.

School shootings are tragedies that have shocked the entire educational system. The immediate outcomes are devastating, from the loss of young lives to being traumatized in any school setting. The trauma inflicted on students may be hidden, which affects the student's ability to learn and collaborate with their peers (Frieze, 2015). Students are not the only ones traumatized by school shootings. Educators' trauma to school shootings reveals itself differently, where educators are burnt out, emotionally distressed, and unable to provide for their students (Rossin-Slater, 2022). However, it is the resilience in everyone involved to keep moving forward amid the trauma.

Impact of COVID-19 on K–12 Education

With the emergence of the COVID-19 global pandemic in late 2019 and its rapid global spread, the virus introduces unprecedented challenges to the K–12 education system. The first major challenge was the transformation in teaching. Depending on the district policy makes, schools adopted either a strictly online instruction method or a hybrid model, which combined in-person learning and online instruction (National Education Association, 2021). With a strictly online learning environment, it was difficult for teachers to understand the learning style of each student and enhance the learning experience. To ensure students were retaining the material, educators needed to reevaluate assessment methods, as traditional assessments did not translate well into the online learning environment (Cairns, 2020). This transformation from traditional learning to online learning caused disruptions to school environments.

The United States began to implement shutdowns on March 13, 2020, to prevent the spread of COVID-19. These school closures caused a major disruption to traditional brick and mortar learning environments that required a sudden shift from in-person instruction to distance learning (UNESCO, 2023). This change to schools nationwide had an immediate impact to children's learning. With the original plan of 2 weeks to flatten the curve not working as intended, many districts extended school closures, which raised concerns about learning loss and students at risk of falling behind in academic performance and progress (Samuel & Tarasawa, 2020). Many school leaders around the world relied on technology to help aid student learning.

With staff and students social distancing at home, school districts rolled out a method to have students learn through the internet. Educational technology in K–12 schools used video conferencing tools and online learning platforms, such as Zoom and Google Suite, to facilitate virtual instruction and learning (Siegle, 2023). These educational tools became an integral part of distance learning and assisting students through technology. However, the pandemic showcased disparities in access to technology and the internet among K–12 students and demonstrated a digital divide for student learning (University of Washington, 2021). The tools used to teach students through the internet relied heavily on how well the student's internet connection was and the computerware the student had access to and if they were poor, the student suffered. Along with student's academics suffering due to the disparity of technology and access to technology, students dealt with mental health struggles.

Because the U.S. government implemented stay-at-home orders, students were unable to attend their school environment as they had in previous years. These school

closures did not allow students to socialize, which contributed to students feeling isolated and lonely (Christ & Gray, 2022). The pandemic had a significant impact on the emotional well-being of students in the K–12 education world. These social and emotional learning consequences led to increased stress, anxiety, and depression on K–12 students (Li, 2022). The COVID-19 global pandemic significantly disrupted K–12 education, necessitating rapid adaptations in instructional methods, the adoption of educational technology, and an increased focus on socioemotional well-being. These multifaceted impacts continue to shape the landscape of K–12 education and warrant ongoing research and policy considerations.

Rural High Schools

The rural community is in a unique position as there is no single, agreed-upon definition of "rural." The federal government has used more than 15 definitions, and states in the United States have their own definitions (Cromartie & Bucholtz, 2008). These classifications are typically tied to the population size or density and proximity to an urban area. Most classifications rely on the distinction between urban and rural, or metropolitan and nonmetropolitan. The U.S. Census Bureau (2023) has classified rural as territory encompassing less than 2,000 housing units or have a population of less than 5,000. Although these numbers seem to be small, there is a lot of land in the United States for many sections of rural communities to exist. The rural population consists of around 20% of the U.S. population, or around 60 million people (U.S. Census Bureau, 2017). The media portrays these rural communities as only consisting of White Americans, but that is not true. The portrayal of rural communities as White, located near farmland, and in an economic decline is a lie and erases a significant part of the rural

population. These depictions are not accurately portrayed, as the rural areas of the United States contains a diverse population (Tieken & Montgomery, 2021). Castillo and Cromartie (2020) describe in 2018, ethnic minorities comprised approximately 22% of the rural population, which contrasts sharply with their urban area counterparts comprising 43%. They further describe whites making up 78.2% of the rural population, in contrast to 57.3% in urban areas.

With 60 million people living in the rural United States, a significant portion of the population are high school students. Rural high schools are in a distinct place among the U.S. education system with their own unique challenges and opportunities. Rural districts are a part of the education system, where 9.3 million students attend a school that is characterized as rural (Bailey, 2021). Similar to the ratio described by the U.S. Census Bureau, these 9.3 million students, or one in five in the United States, are a large number of students nationwide who deal with these negatives and positives. Rural high schools have a challenge with having limited access to educational resources, such as coursework, extracurricular activities, and staff. Furthermore, geographic isolation and low socioeconomic status can further these resource disparities (e.g., transportation to and from school) when compared to their urban and suburban counterparts (Bailey, 2021). In terms of the educational world, teacher recruitment and retention in rural areas are in a precarious situation. Rural schools have a difficult time attracting and retaining qualified educators because they struggle to complete with urban districts with their salaries and professional development (Ingersoll & Strong, 2011). Teachers and students alike deal with challenges of rural schools and persevere to turn these challenges into opportunities.

Even though challenges exist, students in rural areas experience positives as well. Rural high schools, and the families they serve, benefit from the communities being close among the students, educators, and families that allow for a supportive and personalized learning environment (Office of Elementary & Secondary Education [OESE], 2019). With the support system built from the community, education is a priority. Students in these rural districts often score at or above their urban and suburban counterparts on state and national tests (Bailey, 2021). Rural schools allow for students to experiment and engage with their interests in their academic studies. Rural districts offer vocational education programs, commonly referred to as career and technical education classes, that align with local industries and career opportunities (Warner-Griffin & Liveoak, 2023). The ability for these schools to successfully support their students going in multiple directions allows for their students to perform at their highest potential. Rural high schools have higher graduation rates than urban high schools and low-income students in these rural schools have shown they are better prepared academically than their urban counterparts (McHenry-Sorber, 2019; Tieken & Montgomery, 2021). Given the right support, rural schools can compete with the success that is often attributed to urban schools.

Mathematics Teachers

Mathematics teachers have an important role in assisting student's number skills and problem-solving abilities in the K–12 education system. Mathematics teachers have a responsibility of supporting students, navigating shared challenges, and recognizing the importance of professional development to further refine their teaching skills. Mathematics teachers serve as facilitators of learning by guiding students through the

process of understanding mathematical concepts, problem solving techniques, and applications in real-world situations (Koskinen & Pitkäniemi, 2022; National Council of Teachers of Mathematics [NCTM], 2020b). For teachers to implement these strategies, they need to develop a curriculum that works for their students. Mathematics teachers play a crucial role in implementing curriculum standards, designing lesson plans, and selecting specialized materials that will assist the diverse learning needs and promote mathematical proficiency in their students (Mullis et al., 2016). After these teachers have implemented these strategies and instructed their students, they need to see how their students performed. Mathematics teachers assess their students' progress by providing feedback and identifying what areas require improvement in each individual student, which allows for the student to create a deeper understanding of the mathematical concepts being shown (Brookhart, 2018). In a perfect world, mathematics teachers would be able to successfully implement these strategies and instruct their students, but challenges arise in their classrooms that hinder their progress.

In the classroom, mathematics teachers must manage many challenges in instructing their students to learn math. Mathematics teachers face the challenge of instructing conceptual understanding of the mathematics material, which emphasizes the importance of mathematical meaning, connections, and understanding, rather than rote memorization (Hiebert & Grouws, 2007). With the advancement of technology, mathematics teachers have been attempting to integrate technology into their instruction. However, integrating technology into the classroom requires teachers to balance traditional methods of teaching with digital tools to enhance student learning and engagement (Itopia, 2023). Not only must teachers integrate technology into the

classroom curriculum, but mathematics teachers play a crucial role in their students' self-esteem regarding mathematics. Mathematics teachers must address math anxiety in their students by creating supportive classroom environments and implementing instructional strategies that assist in alleviating anxiety and promote a positive attitude toward mathematics (Beilock et al., 2010). To be successful in their craft, mathematics teachers address the challenges in mathematics education through innovative instructional methods and continuous professional development.

Professional development is a pillar in mathematics education for teachers in the United States. These professional development opportunities (PDs) allow mathematics teachers to enhance and refine their content knowledge, teaching strategies, and assessment practices with up-to-date information, which fosters instructional innovation (Ball et al., 2008). PDs are also used for learning new technologies for the classroom. Training focuses on technology integration allow mathematics teachers to be equipped with new skills, strategies, and tools that enhance student learning and understanding of mathematics (Niess, 2005). The new skills learned at PDs allow teachers to better support students of all backgrounds to ensure they learn in an equitable manner. PDs that emphasize inclusive, culturally responsive teaching practices allow teachers to address all the diverse needs of students, which promotes equitable learning opportunities for all students (Gutiérrez, 2013). Mathematics teachers play an important role in assisting students in developing mathematical proficiency, problem-solving skills, ensuring an equitable opportunity in their students' learning.

Theoretical Foundations

By examining multiple theoretical frameworks, the researcher aimed to achieve a deeper understanding of their implications on teaching and learning. This section explores the various theories from resilience theory to social learning theory. These theories provide a deep understanding of experiences of rural students and their teachers.

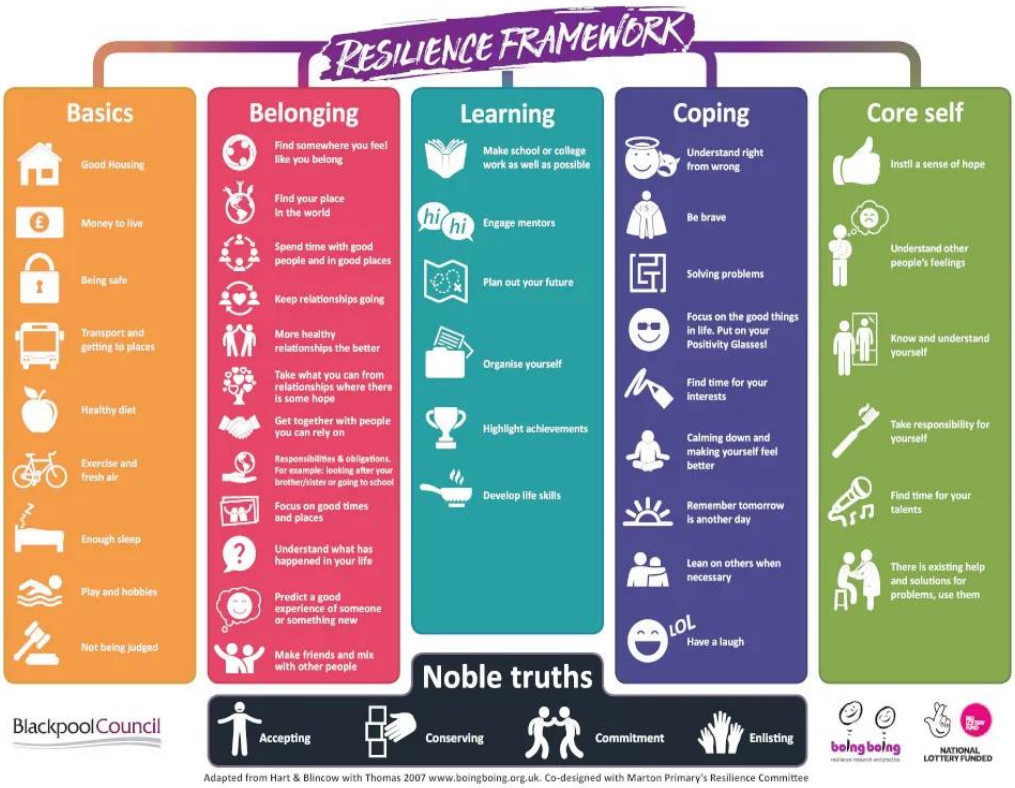
Resilience Theory

The origins of resilience theory can be traced back to the 1970s when researchers investigated children at risk for psychopathology and discovered some children had good outcomes despite being exposed to risk (Li, 2023). The most notable psychologists to contribute to resilience theory were Garmezy, Werner, Rutter, Masten, Luthar, Ungar, and the duo Hart and Blincow. Each of these researchers investigated the capacity of individuals to overcome adversity from their own lens, and looked at foundational theories to assist them.

Bronfenbrenner's ecological systems theory (see Figure 1) influenced resilience theory because it emphasizes the connection between individuals and their social, cultural, and environmental backgrounds (Bronfenbrenner, 1979). The resilience of a student depends on the capacity of five variables in their lives: basics, belonging, learning, coping, and core self. Each of these are connected to the next. Therefore, if one is inadequate, a student is unable to grow.

Figure 1

Examples of Each Variable in the Resilience Framework



Note. From "What is the Resilience Framework," by Biong Biong Resilence Research in Pracitce, n.d., (https://www.boingboing.org.uk/resilience/resilient-therapy-resilience-framework/).

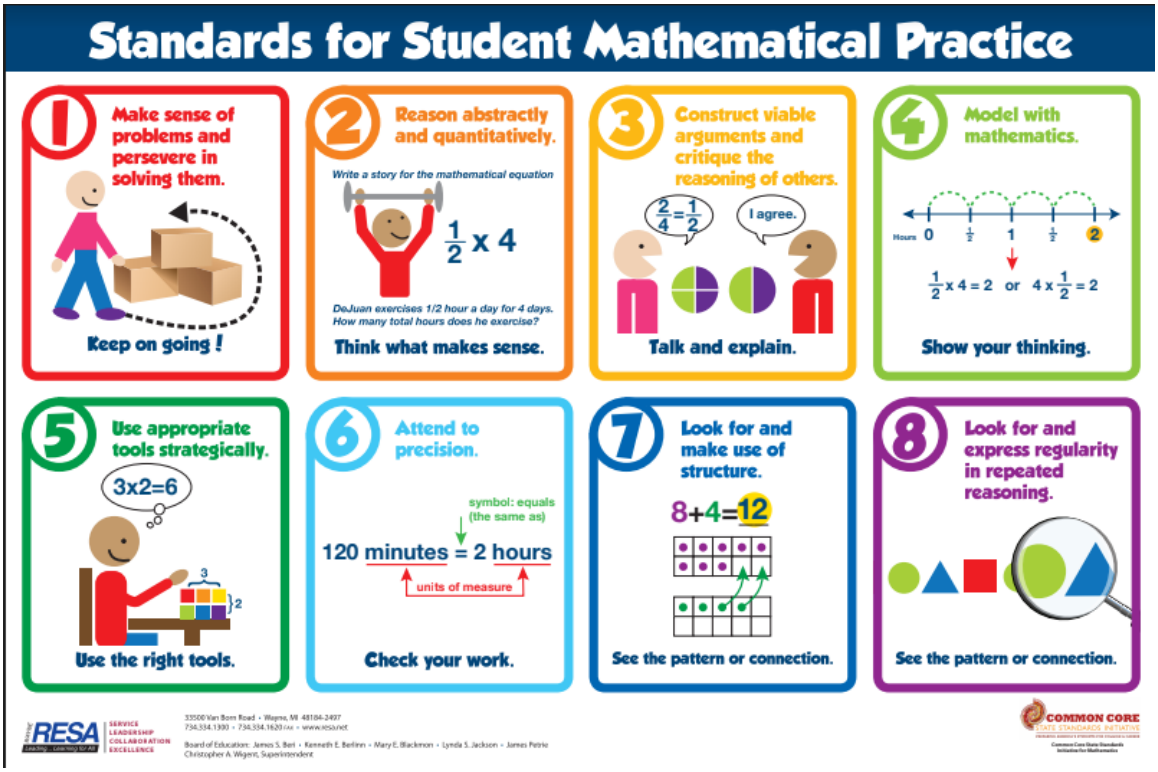
This creation of a resilient mindset among students not only enhances their academic performance but also equips them with valuable life skills essential for working through future adversities. To have students with this skill, educators must implement each of the variables in resilient theory. The practical implementation of resilience theory in educational settings is crucial for promoting the student's development as whole and their well-being (Masten, 2001).

Mathematics Framework

The mathematics framework, guided by the standards set forth by the NCTM (see Figure 2), serves as a blueprint for designing and implementing effective mathematics instruction. The mathematics framework investigates a whole student approach to mathematics education, encompassing conceptual understanding, procedural fluency, strategic problem solving, and mathematical reasoning for all students (NCTM, 2023).

Figure 2

The Standards of Mathematical Practice



Note. From "Standards for Mathematical Practices," by D. Waggoner, n.d., (https://www.debbiewaggoner.com/math-practice-standards.html).

By prioritizing the development of these mathematical proficiencies in students, the framework aims to foster a deeper understanding of mathematical concepts among students, which in turn strengthens their ability to apply mathematical knowledge in diverse real-world contexts. In the framework, the integration of innovative instructional strategies, interactive learning experiences, and technology enhanced pedagogical approaches plays an important role in creating an engaging mathematics learning environment for students.

By using the principles outlined in the mathematics framework, educators can create meaningful learning experiences for their students that promote critical thinking, collaborative problem solving, and an appreciation for the relevance and applicability of mathematics in various academic and professional domains (CDE, 2015). This new approach to mathematics education not only nurtures students' mathematical proficiency, but it also cultivates a lifelong passion for learning and inquiry in the field of mathematics.

Psychological Trauma Theory

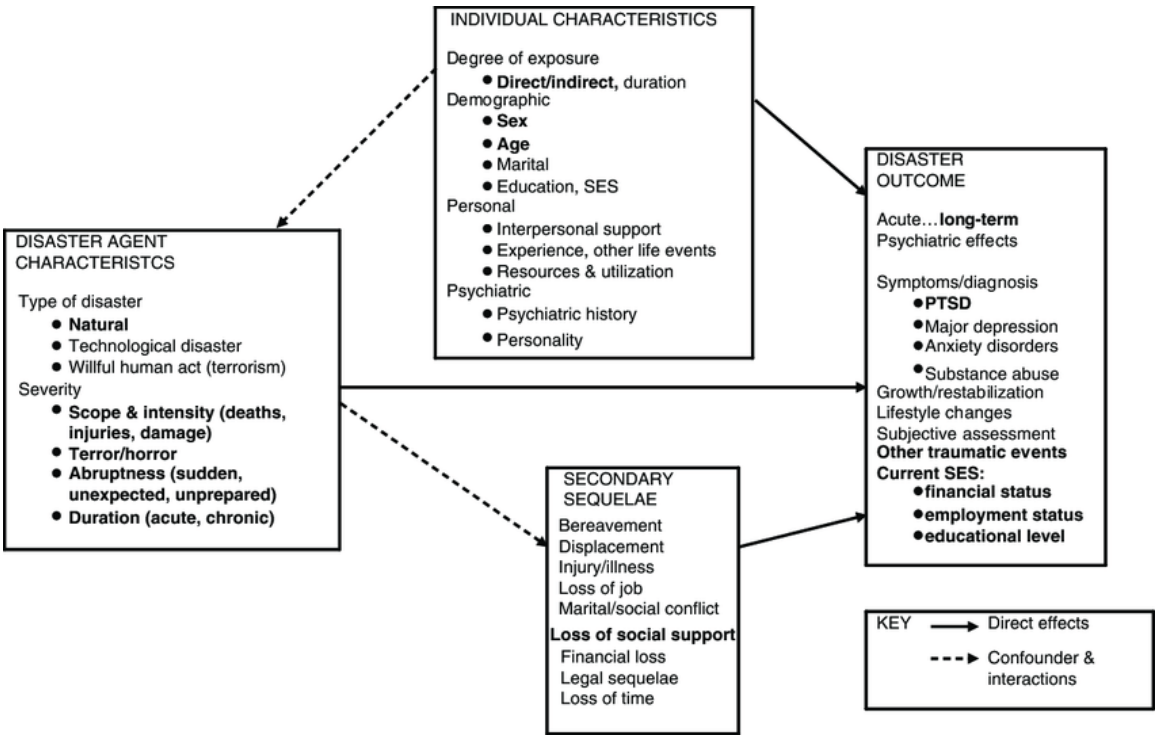
Psychological trauma theory offers a profound insight into the intricate interplay between traumatic experiences and the individuals' cognitive, emotional, and behavioral responses. The study of psychological trauma has its origin in the late 1800s with the work of Martin-Charcot attempting to study and define the disease known as "hysteria" (Novais et al., 2015). Because this was new, more research went into hysteria to find its origin. In the 1880s, Janet, Freud, and Breuer all concluded hysteria was caused by psychological trauma, which created the foundation to continue research into psychological trauma (Ringel & Brandell, 2012). More recently, research has been done

on anxiety, stress, and trauma to determine effects on students (Frieze, 2015; Shapiro & Forrest, 1997).

Due to the trauma that is occurring in the world, educators prioritize their student's psychological well-being. Psychological trauma theory (see Figure 3) in education investigates the impact of psychological trauma on students' overall well-being and academic performance and emphasizes the need for trauma-informed practices in educational settings (Roberts, 2021). If educators can recognize trauma in students, educators can create a safe and supportive learning environment that assists students in their emotional regulation, resilience, and adaptive coping strategies for those who have experienced psychological trauma.

Figure 3

Modified Version of North's (2004) Disaster Trauma Theory



Note. Adapted from "Sixteen-Year Follow-Up of Childhood Avalanche Survivors," by E. B. Thordardottir, U. A. Valdimarsdottir, I. Handsottir, A. Hauksdóttir., A. Dyregrov, J. C. Shipherd, A. Elklit, H. Resnick, & B. Gudmundsdottir, 2016, *European Journal of Psychotraumatology, 7*(1), Article 30995 (https://doi.org/10.3402/ejpt.v7.30995).

By prioritizing trauma-sensitive practices, educators can create nurturing and engaging learning environments that promote students' well-being, academic engagement, and positive socioemotional development. The integration of trauma-informed approaches in education encompasses the implementation of supportive interventions, a compassionate and inclusive classroom culture, and specialized mental health services to address students' diverse emotional and psychological needs (Maynard et al., 2019). This approach not only facilitates students' academic success but also instills a profound sense of security and belonging, laying the foundation for their overall personal and academic growth.

Social Disruption Theory

Social disruption theory was originally founded by Garmezy in 1985. Social disruption theory discusses the influence of social and environmental stressors on students' academic performance and socioemotional well-being (Garmezy, 1985). With this, students who come from low-income areas or rural areas are susceptible to social disruption. The theory emphasizes the need for interventions that address the challenges that arise from socioeconomic disparities, cultural adversities, and familial disruptions that significantly impact students' educational trajectories (Park & Stokowski, 2009). By acknowledging the effects of social disruption on students' learning experiences,

educators can figure out a solution to assist students before they suffer the consequences on academic achievement and their overall development.

These disruptions that affect student's learning experiences interrupt their stable learning environments and impede students' access to equitable educational opportunities, which hinder their academic progress. Studies support the premise of social disruption theory by highlighting the association between social disruptions and academic outcomes. For example, middle school students in the United States who were exposed to violence decreased their feeling of safety in school, which causes lower academic performance (Koposov et al., 2021). Students of different backgrounds can be affected by social disruption, and it does not need to be related to violence. Further, children who experience familial disruption, such as parental divorce or separation, experienced lower grades and decreased school engagement (Steele, 2009). When teachers understand the student's academic performance relies on how well the student is psychologically, they will be better able to assist their students academically.

The application of social disruption theory in the world of education involves educators being active in recognizing what goes on in the background of their student's lives. For educators to better assist their students, they can use culturally responsive teaching practices, equitable resource allocation, and community partnerships that promote a sense of belonging and resilience for their students facing adversity (Ruiz, 2023). By having educators create a supportive and inclusive learning environment, students will be able to navigate social disruptions in a healthy manner by developing a sense of safety and community that will assist their academics. Educators who use this approach will not only see growth in their students' academic success but also be able to

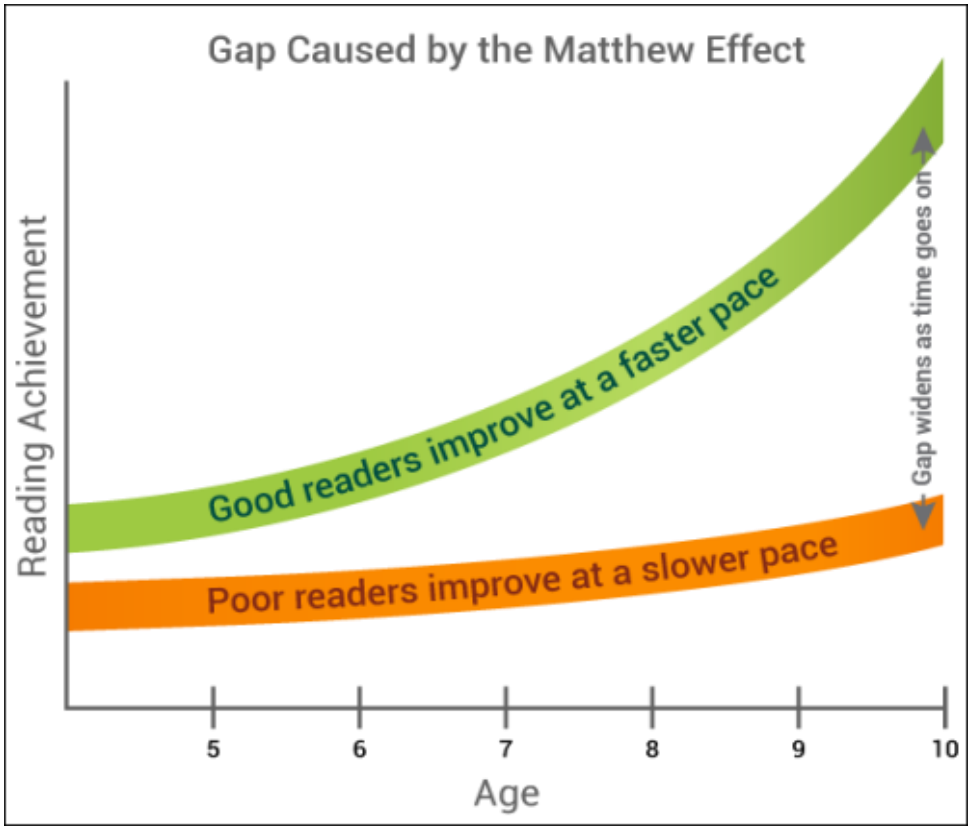
regulate their socioemotional well-being (Khan, 2023). In doing so, educators will be able to create a generation of socially conscious and empathetic individuals who are prepared to address complex societal challenges with resilience and compassion.

Matthew Effect Theory

The Matthew effect theory, explained by Merton (1973) and Stanovich (1986), discusses the compounding impact of early academic success or failure on students' long-term educational trajectories (see Figure 4). The theory discusses the critical role of early literacy interventions, differentiated instructional support, and equitable access to educational resources to help resolve the issue of achievement gaps that exist due to students' different learning opportunities and backgrounds (Cain & Oakhill, 2011).

Figure 4

Achievement Gap Caused Through the Matthew Effect.



Note. From "Latticework of Mental Models: Matthew Effect," by S. Niveshak, 2016, (https://www.safalniveshak.com/latticework-of-mental-models-matthew-effect/).

Students largely benefit from having early access to literacy. Matthew effect theory explains that students who start their educational journey with success early on are more likely to continue their academic achievements in the future (Walberg & Stariha, 1992). By understanding their students' early learning experiences, educators can implement interventions that promote equitable educational access and create students who are eager for learning, regardless of their initial academic proficiency.

In educational settings, the integration of the Matthew effect theory requires educators to implement interventions that cater to students' diverse learning needs and foster a growth mindset. Educators can empower students to overcome initial academic setbacks, cultivate strong foundational skills, and foster a lifelong passion for learning (Tomlinson, 2017). Students who have a growth mindset are more flexible and adaptable when it comes to failure versus the students who have a fixed mindset start to feel helpless and disengage. Students who are in rural, isolated areas tend to develop a fixed mindset because of the few opportunities offered to them in their environment and the little progress in their communities (Hernandez, 2019) Laying the foundation for students to be able to continue to grow promotes academic success and fosters a culture of education that sets them up for success.

The Matthew effect theory discusses the need for students to have early literacy skills for the best opportunity to succeed in the future. The critical need for early literacy interventions and differentiated instructional strategies reduces the achievement gap among students (Keith, 2018). If educators can identify and address these early literacy difficulties, it is possible they can prevent the compounding effects of academic challenges. Educators can use personalized learning plans, specialized interventions tailored to students' literacy levels, and academic vocabulary to provide better results for student learning (Coyne et al., 2018). Educators who prioritize reading literacy play an important role in equipping students with foundational skills necessary for future academic success, closing the achievement gap, and fostering an equitable education for all students.

Situational Crisis Communication Theory

Situational crisis communication theory (SCCT; Coombs, 2007a) provides a strategic framework for organizations and various institutions on how to respond during a crisis or a disruptive event (see Figure 5). Coombs (2007a) discussed three crisis clusters, or types of crises, in his SCCT research: the victim cluster, the accidental cluster, and the intentional cluster. SCCT assists in lessening the negative impact of crises on the broader community by focusing on better communication strategies (Cardona, 2023; Pietroluongo, 2020).

Figure 5

Situational Crisis Communication Theory Diagram

Note. From “Situation Crisis Communication Theory,” by W. T. Coombs, 2007b, SlideShare (https://www.slideshare.net/wtcoombs/situational-crisis-communication-theory?next_slideshow=1). Copyright 2007 by W. T. Coombs.

The crisis managers of an organization evaluate the crisis type and relationship with the stakeholders to better understand how the stakeholders will respond to the organization’s communication amid the crisis at hand. SCCT describes the importance of honest communication channels, providing accurate information promptly, and showcasing compassion in addressing the anxieties of concerned stakeholders during the crisis (Abbas, 2023). SCCT has an application for organizations and businesses, but there is a need to apply it in the educational setting.

The application of situational crisis communication theory supports relevance in educational settings due to various crises that impact everyone involved (e.g., natural disasters, school shootings, public health emergencies, other disruptions of the learning environment). Educational leaders who establish communication protocols to distribute accurate and timely information to stakeholders showcases perceived empathy and creates trust in an organization during crises (Coombs, 2007a; Substance Abuse and Mental Health Services Administration, 2019). School leaders can build trust and resilience in the school community, which will allow school leaders to effectively navigate crises and minimize the disruptive effects of these events on students’ academic experiences and overall well-being. By implementing crisis communication plans that align with SCCT principles, education leaders can maintain trust, dissolve negative perceptions, and ensure the safety of the school community during crises (Roberts et al.,

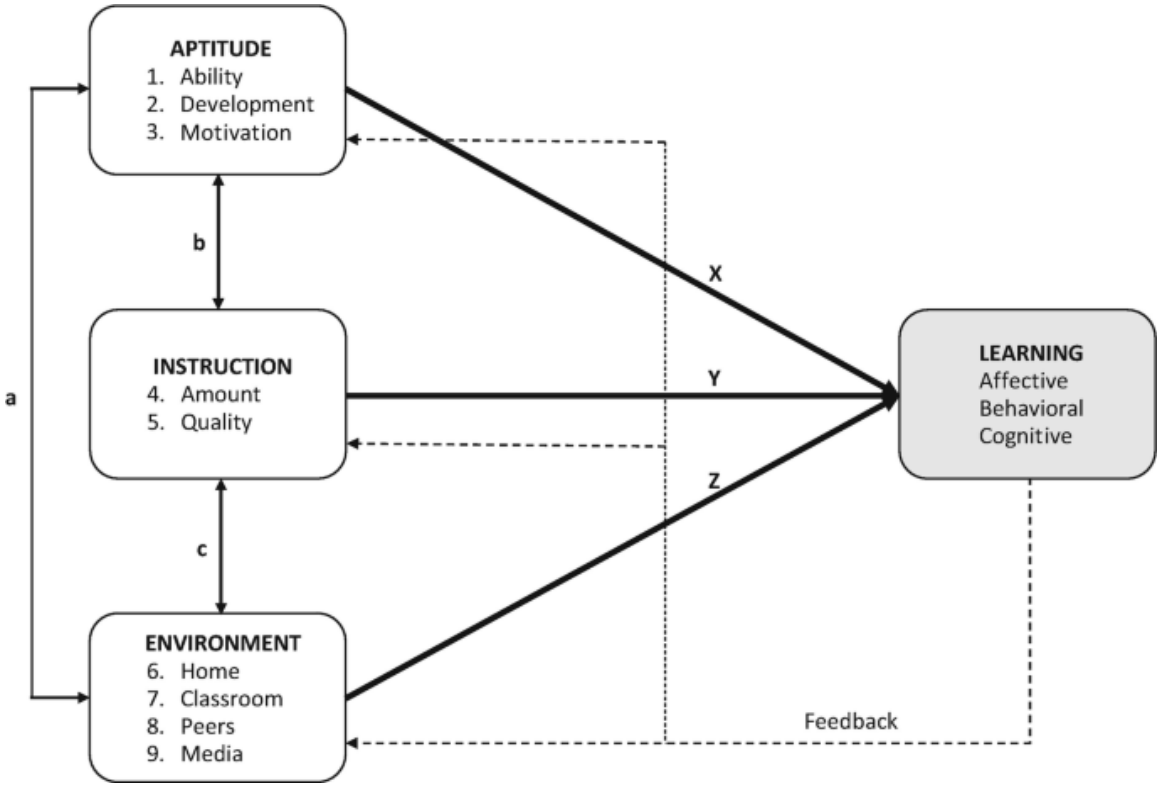
2023). The empathetic approach of SCCT in the education realm not only fosters a sense of security and trust in the community but also promotes a culture of resilience.

Theory of Academic Achievement

The theory of academic achievement, made famous by Reynolds and Walberg in 1992, investigates the dynamics between students' motivational beliefs, goal orientations, and self-regulatory processes in shaping their academic performance. Walberg took his influence from previous research, who investigated and identified 28 categories that influence students learning in terms of psychological factors as the most efficient path toward positive change (Greenberg et al., 2003; Wang et al., 1977). Background influences, such as school policies, were less influential in learning outcomes (Wang & Walberg, 1977). Walberg's theory (see Figure 6) emphasized the significance of promoting academic self-efficacy and cultivating intrinsic motivation to enhance students' academic achievement and engagement in the classroom (Reynolds & Walberg, 1992). By recognizing the many different influences of academic success, educators can implement strategies that foster a culture of academic excellence, motivation, and lifelong learning among students.

Figure 6

Walberg's Theory of Academic Achievement



Note. From "A Framework for Scholarship on Instructed Learning," by M. H. Molenda, 2002, in B. Hokanson, M. Exter, A. Grincewicz, M. Schmidt, & A. A. Tawfik (Eds.), *Learning: Design, Engagement and Definition. Educational Communications and Technology: Issues and Innovations,* p. 3 (https://doi.org/10.1007/978-3-030-85078-4_1). Copyright 2002 by Springer.

The integration of Walberg's theory of academic achievement in education involves the implementation of self-reflection and identifying factors affecting students' learning overall. Walberg identified the nine key variables that affect student outcomes, which are important for school learning (Reynolds & Walberg, 1992). Walberg worked

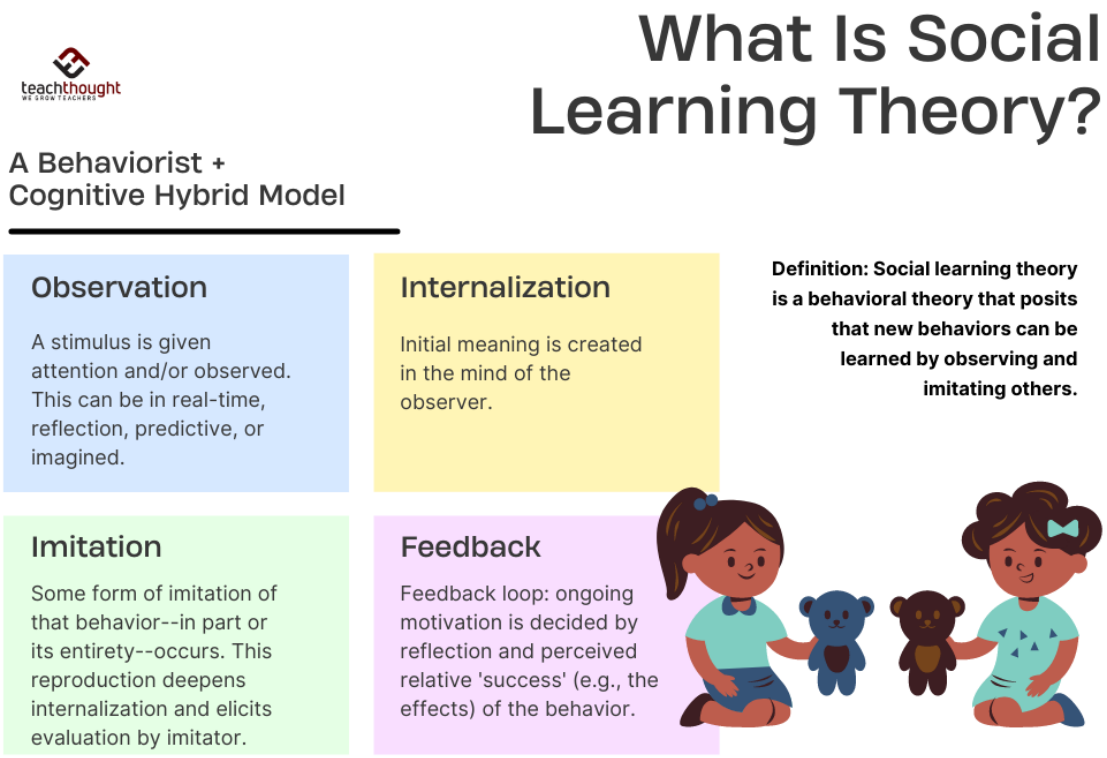
with Wang to identify what other factors impact student achievement. Their research showed mental, school, and home environment characteristics had more of an impact on student educational achievement than demographics or policies made at the state, district, or school level (Wang et al., 1997). By prioritizing learning experiences and fostering a supportive and nurturing academic environment, educators can empower students to develop a sense of academic pride, resilience, and self-efficacy.

Social Learning Theory

Social learning theory (Bandura, 1977b) explores the role of observation, imitation, and modeling in the learning process in children. Bandura investigated the role of observational learning in academic behaviors and self-efficacy beliefs among students. Social learning theory (see Figure 7) involves creating productive learning environments that promote positive academic behaviors. According to Bandura, students learn subject knowledge from their teachers and they also learn social and behavioral norms and expectations by observing and imitating their educators and their peers around them (Main, 2022). By understanding the influence of these social interactions on student's academic performance and development, educators can create a classroom culture that leads students in a positive manner.

Figure 7

Social Learning Theory



Note. From "What Is Social Learning Theory?" by TeachThought, 2022, (https://www.teachthought.com/learning/what-is-social-learning-definition/). Copyright 2022 by TeachThought.

Using social learning theory in education involves the implementation of cooperative learning strategies and peer mentoring programs that promote positive behavior construction and academic engagement. Morgan (2014) discusses the impact of modeling and observational learning on students' mathematical problem-solving skills and the development of these tools in mathematics education. Teachers play an important

role as models for academic success and knowledge. They also display the desired attitudes and behaviors in the classroom, but they are not the only role. There is an association between modeling the student's learning from their peers and the student's academic engagement and performance across various subjects (Delfino, 2019). Bandura's (1977a) social learning theory showcases the influence of observation, imitation, and social reinforcement on students' academic behaviors and performance. By using this information in their classrooms, educators can create learning environments that will yield students' academic success with rediscovered resilience and self-efficacy.

Theoretical Framework

Bandura's (1977a) social learning theory emphasizes the role of self-efficacy beliefs in shaping individuals' behaviors, motivations, and achievements. Defined by Bandura (1977a, 1977b, 1986, 1997), self-efficacy refers to one's belief in their ability to perform tasks, achieve goals, and overcome challenges in specific domains. Students with high self-efficacy tend to set higher goals for themselves, have greater perseverance when facing challenges, and use effective learning strategies to accomplish academic tasks. The theory of self-efficacy is used in education to determine student academic motivation, student learning, and student capabilities in being able to self-regulate in their time of learning (Zimmerman, 2000). To understand the self-efficacy of the student, educators must try to understand the dynamic and complex cognitive functions of humans.

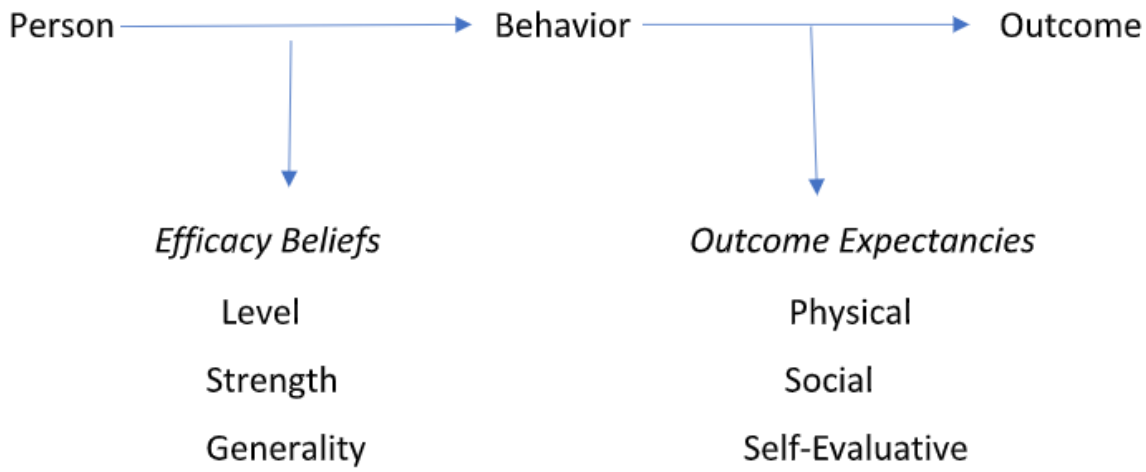
Self-efficacy stands as a powerful force that shapes individual behaviors, academic pursuits, and personal achievements. Self-efficacy beliefs are impacted by a variety of sources that do not necessarily function when in isolation (Bandura, 1997). For example, factors in a person, environmental influences, and behaviors all contribute to an

individual's self-efficacy. Individuals who have poor self-efficacy may have discouraging academic performance that results in a feedback loop that continues this self-fulling mindset that they are not capable (Margolis & Mccabe, 2006). On the converse, individuals who have a stronger self-efficacy will be more likely to have a growth mindset and believe they can work through difficulties.

Self-efficacy beliefs vary in level, strength, and generality. As shown in Figure 8, the outcomes that flow from one's behavior can take the form of positive or negative physical, social, and self-evaluation effects. There are four sources of information that influence self-efficacy beliefs: mastery experiences, vicarious experiences, verbal persuasion, and affective states (Bandura, 1994). To better use Bandura's research in K–12 education, these four self-efficacy beliefs will be renamed academic achievement, behavior, mindset, and social connections as the COVID-19 global pandemic challenged K–12 students with their self-efficacy.

Figure 8

Conditional Relationships Between Efficacy Beliefs and Outcome Expectancies



Note. Adapted from *Self-Efficacy: The Exercise of Control*, by A. Bandura, 1997, W. H. Freeman. Copyright 1997 by W. H. Freeman.

Academic Achievement

The first source of self-efficacy that Bandura (1977) found is related to mastery experiences. For this study, academic achievement is defined as the content standards, the academic knowledge, behaviors, and skills students are expected to learn and demonstrate in a performance task (Bandura, 1997; Logan et al., 2017; U.S. Department of Education, 2022). Academic achievement relates to succeeding on a difficult academic task and this mastery provides the strongest influence on self-efficacy (Bandura, 1994). An individual's interpretation of success raises self-efficacy and an experience that was perceived as a failure weakens it. However, it is not as simple as saying success equates to greater self-efficacy and failure equates to poorer self-efficacy. The impact of the experience on an individual's self-efficacy is determined by how the individual processes their own experience of the task (Bandura, 1997).

Behavior

The second source of self-efficacy is that of vicarious experiences. For this study, *behavior* is defined as the way of learning allowing people to learn from the experience of what others are doing and evaluating their behavior; in the classroom, students are academically engaged, respectful, and/or disruptive and learn those beliefs by observing their peers (Bandura, 1997; Bicard & Bicard, 2012; Chafouleas et al., 2009). This behavior is showcased when an individual observes someone else successfully performing a task, internalizing the behavior they observed, and replicating it as they saw

others being rewarded for their success. An example of vicarious experience would be if a trusted mentor advised the individual on different colleges that would be suitable for their major. How the individual's self-efficacy is impacted is determined by how they process the behavior they have observed and their self-efficacy can be affected by the level of trust the individual has for the mentor (Bandura, 1977, 1986, 1993, 1994, 1997; Deane et al., 2022).

Mindset

The third source of self-efficacy is that of verbal persuasion. *Mindset* is defined as the impact words have on someone (Ackerman, 2018; Bandura, 1997). The impact of the words can be positive or negative depending on where the source of the information stems from. How the individual absorbs the content being told to them is what has an impact on that individual's mindset in their self-efficacy (Bandura, 1986, 1997). The mindset of being able to tackle a task stems from others believing that they are able to succeed in that task. An individual can have a higher success of self-efficacy when they are being told they are capable by someone believed to be trustworthy (Arteaga, 2023; Pfitzner-Eden, 2016). An example of having a strong mindset would be if a trusted teacher cheers on a student for their capability of performing the task and their resilience in it. The self-efficacy of one's mindset depends on how the affirmation is framed and the credibility of the source saying the affirmation (Hattie & Timberley, 2007). One's mindset and perceived capabilities as affirmed by a trusted source serve in assisting their potential achievements and success in life.

Social Connections

The final source of self-efficacy is affective states, sometimes known as physiological arousal or physiological feedback. A person's *social connection* is defined when their emotional or physical state impacts their perception of being able to complete a task in each situation, often by their environment and social circle (Ackerman, 2018; Bandura, 1994, 1997). These emotions being influenced by an individual's family or friends can affect their strong or poor self-efficacy of a task, even before a task is attempted. Individuals who have a positive affective state are likely to say their social connection energizes them and raises them. Those with a negative affective state are likely to say their social connection brings them down and hinders them from succeeding (Chen et al., 2004). A common example of this would be when a stressful situation around friends or family affects the performance of the individual, like on a mathematics test for school. Figure 9 details the four sources of efficacy.

Figure 9

Theory of Self Efficacy

Note. From "Sources of Efficacy," by MoEdu-Sail (https://www.moedu-sail.org/topic/essential-function-1-unpacking-ctes-impact-on-student-learning-2/). Copyright by MoEdu-Sail.

Rural Communities and Schools Before, During, and Post Pandemic

Rural schools offer a unique challenge and opportunity impacting the academic, social, and cultural fabric of the people in these communities before, during, and after the COVID-19 global pandemic. The National Center for Education Statistics (NCES) described, as of 2008, there exist about 7800 rural school districts around the United States with 11 million students enrolled in these schools (Teach.com, 2023). Additionally, 42% of the school districts in the United States are designated rural, and these districts serve 15% of the entire country's students, which is about 11.3 million

different students (McLaughlin et al., 1997). Rural schools, and the communities in which they exist, deal with troubles that their urban and suburban counterparts do not. Rural communities can be impoverished and are sometimes not connected to the assistance that government and nonprofit agencies provide to urban and suburban communities (Parks, 2021). This disconnect from government and nonprofit assistance caused issues in rural communities and how well they could have flourished.

Even before the COVID-19 global pandemic, rural schools had their challenges to manage. Rural students were able to compete with urban students from K–12, but with no way to pay for their higher education, rural students are limited with their options of jobs (Lumina Foundation, 2019). Furthermore, their K–12 schools left them unprepared for the real world due to the lack of teachers, and due to this disparity, they have problems with money, childcare, and health in the future. These schools had to deal with lower population density, higher poverty rates, and limited access to the Internet before the pandemic even started, which caused a lot of issues in the realm of education (Gao, 2022). For these students to have been successful during distance learning, they needed to have fast enough internet to access video conferencing and classroom material. However, in late 2019/early 2020, about 20% of Americans still did not have access to high-speed internet (Federal Communication Commission, 2020; Gao, 2022; U.S. Department of Agriculture, n.d.). The rural communities and families also suffered before the pandemic in other ways. Before the pandemic, these rural communities suffered from economic instability and physical health and the pandemic furthered the decline of situations (Buffington & Tieken, 2020). The rural communities were suffering before the pandemic, and COVID-19 further disadvantaged them.

During the COVID-19 global pandemic, rural communities encountered unique challenges while demonstrating resilience and adaptability with their allotted resources. As described previously, rural communities do not have access to faster internet, and rural schools have difficulty recruiting teachers and principals (Federal Communications Commission, 2020; Parks, 2021). Due to these issues during the pandemic, having access to rural communities suffered and impacted parents and students alike. Rural communities had technology problems due to multiple devices not being able to be supported by their internet provider, which caused issues for parents who were forced to work at home and students to do schoolwork (Alpago & Alpago, 2020; Lai & Wildmar, 2020). Rural communities were challenged due to their disadvantages and systemic barriers; in turn, they adapted to their environment as they have in the past. The rural communities needed to change their mindset, create a peer mentoring program, and review elements of their rural location to succeed in a post-COVID world (Freeman & Weaver, 2021). Although there is a lot of research and articles about rural communities and the schools that exist in them, further research is needed to assist rural schools in a post-COVID world.

Despite the focus on educational impacts during the COVID-19 crisis, there is a gap in understanding the challenges and resiliency of rural schools, highlighting that they are overlooked in pandemic-related research. A deputy assistant secretary for rural outreach at the U.S. Department of Education searched for “rural” in education programs and was unable to locate information about them (Parks, 2021). Furthermore, research has discussed rural schools in the Midwest and other countries, but not rural districts in California (Mukuka et al., 2021; Myers et al., 2021). There has been information about

rural businesses and how they succeeded during the pandemic, but not how rural communities and schools were resilient throughout the pandemic (McIntyre & Roy, 2023; Ngo, 2022). Gao (2022) mentioned that high school students had poor mental health during the pandemic, but there is no research to discuss what these students' mental health was like after the pandemic ended. The COVID-19 global pandemic highlights a need for research that addresses rural communities and the students in them.

Mathematics Teachers in Education Before, During, and Post Pandemic

Mathematics teachers play a pivotal role in developing students' problem-solving abilities and critical thinking skills. Their duties and teaching capacities need to evolve to stay present with best-practice teaching approaches. The 20th century saw the emergence of educational psychology and advancements in teaching methodologies, which influenced new curricula and integrated technology into instruction (Obersteiner et al., 2018). The end of the 20th century and the start of the 21st century witnessed ongoing reforms in mathematics education, including the development and implementation of the Common Core State Standards for Mathematics in 2010 (California Department of Education, 2023). The role of mathematics teachers expanded to focus not only on computational skills but also on conceptual understanding, critical thinking, and real-world applications. Professional development training and the integration of technology into teaching practices have become important in mathematics teacher preparation and growth. Mathematics education has witnessed significant shifts both before and during the COVID-19 global pandemic, which has influenced teaching methods made by educators.

Before the pandemic, mathematics teachers used traditional face-to-face teaching methods to instruct their students. The effectiveness of interactive classroom practices, collaborative problem solving, and the integration of technology assist in enhancing students' mathematical understanding (Bukhatwa et al., 2022). Mathematics teachers who use hands-on activities, group work, and individualized instruction cater to the diverse learning needs of their students. Individualized instruction by mathematics teachers uses a blend of direct instruction, textbook-based learning, and teacher-led group activities where students are the focus to assist in further developing and improving their mathematics skills (Matific, 2021). Mathematics teachers had to balance between traditional methodologies and evolving strategies, focusing on conceptual understanding, problem-solving skills, and a commitment to engaging mathematical instruction for all their students.

During the COVID-19 global pandemic, mathematics teachers experienced a major educational transformation, navigating the uncharted territory of remote learning while striving to maintain effective mathematical instruction for their students. After March 13th, 2020, teachers were tasked to use unfamiliar tools and resources to instruct their students by delivering their teaching from home (Engelbrecht et al., 2023). This shift in online teaching required teachers to adapt to their students' needs. Many teachers had never taught an online course and had to change their traditional way of teaching to be more interesting and entertaining to keep their students engaged in their studies (Hodges et al., 2020; Mulenga & Marbán, 2020). Mathematics teachers had to adapt their content to an online environment, which caused an issue in making sure that all students had access to these learning resources. Mathematics teachers needed to have virtual

manipulatives, video tutorials, and interactive software to make sure students were engaged and learning while in a remote environment (Alabdulaziz, 2021). With the shift to remote instruction, mathematics educators needed to accurately assess what their students were learning in an online environment. Mathematics educators had the challenge of assessing student learning effectively in online settings and maintaining connections with their students in a remote environment (Hodges & Fowler, 2020). The COVID-19 global pandemic presented mathematics teachers with unprecedented challenges; therefore, there is a critical need for further research to address insights into future educational strategies.

The COVID-19 global pandemic forced mathematics teachers into an unforeseen realm of remote instruction, which unveiled noticeable voids in educational research. Students in wealthier districts made significant progress in math during remote learning while the students in poorer districts fell behind (Walters, 2022). Although the achievement gap had been identified long before COVID-19, there is little research on the educational impact of the COVID-19 global pandemic in terms of the achievement gap in high school mathematics. These poorer districts had teachers return to foundational mathematics to help students improve their mathematical skills prior to learning the current curriculum (NCTM, 2020a). The students from low socioeconomic status fell further behind their financially stable peers, which widened the already existing achievement gaps in mathematics classrooms of all grades. There exists limited research about U.S. high school mathematics classrooms and the impact of COVID-19; most of the educational research done is based on middle school or higher education mathematics classrooms (Bellamy, 2021; Moliner & Alegre, 2022; Myers et al., 2021;).

The dearth of research necessitates further investigation of the educational experiences and long-term impacts on high school mathematics education after COVID-19.

Conclusions

The review of literature showcases the evolution of self-efficacy from the beginning of Bandura's (1997) social learning theory. The research has expanded to focus on the area of education and how self-efficacy affects the learning outcomes of students. Limited research studies have revealed the need to gain a deeper understanding of self-efficacy in the lives of rural high school mathematics students to better understand how to support these students' self-efficacy. The intention of this study is to discuss with expert high school mathematics teachers about their experiences during the COVID-19 global pandemic and how it affected their student's lives in terms of self-efficacy.

Synthesis Matrix

Synthesis matrixes are a useful tool that provides an organized list of references categorized by variables or key terms to provide a visual of the various cited sources used throughout the research study (see Synthesis Matrix in Appendix A).

CHAPTER III: METHODOLOGY

Quantitative research is used by researchers to observe certain occurrences that are affecting a particular group of people. Quantitative researchers use numerical data to find patterns and make predictions to establish relationships and explain causes of change (McMillan & Schumacher, 2010). By using scientific inquiry, quantitative researchers rely on data to examine questions about the population being observed (Allen, 2017). Both quantitative and qualitative research methods collect data designed to minimize bias and help to understand a phenomenon that is under study (Patten & Newhart, 2018). Qualitative researchers offer depth and richness to understanding human experiences of narratives, emotions, and meanings by looking beyond numbers and statistics. Qualitative researchers interview people or observe settings and analyze data by reviewing the transcript of what occurred during the interview and/or looking through the field notes of what was observed (Patton, 2015). Qualitative research is important to a diverse audience of scholars who seek a deep understanding of a social phenomenon.

Research methods must be tailored to the research setting and target audience. It was critical for the researcher of this study to select the most suitable method to produce valid information. A qualitative phenomenological methodology was used in this study to describe the lived experiences of rural mathematics teachers on the academic achievement and mental health effects of the COVID-19 global pandemic on freshman students returning to school after being online for 2 years. This chapter describes the research methodology used in this study, which includes a description of the study purpose statement, research questions, research design, population, target population, sample, instrumentation, data collections, data analysis, and limitations. A

phenomenological study provides insight into experiences of the participants to gain an understanding of their perspective during a phenomenon (McMillan & Schumacher, 2010). This qualitative method was appropriate for its use of interviews and analysis of behaviors of the unique lived experiences of the study participants.

Purpose Statement

The purpose of this phenomenological study was to determine rural mathematics teachers' lived experiences on the effects of the COVID-19 global pandemic on freshman students returning to school after being online for 2 years with regard to the domains of academic achievement, behavior, mindset, and social connections.

Research Questions

The following research questions guided this study's research:

1) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to academic achievement?
2) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to behavior?
3) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to mindset?
4) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to social connections?

Research Design

A qualitative research design was chosen for this study to explore the lived experiences of rural high school freshman mathematics teachers on their students returning to school after distance learning. Qualitative phenomenological studies examine the experiences and individual observations of a population by collecting and compiling data to provide a descriptive narrative of their lived experiences (Alhazmi & Kaufmann, 2022; Patton, 2015). Phenomenological studies examine human experiences through the descriptions provided by the people involved. The goal of phenomenological studies is to describe the meaning that experiences hold for each subject. Further, phenomenology is used to study areas in which there is little knowledge (Donalek, 2004; Neubauer et al., 2019). Although many studies discuss rural teachers and students, there are few studies that inquire about rural high school freshman mathematics teachers. In this study, the phenomenon studied was the effects of the pandemic on students returning to school as experienced by rural high school freshman mathematics teachers. The study used one-on-one interviews to gather data and understand rural high school freshman mathematics teachers' experiences. From that data, the researcher analyzed the interview transcripts via Zoom to develop the themes that became the findings of the study.

McMillan and Schumacher (2010) described phenomenology as a way of collecting data to more easily understand an experience of a situation. Using a phenomenological qualitative research design allowed a deep dive by looking at the essence of the experience these rural mathematics teachers had over their 2 years of distance learning. The following research process was used for this phenomenological methods research study: a research problem was identified, a literature review was

conducted, a purpose statement was formulated, and the study research questions were created and aligned to Bandura's theory of self-efficacy framework which identified the research variables as academic achievement, behavior, mindset, and social connections. A qualitative interview study was conducted on nine voluntary participants, data were collected and analyzed, interviews were transcribed, themes were deduced, and a conclusion of the study findings was created.

Population

A population is a group of individuals, objects, or events that meet certain requirements and is used to generalize the study's findings (McMillan & Schumacher, 2010). This study included data from teachers enrolled in schools across the United States. In the United States, there are currently 4,007,908 teachers; this includes all K–12 public and private schools, adult education, and career/technical schools (Staake, 2023). According to demographics and statistics, there are over 1.4 million math teachers currently employed in the United States (Zippia, 2023).

Target Population

The target population is often different from the population that the sample is selected (McMillan & Schumacher, 2010). The researcher narrowed the population from the total teachers in K–12 education to a representative target population of the rural high school group. The target population represents a larger population delimited to a smaller number due to time, money, geography, and other constraints posed by the challenge of studying every individual (McMillan & Schumacher, 2010; Patton, 2015).

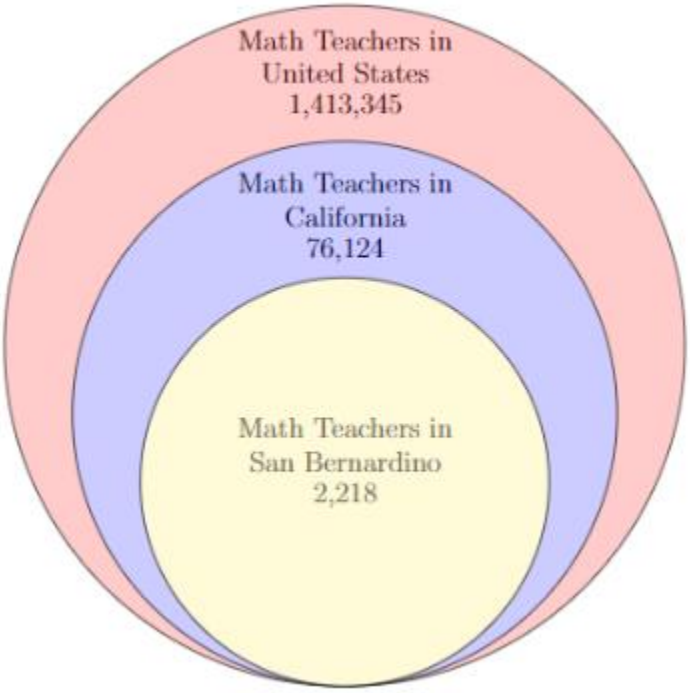
The target population for this study was rural districts in San Bernardino, California. In 2022–2023, there were 34 public school districts in San Bernardino County, varying with 20 Unified School Districts and two High School Districts (Education Data Partnership, 2023). During the 2022–2023 school year, there were 67 High Schools (Education Data Partnership, 2023). San Bernardino County had a total of 2,218 math teachers in 2023 (California Department of Education, 2023; Zippia, 2023). There were three districts chosen for this study and were given pseudonyms to protect the participants in remaining confidential. District 1 had 18 high school mathematics teachers, District 2 had 23 high school mathematics teachers, and District 3 had 39 high school mathematics teachers, based on each district's website in 2023.

Sample

The sample of a study is the group of subjects or participants from which the data are collected who represent the intended population (McMillan & Schumacher, 2010). The sample can be selected from a larger group of persons named the target population. Figure 10 demonstrates a visual representation of the population, target population, and sample.

Figure 10

Population of Teachers in San Bernardino



Note. Red is the population, blue is the target population, and yellow is the sample.

For this study, purposeful sampling was used as the sample participants were from the population that provided information and data about the study (McMillan & Schumacher, 2010). The researcher worked in the same geographic county as the target population and the sample. Purposeful sampling was used because the subjects chosen would provide the best information to address the study (i.e., expert teachers). The criteria for individuals to participate in the study included (a) must have been employed in a high school public school setting for a minimum of 5 years, (b) must have taught a minimum of one section of freshman Integrated Math 1, or an equivalent class, before,

during, and after the COVID-19 global pandemic, and (c) must have been employed in San Bernardino County, California.

Participants were close to San Bernardino County, California, and readily accessible to the researcher. The participants responded to the researcher's request to participate in face-to-face interviews or by Zoom, a video conferencing tool, and were willing to voluntarily participate in the study. Along with purposeful sampling, convenience sampling was used as the sample participants were easily accessible and willing to be a part of the study (McMillan & Schumacher, 2010). Convenience sampling involves a group of subjects selected based on being accessible due to this being the best the researcher can find in part due to constraints, efficiency, and accessibility. Convenience sampling is most frequently used in quantitative studies as participants are more readily accessible to the researcher, which means they are more likely to be included (Suen et al., 2014). Due to the interest in rural high school freshman mathematics teachers' lived experiences, it was determined by the researcher to interview expert or master mathematics teachers rather than the sample of all mathematics teachers (McMillan & Schumacher, 2014).

The researcher identified and created a list of potential study participants working in San Bernardino County, California with the help of high school mathematics colleagues. The researcher contacted potential participants who were willing to participate by email and/or phone (see Appendix B) to explain the research purpose and the objective of the study, procedures, and their rights while participating in the study. The email sent to study participants extended an invitation to participate in the study, provided the expected timeline for where interviews would take place, and explained it

was fully voluntary and they had a right to opt out at any point in time. Once nine participants were identified, and the researcher received confirmation of their intent to participate, participants were sent informed consent materials (see Appendix C). Once materials were returned, participants were asked to provide their availability for a 1-hour interview to be conducted with an in-person face-to-face interview at their job site location or by Zoom at their discretion, and interviews were scheduled and administered.

In this study, for convenience, financial, accessibility, and practical purposes, the researcher narrowed the study to San Bernardino County, California high school mathematics teachers who met the study participant criteria. Data gathered from the study were used to analyze the lived experiences of rural freshman mathematics teachers on the effects of the COVID-19 global pandemic on freshman students' academic achievement and mental health.

Instrumentation

The most used type of instrumentation for collecting data when conducting qualitative research is interviews. Interviews can be structured, unstructured, or semistructured (Creswell & Creswell, 2018, McMillan & Schumacher, 2010). Semistructured interviews that contain open-ended questions intend to answer the study's research questions by linking the questions to the purpose of the study (McMillan & Schumacher, 2010). Furthermore, the researcher follows a protocol of asking the same interview questions in the same order to each of the participants in the study. For this phenomenological study, the thematic researchers and faculty members worked collaboratively to develop and create an instrument consisting of six standardized, open-ended interview questions and two follow-up questions aligned to the study's research

questions, purpose of the study, and theoretical framework (see Appendix D). The interview questions aligned with Bandura's (1977a) theory of self-efficacy with four variables: academic achievement, behavior, mindset, and social connection. The researcher maintained alignment and consistency by adhering to a scripted interview protocol (see Appendix E) during the interview process with all study participants.

The thematic research group was made up of nine doctoral students guided by three faculty members. The thematic research group and faculty were divided into three teams based on the sample population they were each working with. The faculty members provided guidance and support to ensure alignment with the research questions and purpose of the study and control for bias. Although it is impossible to completely avoid bias, there are two types of bias to manage: participant bias and researcher bias (Shah, 2019). The researcher can minimize bias by staying objective to the research, asking a colleague or mentor to review the interview questions for bias, which indicates transparency of the participant recruiting process, and providing unbiased analysis and reporting of the study (Shah, 2019).

Under the direction and supervision of an experienced thematic faculty member, a field test was conducted, with the researcher as the interviewer, the study participants the interviewees, and an observer who provided feedback regarding the process. The field test interview (see Appendix F) was recorded to allow the researcher to analyze and obtain valuable information regarding the pilot test experience and interview process. The field test allowed the researcher to assess their interview skills, gain experience, increase their knowledge and confidence, and assess necessary revisions, changes, and improvements to the research study (see Appendix G).

Validity and Reliability

To gain insight during qualitative research, the researcher must have credibility in the findings, transferability in other contexts, dependability in the findings to be consistent and repeatable, and confirmability in the findings to have no bias (Sutton & Austin, 2015). In qualitative research, validity is having the appropriate tools and processes to gather accurate data during a research study (Leung, 2015). Validity is used to discuss how researchers measure their data, such as tests, questionnaires, or interviews (Patten & Newhart, 2018). Validity refers to the accuracy of interpretation of mutual meaning among study participants and the researcher (McMillan & Schumacher, 2014). Something is reliable when the test results which were measured are consistent (Patten & Newhart, 2018).

To enhance validity and reliability, the researcher followed strict interview protocols, adhering to confidentiality, ethical standards, and procedures with all study participants ensuring the validity of the interview data collection. The researcher recorded the interviews, used transcription and intercoder reliability to transcribe the interviews for accuracy, and deduced themes. The interviewer captured direct quotes from participants and used them to provide rich details that described their lived experiences about students' academic achievement, behavior, mindset, and social connections. The researcher analyzed the themes and measured the perceptions to create findings.

To further enhance validity and reliability, researchers use data triangulation techniques to support the consistency and accuracy of the information gathered from different sources. Researchers obtain this by corroborating data from various sources, such as interviews and observations, to enhance the overall reliability of the findings

(Patten & Newhart, 2018). Data triangulation is about using several data sources, referring to more than one individual as a source for data (Mathison, 1988). The researcher collaborated with the thematic team members and used the NVIVO software to support the triangulation process. The interview recordings were verified and transcribed for accuracy by the researcher and a copy was provided to the participants to review and check for accuracy.

Data Collection

Data collection in this study was done through interviews. Before starting data collection, the researcher completed the National Institutes of Health training course on human subjects research for social–behavioral–educational researchers (see Appendix H). In addition, prior to the data collection the researcher obtained approval from UMass Global University Institutional Review Board (see Appendix I), which provides ethical and regulatory oversight on research conducted on human subjects (National Institutes of Health, n.d.).

The primary methods of data collection in this study were semistructured, open-ended interviews conducted on nine rural high school freshman mathematics teachers serving public schools in San Bernardino County, California. The reason for conducting qualitative research is to "provide insights on interpretation, context, and meaning of events, phenomena or identities for those who experience them" (Patten & Newhart, 2018, p. 34). The researcher engaged participants in a structured interview with questions that were exploratory and open ended (Patten & Newhart, 2018). Qualitative studies provide insights into themes and data that can be presented via in-depth narrative format. The 60-minute interviews were scheduled via zoom or face to face in person and took

place in February and March 2024. The interviews were recorded and transcribed and downloaded and saved using a password-protected thumb drive and saved in a locked cabinet.

Interview Process

Throughout the study, the researcher served as the data collector. Each of the nine participants who agreed to be a part of the study and be interviewed were scheduled for an interview. Before each interview the study participants received documents that consisted of an informed consent and audio recording release (see Appendix J), University of Massachusetts, Global Institutional Review Board research participant bill of rights (see Appendix K), and a copy of the interview questions (see Appendix D) for their review. Once given the documents, participants were asked to review for clarity, and then to sign the consent form. Participants were asked if they preferred face-to-face or Zoom interviews. The day of the interview, the researcher followed an interview protocol that was consistent and scripted for every participant, followed ethical standards of participant confidentiality, and ensured obtained informed consent. Once the researcher obtained consent, the researcher began the interview following a protocol guide with a script that explained the purpose of the study, discussed confidentiality and privacy protections, time frame, voluntary nature of the study and interview, and provided an opportunity to ask clarifying questions before starting. The recording began once consent was obtained and clarifying questions were addressed. Throughout the interview, the researcher followed the interview protocol, which guided the six interview and probing questions. Prompt questions were also included to encourage a comprehensive response. The interviews were about 60 minutes long. At the completion of the interview, the

researcher thanked the participants for their time and participation. The researcher recorded and transcribed the interviews for accuracy using the Zoom embedded features. The researcher provided participants with a copy of the transcription.

Data Analysis

Once the researcher provided a final copy of the proposal, it was reviewed by a faculty dissertation chairperson and two faculty committee members reviewed the data collections instruments, researcher methods, validity and reliability methods, and limitations. The faculty committee members then approved the study and the dissertation chairperson submitted the research proposal to the University of Massachusetts Global Internal Review Board for approval to conduct research. This multilayer process of study design and methodology significantly contributed to the validity and reliability of the study's research collection methods, data analysis and findings.

Data analysis is defined as "an inductive process of organizing data into categories and identifying patterns and relationships among the categories" (McMillan & Schumacher, 2014, p. 395). The researcher met with thematic members to collaborate and triangulate the data using the NVIVO intercoder data collection software system for analysis and reliability purposes. The data analysis was a careful, tedious process that required paying attention to detail, labeling, categorizing data, recording frequencies, and identifying themes.

The intercoder reliability process consisted of cross checking for consistency. During this process, the researcher sent the transcribed interviews to a faculty member to compare themes and phrases that matched, to further ensure accurate data analysis. The

data were organized into themes, coded, and the study analysis was completed. The data and notes were destroyed a month after the study was published.

Limitations

The limitations of a study explain the weaknesses of research design that could influence results and conclusions of the research study (Ross & Zaidi, 2019). Is important for researchers to present complete limitations of a study as they have a duty to uphold academic standards. A study design limitation is the participants are from the San Bernardino geographic region. In addition, study participants are rural high school freshman mathematics teachers. The study did not include high school mathematics teachers working in charter schools, private schools, and not working in a school setting. The researcher did not make the study designed to consciously limit to whom the findings can be generalized to based on "a particular age group, sex, race, ethnicity, geographically defined region, or some other attribute" (Ross & Zaidi, 2019, p. 262). Limitations for the sample size in qualitative research arise from different circumstances such as time and funding constraints, or participant availability (Ellis, 2016; Viera, 2023). There was no monetary incentive for participants, they volunteered their time, and were willing to participate.

Summary

This chapter presented an overview of the phenomenological qualitative research design used in the study and a detailed description of the methodology. The purpose statement and research questions were included and an explanation of why a qualitative phenomenological approach was appropriate for this study was provided. A description of the population, target, and sample population was included, and the instrumentation

methods, validity and reliability were described. The chapter included the data collection process, the interview process, the protocol in the study, a description of the analysis process, and finally a discussion about the study's limitations.

CHAPTER IV: RESEARCH, DATA COLLECTION, AND FINDINGS

Chapter IV presents the findings for the current study. The chapter includes a review of the purpose statement, research questions, population, sample, and demographics. The chapter then presents qualitative data findings regarding the perceptions of K–12 rural high school freshman mathematics teachers following the pandemic. This study used Bandura's (1977a) theory of self-efficacy as the theoretical framework and academic achievement, behavior, mindset, and social connections as the research question variables.

Purpose Statement

The purpose of this phenomenological study was to determine rural mathematics teachers' lived experiences on the effects of the COVID-19 global pandemic on freshman students returning to school after being online for 2 years regarding the domains of academic achievement, behavior, mindset, and social connections.

Research Questions

The following research questions guided this study's research:

1) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to academic achievement?
2) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to behavior?

3) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to mindset?
4) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to social connections?

Research Methods and Data Collection Procedures

This qualitative phenomenological study examined the experiences and individual observations of K–12 rural high school freshman mathematics teachers following the pandemic using the following variables: academic achievement, behavior, mindset, and social connections. The researcher conducted one-on-one individual interviews with nine rural high school freshman mathematics teachers providing services in K–12 public school settings who met specific criteria to participate in this study. The interviews were conducted via Zoom and were recorded and transcribed with prior consent from participants. The consent forms, transcriptions, recordings and data obtained for the study were stored securely by the researcher for 3 years and then destroyed.

Population

The population for this study encompassed over 1.4 million math teachers currently employed in the United States (Zippia, 2023). Considering the researcher's time and resources, to make the population size more accessible, the researcher narrowed the population to a target population.

Target Population

The target population is often different from the population that the sample is selected. The researcher narrowed the population from the total math teachers in K–12 education to a representative target population of the rural high school group. The target population represents a larger population delimited to a smaller number due to time, money, geography, and other constraints posed by the challenge of studying every individual. For this study, the target population included 2,218 math teachers in San Bernardino, California. Purposeful and convenience sampling was used to gain access to participants in San Bernardino County in California (McMillan & Schumacher, 2010).

Sample

The sample of a study is the group of subjects or participants who represent the intended population and from whom data are collected (McMillan & Schumacher, 2010). The sample was chosen from the target population; for this study, it was composed of nine rural high school freshman mathematics teachers in San Bernardino County serving students in K–12 public schools. Participants were selected using purposeful sampling as the sample participants were from the population that provided information and data about the study (McMillan & Schumacher, 2010). Purposeful sampling was used because the subjects chosen would provide the best information to address the study (i.e., expert teachers). The researcher works in San Bernardino County, has knowledge of the participant population, and believes they were a good source of information to provide data on their unique lived experiences to contribute to this study. The criteria for individuals to participate in the study included (a) must have been employed in a high school public school setting for a minimum of 5 years, (b) must have taught a minimum

of one section of freshman Integrated Math 1, or an equivalent class, before, during, and after the COVID-19 global pandemic, and (c) must have been employed in San Bernardino County, California.

Demographic Data

The study included nine participants who met eligibility criteria to participate and voluntarily agreed to participate, signed an informed consent form, and were provided the University of Massachusetts, Global Bill of Rights prior to their participation. An email invitation was sent to potential participants explaining the study criteria with an invitation to respond if participants were interested in participating and met criteria for participation. The demographic data collected described the participants' age, gender, ethnicity, highest level of education, number of years serving as a high school mathematics teacher, and what grades they taught in the school setting. Table 1 represents demographic data that describe each participant, identified as Rural Freshman Mathematics Teacher (RFMT) 1 to RFMT 9.

Table 1

Participant Demographics

RFMT #	Age	Gender	Ethnicity	Highest Level of Education	Years serving as a teacher	Grade levels
1	55	Female	Caucasian	Masters	29	9th and 11th
2	28	Female	Hispanic/Latino	Masters	5	9th and 11th
3	32	Female	Caucasian	Masters	10	9th and 11th
4	30	Male	Hispanic/Latino	Masters	6	9th and 10th
5	34	Female	Caucasian	Masters	12	9th and 10th
6	38	Male	Caucasian	Bachelors	13	9th through 12th
7	40	Female	Caucasian	Masters	15	9th
8	31	Male	Hispanic/Latino	Masters	6	9th
9	31	Male	Hispanic/Latino	Masters	6	9th through 12th

Table 1 shows a summary of the demographic data collected from the nine participants. Participants' ages spanned from 28–55 years old. The gender of the participants included five women and four men. The ethnicity of the participants was four Hispanic/Latino and five Caucasian. Eight participants held a master's degree and one participant's highest degree earned was a bachelor's degree. The span of years the participants served in the school setting varied between 5–29 years, with a total of 102 years of experience. The span of the grades participants served in school settings was 9th to 12th grade, with all participants serving 9th grade students.

Validity and Intercoder Reliability

To enhance validity and reliability, the researcher followed strict interview protocols, adhering to confidentiality, ethical standards, and procedures with all study participants ensuring the validity of the interview data collection. The researcher used the same process during the interviews and all nine participants were asked the same questions. The researcher recorded the interviews, used transcription and intercoder reliability to transcribe the interviews for accuracy, and deduced themes. The interviewer captured direct quotes from participants and used them to provide rich details that described their lived experiences about students' academic achievement, behavior, mindset, and social connections. The researcher analyzed the themes and measured the perceptions to create findings. The interview recordings were verified and transcribed for accuracy by the researcher and a copy was provided to the participants to review and check for accuracy. To control for bias, interview transcriptions were verified for accuracy by the researcher in collaboration with the dissertation chair who was an experienced researcher.

Presentation and Analysis of Data

The researcher collected and analyzed data from nine voluntary participants to determine their perceptions of their experiences working with high school freshman students regarding their academic achievement, behavior, mindset, and social connections in their mathematics classrooms. These variables aligned to Bandura's (1977a) theory of self-efficacy framework. The researcher conducted one-on-one qualitative semistructured interviews via the Zoom platform. The interviews consisted of six open-ended questions and two follow up questions, with probing questions used to elicit further information or clarification. The researcher transcribed the interviews verbatim, after which the researcher sent over the transcribed interviews to the participants to confirm the transcription was accurate. The data that was collected was analyzed and coding was conducted to deduce themes to formulate a conclusion of the study findings.

Data Analysis for Research Question Academic Achievement

The academic achievement research question asked, "Which academic achievements do you feel impacted your student's self-efficacy more and why?" Table 2 shows the different themes, total participants, and total frequencies followed by a summary analysis of the data collected presented by the themes discovered and what the participants shared.

Table 2

Themes, Participants, and Frequency: Research Question Academic Achievement

Themes	Total participants	Total frequencies
Students lost ability to do mathematics	9	29
Students are using cheating tools	5	15
Students have lower work ethic and drive	7	22

Students Lost Ability to do Mathematics

All participants observed a learning loss in their students' ability to do basic mathematics skills with a frequency of 29. RFMT 1 shared:

> Now you're behind today because you didn't build in those skills. [They] don't know [their] math facts. [They] need to practice them. [They] got to do something outside of school and figure it out and get yourself caught up.

RFMT 2 shared:

> I've noticed that a lot of them lack the skills that they need to succeed, like multiplying. They should have learned that elementary school and practiced it a lot in middle school. I think that definitely impacted them because I feel like they were a little bit more like knowledgeable with just doing things in their head, but now they want to calculator everything.

RFMT 6 shared:

> Well, yeah, number fluency and flexibility. Like many students just don't have basic number sense. For example, the factors of 12, if I just ask them to Give me the factors of 12. It's a struggle and I already accepted that if I ask the whole class, students will be shy about answering that question, but working one on one with my freshman kids, they can't factor the number 12. That's a gut punch to just try to get them to solve equations or graph lines.

RFMT 9 shared:

> It seemed like there was less learning going on. It seemed like there was probably a larger gap or even less practice of their math skills because students weren't being actively monitored and supported during the COVID year of 2020/2021.

Students Are Using Cheating Tools

Six of nine participants observed students more inclined to use cheating tools, like PhotoMath or SymboLab or Mathway, like they did during distance learning with a frequency of 22. RFMT 1 shared:

> They were just cheating so much, and they got away with it so much. And now we're catching on to that, so they don't have those skills. And it's caught up to them, a lot of them, which is why they're not doing so well.

RFMT 2 shared:

> Oh yeah, definitely. I think it has grown so much. I feel like students were using Mathway a lot during COVID. I know there's other ones, but that's their favorite. I know there's a lot that they did before, but I feel like they kind of thought about it and would rather do that and they would ask questions about it later.

RFMT 3 shared:

> I think we are trying to raise those standards again to get students to achieve at high levels of academics and try to motivate them to honestly earn grades. I feel like a lot of kids got into some really bad habits, like cheating, so I definitely have not seen the same level of academic drive in students. Some students still have that because they've just never lost it, but a lot of students, have given up on academically achieving because they know that there's easier routes to take.

RFMT 4 shared:

> [The COVID-19 pandemic] pushed them to be very lazy in the sense of now they were alone all that time with these documents at home. And they've gotten very good at using like PhotoMath or ChatGPT and finding ways to cheat and upload evidence of work that obviously isn't theirs. It could definitely fool somebody into thinking, especially a teacher, that they really understand what they're talking about, but when you give them some kind of formal exam, it comes out anyway.

RFMT 5 shared:

> One of the struggles I've had here with students is a higher instance of cheating. That is one of our top frustrations as a math department and it's why a lot of us don't give homework anymore because when it goes home, it is not actually being accomplished. It's just being PhotoMath'd or WolframAlpha'd or Mathway'd. [They're] not actually doing it.

RFMT 6 shared:

> They try to pull it off as their own work. Before COVID-19, they were a little bit smarter about cheating and now, they don't really care, they're just going to copy it down. There definitely has been a lot more cheating and a lot more of, "Oh, I'm just using it because this shows you like to step by step." Of course, there's some students that use it for that, but for the most part, especially when I'm not in class, that's when they cheat the most.

Students Have Lower Work Ethic and Drive

Seven out of nine participants noticed students had less work ethic and drive like they did before and during distance learning with a frequency of 11. RFMT 1 shared:

> I think they may have poor work habits and if they had a little better work habit, they would catch on and they would do better and they would hopefully have more of a more self-motivation and feel good about themselves. But now, they can't build back up. They have shut themselves off like instead of let me try, let me get better.

RFMT 3 shared:

> I think that for many of them, because academic standards were so much lower, they kind of failed to rise to the occasion because there was no occasion to rise to. That has affected how open they are to learning new things and being able to try new things because they're so afraid of failure, rejection, or whatever it is that they're not really willing to try. I've noticed that a lot and that their attention span is lacking.

RFMT 4 shared:

> One of the big things I guess I notice with their behavior, is the ability to focus. That time period in which you have real focus has definitely shortened. I would say you get a max of 10 to 15 min of real focus that they're absorbing what you're saying. You can't, definitely after COVID, resort back to a traditional lecture where maybe you talk for 40 min and they do something for 20, they just don't have that attention span after COVID.

RFMT 5 shared:

> They don't want to attempt a hard thing without a grown up there to hold their hand. I see a lot of students that were capable of doing it before COVID. I have to hold their hand through like basic calculator work and they're like, "I don't know." It feels like they're not even willing to try it. I don't know if it's a fear of being wrong or a fear of looking dumb, but it felt like before they were willing to take risks and we've kind of lost that risk taking.

RFMT 6 shared:

> They are so risk averse. They lack courage to try anything math related so I've been trying to get off curricular math tasks with them because it's so scary and formal. I've been doing a lot of noncurricular thinking tasks just to get them to try and telling them anybody could solve this, just be creative.

RFMT 7 shared:

> The willingness to do homework or classwork is nonexistent now. When I first started teaching, I could assign 30, 40 problems, for the practice homework, and most of the kids would come back and would do it. If I assigned even 10 problems now, I'd be lucky if I had students complete 5 of them. It's shifted completely.

RFMT 8 shared:

> For specifically, freshman math, I strongly believe it's all about work ethic. I don't think the math is difficult, especially because a lot of the math that they see freshman year is almost identical to the math they saw eighth grade, right? So, I think so for me, I just refer to which student has the work ethic, versus one who is not motivated. For that work ethic kind of thing. I think a lot of it comes down to are they willing to get the work done?

Data Analysis for Research Question Behavior

The behavior research question asked, "Which behaviors do you feel impacted your student's self-efficacy more and why?" with a follow-up question of "What might be another experience that impacted your student's self-efficacy in terms of behavior differently? In what ways did that impact your student's self-efficacy?" Table 3 shows the different themes, total participants, and total frequencies followed by a summary analysis of the data collected presented by the themes discovered and what the participants shared.

Table 3

Themes, Participants, and Frequency: Research Question Behavior

Themes	Total participants	Total frequencies
Teachers were nicer to their students	6	15
Students became apathetic to education	6	22
Students have more phone usage now	8	34

Teachers had to be Nicer to Their Students

Six out of nine participants were nicer and more lenient to their students after the COVID-19 global pandemic with a frequency of 15. RFMT 1 shared:

> To help them to do something a little bit harder, a little bit different, we needed to be teaching it at a lower level than what we used to teach it at. We've tried to hold our bar pretty high this year, but we've still had to say, alright, go ahead and grab a calculator. We showed a lot of grace and said, skip those problems or don't worry about that or you could do these. We'll just move on type of thing.

RFMT 2 shared:

> The students thought I might as well just turn anything in because does it even matter what I turn in? I did notice a lot of teachers would also not even check anything their students were turning in, which is great for the student, but it was because they thought they were going to pass the class regardless.

RFMT 3 shared:

> I have one specific kid after the pandemic who was a very, very intelligent kid. She's reading at really high levels, her math scores are good, but socially she has very high levels of anxiety. She has a really good home life and feels a lot safer at home than she does at school. I know she's kind of been struggling emotionally, even though her grades are still good. I have had to help her and be more involved in helping other students because that is what they expected during distance learning.

RFMT 4 shared:

> During COVID, they could turn their camera off and mute themselves if they were distracted or needed to take a break. The first year after COVID, I think they were more excited to see one another again and it took them a little bit more time

> to adapt back to classroom expectations and establish those classroom routines that are necessary. Those kinds of behaviors would kind of get them in trouble a lot, but there was a lot of leniencies and a lot of understanding, you know? But now, I would say [behavior] really hasn't been much of an issue.

RFMT 8 shared:

> The group of kids that I mentioned had an issue with their behavior, just not being able to remember how to act in a classroom. A lot of them kind of started to realize during second semester that they needed to change their perspective on how they're doing this and actually try. So, I felt I had a lot of students last minute tried to kind of change their behavior because we allowed them to be a little bit more motivated to change the way they were doing. We were graceful with our kindness.

RFMT 9 shared:

> Yeah, I think a large percentage of my students had a lessening of a concern of how others are viewing them, that they're more comfortable in my class. With that comfortability creates a better environment in which they are willing to try, problem solving or try answering a question. Even if they don't necessarily know the answer, they're more willing to put in the effort because they are not as worried about their friends or what the other peers in the class may think.

Students Became Apathetic to Education

Six out of nine participants observed their students had become apathetic to education after the COVID-19 global pandemic with a frequency of 22. RFMT 1 shared:

> A lot of them just kind of sit there and wait for you to try to get them engaged, but they have a blank stare. Their behavior is not awful, they're not squirrely, not being rude or disrespectful. They're just so withdrawn, and they'll just sit there until you say, "Hey, can you put a pencil in your hand and take down these notes?" or "Can you try this problem?," but they don't make that effort to do anything. They don't have that inner self-worth of the motivation to do something. They don't see the reason behind why you may need math or an education and that, mentally, is almost harder to deal with.

RFMT 2 shared:

> Now, I feel like everybody has this mindset of "I don't have to learn it." I just have to make it seem like I'm getting it done. A lot of them are just afraid that I'm going to yell at them and tell them to do their work. The ones that don't try at all are either trying to prove a point or they feel like there's no point of catching up.

RFMT 3 shared:

> Well, I want to say the trauma of COVID caused the fear and uncertainty to poison the collective group think of apathy, especially in our youth. I'm seeing a cynicism, you know, for the environment. One thing that's obvious to me is just all the trash that's everywhere. There's no appreciation in the lower socioeconomic areas. At [my school], there is a trash problem in my classroom. They just fling it everywhere. They don't care. They have zero appreciation for the classroom. It's like they've given up and I think that COVID made that worse. Also, they've become so vain. If they can't achieve this unrealistic ideal without filters, then they feel so worthless and diminish their value of themselves. All this worthlessness seeps into the class where they've given up because they feel like "What's the point?"

RFMT 5 shared:

> During distance learning, we might give a hard assignment where we knew that they didn't have the skills and tools to do it at home by themselves, so we had to be available. I had to be on my Chromebook or there was after school tutoring. I had to make phone calls to help them get through this work online versus in person. Now, I feel like students feel like they should still be getting all that attention. They feel like they are entitled to one-on-one time with the teacher now because they got that when they were in distance learning if they needed it. There's this apathy where they feel like, "Oh well if you're not going to take the time to sit next to me and do it with me, then why am I going to do it?" or "This is hard, I'm not going to do this."

RFMT 6 shared:

> I feel like their attention span is so broken and it's been a trend that I think is magnified and worse. For some kids, it's so extreme, like they've fallen into this complete pit of apathy towards everything because they just can't get anything done anymore. These kids have no sense of accomplishment and being able to complete anything. They don't think they can do anything and they're helpless. They're just so helpless.

RFMT 7 shared:

> They fell further behind so they feel like they can't even try, but I think there's this huge fear of "I'm going to fail. I'm going to look stupid" and to avoid feeling that way, they compensate and put up like a façade of "I don't care. I don't want to do this. I'm choosing not to. Sure, fail me, whatever," causes them to feel great because they didn't try. They know it's not a true failure because they didn't try. If they earn a failing grade because they work their butts off and still couldn't do it, now they feel awful about themselves.

Students Have More Phone Usage Now

Eight out of nine participants observed their students had been using their phones more in class after the COVID-19 global pandemic with a frequency of 34. RFMT 1 shared:

> Another impact is being able to do everything from a phone, right? Like those are huge. Nowadays, you can check your email, you can call people, you can order things online, you never have to leave your house. Students now feel that as long as they have their phone, they're okay. And it's like, no, you have to learn how to relate to the real world and talk to people and work in groups and socialize and look at people. You can't always just hide behind your phone and say "Oh, I just want to be on my phone."

RFMT 2 shared:

> Oh, for sure their phones. This year's class is a lot better with phones, but the class right when we came back from COVID and even last year, they were horrible. They hardly cared about any of the things we did in class, they just wanted to use their phone. This year, I feel like the phone problem isn't really an issue, at least for me. I think it's going to improve as we move on. I feel like freshmen now, they're still stuck to their phones, but it is much easier to get them do things.

RFMT 3 shared:

> Cell phones are my immediate response. The amount of screen time that all of us had was so unstructured time during distance learning. We know how addictive screens are and for teenagers with developing brains that are like swiss cheese and will absorb whatever goes through them. Their phones have such a hold on them

> that they really are not able to regulate their behaviors. They're not able to separate themselves from something that is so addicting to be able to engage with class. And even when they don't have their phones for whatever reason, they lack caring about stuff.

RFMT 4 shared:

> They wouldn't necessarily misbehave when in the classroom, but they would just go on their phone and not pay attention. There was really no way to know if they were paying attention or not. Some would say they could multitask, but when I would call on them, they would kind of do a half reply or they would just grunt. There was no classroom management during COVID when we had to teach, so they definitely had a hard time adapting back to the classroom routines.

RFMT 5 shared:

> If I didn't have to correct 17 different people about their phones, then we could just be done and then you would have time to do whatever you needed to do. It's not like students interpret it as a punitive thing. They feel like we are punishing them for being on their phone and we've had to explain, "no, we're just literally trying to help you be here with us." And one of the teachers, explained to his students "If you want me to hold you accountable, I will hold you accountable, but you need to understand that holding you accountable means if you're on your phone, I will take your phone."

RFMT 6 shared:

> We were heading towards this point [of academics] with phones and smartphones in general because of this screen addiction that students have. This reliance on apps to solve their math homework for them. You know, I felt like this was something we are moving towards. When kids were on the pandemic, there was no supervision for many of them to be off their phones. There's a lot of small children in the household and the elementary school kids are going to get the priority of the attention from their parents versus the high school kids. Now in the classroom, they zone out on their phones.

RFMT 7 shared:

> It's been an interesting transition too. When I first started teaching 15 years ago, very few kids had a smartphone. Out of the class of 30, I had maybe half of them who had phones and most of them stayed in their backpacks. iPhones existed, but it wasn't the same thing as it is now. They didn't do as much as they do now because the phones were relatively new to them at the high school age, it wasn't all they wanted to be doing. But gradually, they were on their phones constantly and every year since then, more and more kids have a phone now. More of those

> kids have smartphones and they typically start getting them younger and younger and the worse it is by the time they get to high school. Every year I've taught, it's gotten worse.

RFMT 9 shared:

> Phones have impacted us, and our students, so much. I feel like it's taken us so far. These kids are full on addicted to their phones. You try and remove a phone from one of the kids like, hey, just let me hold it while you take your test. You can't have your phone while you test. Let me hold it for you. You can have it back as soon as you're done. And they're itching for their phone. They're freaking out. It looks and feels as if it's a full-blown addiction, just like it would be to drugs or alcohol. That's scary because I'm afraid that's only going to get worse as the kids keep growing up.

Data Analysis for Research Question Mindset

The mindset research question asked, "Which mindsets do you feel impacted your student's self-efficacy more and why?" with a follow-up question of "What might be another experience that impacted your student's self-efficacy in terms of mindset differently? In what ways did that impact your student's self-efficacy?" Table 4 shows the different themes, total participants, and total frequencies followed by a summary analysis of the data collected presented by the themes discovered and what the participants shared.

Table 4

Themes, Participants, and Frequency: Research Question Mindset

Themes	Total participants	Total frequencies
Parents Impacted Student Attitude on Education	8	31
Peers Impacted Student Attitude on Education	6	21
Social Media Impacted Student Mindset	3	7

Parents Impacted Student Attitude on Education

Eight out of nine participants observed parents impacted their student's mindset and attitude in the classroom after the COVID-19 global pandemic with a frequency of 31. RFMT 1 shared:

> There are the excuses from their parents of, "I was never good at math" or "You used to not have to do the homework and now you're having to" and "Oh, it'll be fine, you can still just get by without it." The students now just look at it as, "Oh, I got an F, I'm stupid, I'm dumb and I just am going to not try anymore." They would rather just not try so that people don't think that they're dumb.

RFMT 2 shared:

> That's their life experiences because I have spoken to students about what do you expect is going to happen when we get to your senior year and you're not going to graduate? Do you think they're just going to tell you, "Actually, go ahead and graduate, you're good." No. When I had these conversations with this student, he just tells me "I'm just going to live my dad forever. He's fine with it, I'm just going to live with him forever." They're thinking that because it's 3 years from now, nothing really matters. They think it'll go by slow, and they'll have time to catch up.

RFMT 3 shared:

> So obviously parents are their primary voices and their heads well before they ever get to school. Parents do have a lot to do with kind of shaping their kids' mindsets. And if parents are not willing to be on board with education and making sure their students are getting what they need, then the students 9 times out of 10 are really going to struggle. They haven't developed that internal voice of like "This is important, I need to do this." For a lot of our kids, especially in the area that we live in and the lifestyle of the family stuff that they've been exposed to, they don't realize that they can do a lot more.

RFMT 4 shared:

> I think parents have put more emphasis on the importance of school after COVID-19 than during COVID 19. They were just trying to get by during COVID and didn't really care about school and we had to have an understanding that we can't have all those expectations. Some parents were very good at holding their kids accountable and being on them about learning the content and helping them at

home. That was kind of essential, having that parent cooperation during COVID-19. I would say after COVID 19, more parents have resorted back to looking for resources provided by the school and making sure their kids take advantage, whether it be tutoring, staying after to retake tests rather than all the work being put on them too at home.

RFMT 5 shared:

> But that is the mindset that kids have, what they're learning at school isn't super important. We have a lot of kids that don't want to go to college and their parents are like "Good. Go to a trade school." I'm not against trade schools, but I think that we shouldn't be angry about school. It feels like people, especially parents, are angry about school and I don't know why. I don't know what changed that we're angry about school now.

RFMT 6 shared:

> Well, there's a lot of parents that will say, "I was never good at math," so now their children have the excuse of saying the same thing. It solidifies that fixed mindset that genetically, "I'm not a math person. My dad's not a math person. My mom's not a math person, so I'm not a math person. Why am I gonna try?" And so that definitely is a huge issue. And our culture, there is nothing more important than your attitude, which is a choice, about anything and it's not convenient to believe that you are a math person, cause now all of a sudden you have to try. If I say I'm not a math person, hey, I get to kick back and play Clash Royale on my phone. but if I am a math person, I guess I should work and craft my mind.

RFMT 7 shared:

> A lot of their parents were worried more about putting food on the table and making sure bills were getting paid. I know that I had several students the year we were online reaching out like. "Hey, my mom's going to try and look for jobs" or "she's got an interview and I'm responsible for my 3 younger siblings. I promise I'm listening. But I can't guarantee how much I can interact," and this is all via Zoom. Priority was not school, priority was not education, priority was survival. It was day to day survival because a lot of people didn't know from one day to the next what was happening. School is just so secondary in that situation. Parents were thinking, "how am I going to put focus on education when I've got to put food on the table for my 4 kids" or whatever the situation was.

RFMT 8 shared:

> The difficult part is that students still go into math with that mindset of "Oh, I was always bad at math, I'm not good at math," even during pandemic. For our demographic, the pandemic affected a lot of people very differently. Some parents were more involved than others and others not so much, just depending on whether they were at home or not. So, we definitely notice some of the parents would be on top of the students and make sure they got onto the computer every single day, but some students weren't lucky to have that. They had to babysit a younger sibling while the parents were at work because that was the priority. It was very different for a lot of students.

Peers Impacted Student Attitude on Education

Six out of nine participants observed student peers had impacted their student's mindset and attitude in the classroom after the COVID-19 global pandemic with a frequency of 21. RFMT 2 shared:

> The friends they surround themselves with. They think "why am I wasting time now when I can be doing something better?" The student that's failing says "why am I wasting time with things that I'm not going to use in the future when I can be making money with my friends?"

RFMT 3 shared**:**

> During COVID, there really wasn't a lot of input for them to grow from necessarily because there wasn't really that connection on the screen. After COVID, I saw a group of students who hung out and are good friends that didn't turn anything in, continue to be that way. And then you'll have your group of students who are very focused on getting everything done and cheer each other on. They naturally resort to that with each other.

RFMT 4 shared:

> During COVID-19, I mean, there was only one source of information coming from me during distance learning through the computer. But after COVID-19, they would listen to their friends instead because they were on their phone texting each other rather than being focused in the classroom. Their friends would distract them during class.

RFMT 5 shared:

> Kids are echoing what they hear to their friends. When we were doing in person classes, our campus had a protest where students wouldn't go to class because they had to wear their masks. They protested with their friends and just sat in the quad all day and we had to bring them their work. They had to do their work in the quad. And we couldn't give them zeros for anything. Kids were taking pictures of teachers in their class that were wearing masks then posting them on Facebook and like talking smack about them and how they're terrible teachers.

RFMT 6 shared:

> I've never seen so many girls with a makeup obsession before this year. I was used to seeing maybe one or two girls in a class, but now I have so many handfuls of girls in my class that spend an excessive amount of time putting on makeup instead of doing their work. They don't value their minds and who they are. They only get value from how they look. The whole point of school is to develop your character in your mind.

RFMT 7 shared:

> The freshmen are trying to still kind of discover who they are going into high school, trying to find out what their identity is. They focus on their identity and who they are with their friends and how they are going to act. The peer-to-peer connection matters because only them themselves can really connect with each other and figure it out for themselves.

Social Media Impacted Student Mindset and Attitude

Three out of nine participants observed social media had impacted their student's mindset and attitude in the classroom after the COVID-19 global pandemic with a frequency of 7. RFMT 2 shared, "During COVID, a lot of students were just in their own bubbles, so they didn't really interact with students or others other than through TikTok or Instagram. They were stuck on their screens." RFMT 3 shared, "It's hard to fight against YouTube or TikTok or Instagram or Snapchat. They're always connected, and I think they don't know how to disconnect to pay attention in class. It's always a struggle." RFMT 6 shared, "When their parents get home, they zone out on their phones, and I feel

like their kids do that as well. The sad irony of these social media, it's created super antisocial behavior and apathy in education with our students."

Data Analysis for Research Question Social Connections

The social connection research question asked, "What social connections do you feel impacted your student self-efficacy in math and why?" Table 5 shows the different themes, total participants, and total frequencies followed by a summary analysis of the data collected presented by the themes discovered and what the participants shared.

Table 5

Themes, Participants, and Frequency: Research Question Social Connections

Themes	Total participants	Total frequencies
Students don't communicate with each other in person	7	23
Students missed social development years	9	30

Student's Did Not Communicate With Each Other in Person

Seven out of nine participants observed student's did not communicate with each other in person when in the classroom after the COVID-19 global pandemic with a frequency of 23. RFMT 1 shared,

> Before COVID, kids would ask, "Hey, [RFMT 1], can we work together with somebody?" and they would move their desks and work together, and they literally would work on the assignment. Well, COVID happened and now you don't really have them working together anymore. They became very shy around each other and they just wouldn't like interact and talk. Now that we're kind of back to normal, I've noticed still kids don't always ask to work together.

RFMT 2 shared, "They don't really care to socialize with others, which impacts when you try to do activities in groups and having them discover different things in an assignment because they don't really want to interact with each other."

RFMT 3 shared:

> Their socialization skills are low and underdeveloped. A lot of our kids do not know how to talk to people outside of their immediate group. They formed tight social circles with certain people and then don't know how to go outside of that. If it is a different student than someone that they're already comfortable with, a lot of my kids will shut down. They'll refuse to work with other people. There's a lot of self-doubt and insecurity there.

RFMT 4 shared, "I would say that with each other, sometimes students won't say things.

They kind of lost a sense of how to communicate with other people in public during

COVID and that still impacts them to this day."

RFMT 6 shared:

> My older students are way less shy. They don't care if they get it right or wrong. They are trying. They're curious. They're interested. My freshman and sophomore are terrified and quiet, even if I let them work with their friends. I'm desperate to get them to collaborate. I told them that they could pick their group of 3. I don't care. Talk. Please try, but they can't make small talk with people that they don't know. I feel like the number of quiet kids I have has quintupled over the past several years. Before, it would be maybe 2 or 3 kids in a class but now, it is well over half my class.

RFMT 7 shared:

> Before COVID, I felt that the student social connections were a little more face value. They interacted with friends all day every day and it was mostly positive. When everything switched to online for that year for COVID, those social connections deteriorated. Students forgot how to have a conversation. Everything was more digitized so it's a lot more text or messaging on Instagram.

RFMT 9 shared:

> There was an apprehension in being social and talking to each other. Students were much more guarded when we first came back, the 21–22 year. Their relationship with their teachers was much more apprehensive. I remember feeling very distant from them during the distance learning year, obviously not seeing them in person, so I could only imagine how they felt. There was less of a relationship built during that year with my students. COVID was a new experience for them, and they were less comfortable or less familiar with others and they were more apprehensive to talk to others.

RFMT 9 also shared:

> The goal of trying to get them to interact with each other was a challenge because they were hesitant. Maybe it was that they didn't trust each other. But a lot of that was due to the fact that they didn't interact with each other for a whole year and a half.

Students Missed Social Development Years

All participants observed that students missed social development years in the classroom after the COVID-19 global pandemic with a frequency of 30. RFMT 1 shared:

> During the second semester, I was tired of attempting to forced them all into groups. Now, they have to work a little bit together, but there are still kids that are like, "No, I'm good. I don't want to work with anyone." I'm trying to get the kids to socialize and interact a little bit more. It's getting better and I'm hoping that it becomes more and more over the years because I miss kids interacting and wanting to work together and small groups. I miss that because it's so important.

RFMT 2 shared:

> I feel like [COVID] impacted them and how students feel about their education, they see it as a negative thing. They don't want to try in school or even go to school after high school because they feel that they are going have the same experience like they did during distance learning.

RFMT 3 shared:

> Teenagers always have the need to belong. It always will be there because that's a normal part of their development. When COVID happened, they were physically distanced from everyone, and they lost the ability to connect in normal human experiences in some ways. With the rise of TikTok, it's really easy to find other people with similar experiences, but students can't really connect outside of it.

RFMT 4 shared, "They lost those primary years to hang out with friends. They would have been in middle school around that time, and that time is used to be with friends and they lost it."

RFMT 5 shared:

> They are here to build relationships and meet as many [math] standards as they can in that process. That's where I feel like they lost the most, just learning to be humans with other humans and we have to give them as many opportunities as possible. We had that whole conversation when we came back. We spent a year saying, "Okay, we're going to put standards to the side. We're going to give the kids what they need."

RFMT 6 shared:

> I'm already hearing from the middle schools that there's some good crops coming up behind this group. And so, I think it's so funny that you're interviewing me this year because I feel like this is rock bottom with this group. I got to see the decay of their social interaction and education overall with some of my freshmen last year, and even they were not as bad as this one group that I currently have.

RFMT 7 shared:

> Before COVID, student social connections were a little more face value. They interacted with friends all day every day, which was mostly positive. And then when everything's switched to online for that year for COVID, those social connections just kind of deteriorated. It's almost like the students forgot how to have a conversation. Everything was more like digitized so it's a lot more text it was more like on Instagram and that kind of thing.

RFMT 8 shared:

> Teachers post pandemic are trying to provide that environment so students feel comfortable enough that they can communicate with each other. That allows them to be social and they could be perceived in a positive way. They needed the social thing and something we caught students doing was making their own google groups that were inviting each other to it aside from the actual class environment. They craved that social interaction and a lot of students actively learned how to create it with what they had.

RFMT 9 shared:

> Overall, most of the social connections that they had were dampened because of being away from school for a full year at least. Being at a school site with other students led to apprehension when it came to building connections and making friends. That lowers student's self-efficacy trying to be comfortable with their peers.

Final Thoughts

The final research question asked, “Is there anything else that I missed that you would like to share?” Table 6 shows the different themes, total participants, and total frequencies followed by a summary analysis of the data collected presented by the themes discovered and what the participants shared.

Table 6

Themes, Participants, and Frequency: Research Question Final Thoughts

Themes	Total participants	Total frequencies
Teachers are hopeful for the future	9	12

Teachers are Hopeful for the Future

All participants described they were hopeful for their students in their classroom after the COVID-19 global pandemic with a frequency of 12. RFMT 1 shared:

> Every year gets a little better, but it’s going to be a while until it’s totally back to normal. I think it is a mental shift not only with the students, but with the parents as well. I just think that’s going to take some time. So, I would say it’s going to be another 5 years, I would hope it would be sooner. I still see that it’s a little ways out.

RFMT 2 shared:

> I feel like it’s starting to get a little bit better. I think it’s going to improve as we move on. A lot of kids don’t get the point of why you’re doing things, so you’ll always get the occasionally first question, why are we doing this? But we’re getting there.

RFMT 3 shared:

> They’ve gotten better at advocating for themselves. This year, I have a lot of kids who will make time to come in for extra help rather than expecting help to come to them. They’re willing to come in at lunch and they’re willing to come in at my prep period. They email me at all hours of the night when they should definitely be asleep, but I think they’re more willing to advocate for themselves. That helps with their self-efficacy because they are taking the steps needed to make progress rather than just failing quietly.

RFMT 4 shared:

> It's going to take about 4 to 5 years before we get back to normal. I would say whenever that group of whoever was in fourth grade and higher during those COVID years cycle through. Once they cycle through, then I would say things would probably go back to normal.

RFMT 5 shared:

> Parents are more willing to give their students friend time. I hear kids talk about getting together all the time on the weekend. There's more school events for them to be with each other at. For most kids, they want the social interaction. They like working in groups now. They want, and are more willing, to work in groups than they were before. If I say choose your people and go up to the whiteboards, they're more willing to do that.

RFMT 6 shared:

> I feel that we are going to get back to normal once this group graduates. I really think the lower elementary kids are going to be okay. These younger kids got the attention at home. I'm already hearing from the middle schools that there's some good crops coming up behind this group.

RFMT 7 shared:

> They still have lots of test anxiety, but before they submit their tests, I have them come up and check through it with them. I point out a few things to give them some hints and I have them go retry certain problems so they're correcting things on the spot. As a result, their scores are much higher and I'm very much seeing an increase from one test to another. I'm seeing that confidence build because they're motivated to try more with those. I'm seeing an increase across the board with all my students.

RFMT 8 shared:

> Both teachers and students were questioning when are we going to go back to normal? It was always in the back of our heads. But I think now that we're kind of well past that, everybody is thinking that we're back to normal. Now that we're kind of back in the groove of things, it feels like we're back to normal. And I think the students would agree on that as well. We see that improvement in them as well.

RFMT 9 shared, "Now, there are high, positive social connections happening amongst each other. Those connections benefit students and they're more willing to try and have more of a growth mindset and have that positive self-efficacy."

Summary

Chapter IV presented a review of the purpose statement, research questions, research methods and data collection procedures, population, target population, sample, demographic data, intercoder reliability, and presentation and analysis of data. The presentation and analysis of data was developed through the findings from qualitative phenomenological interviews conducted with nine participants. The study interviews consisted of six questions and two follow up questions that were used to further elicit data. 12 themes emerged from the four research questions, further contributing to the depth of data collected. The study was designed to address how school rural high school freshman mathematics teachers describe the impact on their role returning to school after being online for 2 years with regard to the academic achievement, behavior, mindset, and social connections, which are variables aligned to Bandura's theory of self-efficacy framework. Chapter V presents a final summary of the research study, major findings, unexpected findings, and conclusions as a result of the study. The findings and conclusions are followed by implications for future research, recommendations for future research, and concluding remarks and reflections.

CHAPTER V: FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Chapter V presents a methodology review, key findings, unexpected findings, conclusions, and implications for action. Implications for actions include interventions that support the school systems' students, staff, families, and community when implementing systems to improve academic and mental health outcomes. The chapter also includes recommendations for future research. Finally, the researcher provides concluding remarks and reflections.

Methodology Review

A qualitative phenomenological study was conducted to examine the lived experiences of rural high school freshman mathematics teachers on the effects of the COVID-19 global pandemic returning to school after being online for 2 years with regard to academic achievement, behavior, mindset, and social connections, variables that aligned to Bandura's theory of self-efficacy. The methodology was designed to answer the following research questions:

1) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to academic achievement?
2) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to behavior?
3) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to mindset?

4) How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to social connections?

The researcher used purposeful and convenience sampling to identify potential candidates to participate in the study who met the predetermined criteria and who were willing and available to participate. The researcher enlisted the support of high school mathematics teachers at work and school district websites. In the invitation to participate, the researcher listed the title, the purpose of the study, the criteria for participation, the medium where the interview would take place, the length of the interview, and the assurance that participants would remain anonymous. The researcher invited participants who met criteria to contact him via email. Interested participants were provided an introduction email describing the nature of the study, a copy of the UMass Global Research Participant's Bill of Rights, Informed Consent and Audio Recording Release, interview and demographic questions, and definitions. Interested participants contacted the researcher stating that they met criteria, agreed to willingly participate, and signed the consent. The researcher conducted semistructured interviews via Zoom with nine rural high school freshman mathematics teachers providing services in K–12 public schools in San Bernardino, California. All interviews were conducted following a protocol to ensure accuracy and minimize bias.

Major Findings

Research Question Academic Achievement

How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to academic achievement?

Key Finding 1: Student Learning Loss in Fundamental Mathematics Skills

The findings indicated the participants experienced a concerning trend in the decline of students' mathematical proficiency. As a result of this trend, participants needed to change their methods of delivery of the material. The findings supported the Matthew effect theory where those who begin with disadvantage become more disadvantaged over time (Dannefer, 1987). All nine of the rural high school freshman mathematics participants identified that their students lost the ability to do basic mathematics (F29) and became reliant on using calculators to solve their problems. According to Bandura's (1977a) theory of self-efficacy, self-efficacy will predict students' academic achievement in all areas and levels of academia, and in this case, it is in mathematics. This significant decrease in students' mathematical abilities influenced their standardized test scores, classroom performance, and problem-solving skills. These findings connected to the key finding of student learning loss in mathematics skills.

Key Finding 2: Students Cheat on Assignments and Demonstrate Lower Work Ethic

The findings indicated the participants experienced a widespread use of cheating tools among students, which is linked to their lower work ethic habits. Five participants (F15) explained their students used cheating tools, like PhotoMath, Mathway, or similar apps to get their work done. From this, seven participants (F22) observed that students

had a lower work ethic related to their mathematics classwork. Participants mentioned that students gave up when something was too challenging or when their teachers mentioned that they are unable to use cheating tools to assist them on their assignments. These self-efficacy efficacy expectations are associated with the belief that individuals can determine how much effort to expend when faced with a challenge and how to confront the challenge to achieve favorable outcomes, which may increase an individual's work ethic and persistence (Bandura, 1977a). This increase in student cheating and decrease of work ethic was a detriment to the participants and showed these instances connected to the key finding.

Research Question Behavior

How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to behavior?

Key Finding 3: Students Required Kindness and Grace Post Pandemic

The findings indicated the participants observed that they were nicer to the students amid the trauma of the COVID-19 global pandemic. Six participants (F15) explained they were more lenient with their students in the classroom as that was the norm during distance learning. Students need the conviction that they can successfully perform under challenging circumstances (Bandura, 1977a). To improve student self-efficacy, participants attempted to boost student confidence in the traumatic aftermath of COVID-19 with kindness. Participants felt the need to adjust to these changes positively to support their students' self-efficacy. Positive behavior in the classroom is linked to predicting positive academic achievement (Alvidrez and Weinstein, 1999). Schools, and

the teachers in these schools, assisted these students in their behavior and furthered their academic achievement.

Key Finding 4: Apathy Toward Mathematics Education

Regarding kindness and grace in the classroom, students' behavior toward the classroom took a turn for the worse. Six participants (F22) described their students had become apathetic to math class after the COVID-19 global pandemic. Participants explained students showcased a lack of interest and motivation toward learning in their math classes. They further explained that students had low levels of engagement during lessons, minimal participation in class activities, and an indifference toward problem-solving tasks. Multiple participants stated that students believed mathematics was irrelevant to their lives and future life goals, leading to a disconnect between the content taught in their math classes and its real-world relevance. Bandura's (1977a) theory of self-efficacy explains that students are inclined to succeed if they have confidence in their abilities to succeed. Participants further mentioned, because their rural students didn't have the adequate assistance they needed to succeed, their students expressed this negative attitude toward mathematics. Participants explained this attitude was often reinforced by past experiences of failure or frustration during the COVID-19 global pandemic, leading to avoidance and disengagement in their classrooms.

Key Finding 5: Phone Usage in the Classroom Became the Norm

As students became more apathetic, students' engagement went toward other outlets. Eight participants (F34) described they had seen an increase and normalization of students' phone usage in the classroom following the COVID-19 global pandemic. There was an integration of technology into classroom settings because of remote and hybrid

learning models necessitated by the pandemic. Due to rural populations not having the necessary technology at the start of distance learning, many students began using their phones for educational purposes, such as digital textbooks, video conferencing apps like Google Meet and/or Zoom, and online resources. During this time, the blurring of boundaries between personal and academic use of smartphones became increasingly prevalent. Phones caused distractions and challenges for maintaining focus and engagement during class time. Participants described how the normalization of phone usage in the classroom hindered attention span and academic integrity, causing learning to be ineffective and a mindset shift in the realm of education across all subjects at their sites.

Research Question Mindset

How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to mindset?

Key Finding 6: Influence of Parental, Peer, and Social Media On Students

The findings indicated the participants observed that outside sources, such as parents, peers, and social media, had an impact and influence on their student's mindset in their classrooms. Bandura (1977a) described that self-efficacy looked into the effort and persistence of an individual. Individuals who have low self-efficacy for accomplishing a specific task may avoid that task and individuals who have high self-efficacy feel capable of completing the task. Eight participants (F31) mentioned parental influence having an impact on their student's mindset after the COVID-19 global pandemic. Participants described parents who were more actively engaged in their child's

education during distance learning had students who had more positive attitudes toward learning when they came back to the classroom. Furthermore, parents who were occupied with other items during distance learning other than their child's education, like jobs, social media, or younger siblings, demonstrated to their children that education wasn't important. Similarly, six participants (F21) described peer influence contributing to the student's self-efficacy in their classroom. When surrounded by peers who value effort, perseverance, and academic excellence, students were more likely to adopt these attitudes for education. On the other hand, negative peer influences have students engage in academic dishonesty or disengagement from learning undermined the students' motivation and confidence. Lastly, three participants (F7) described how social media impacted their student's mindset in their classroom. Participants described how the use of social media contributed to distractions and antisocial behavior, which impacted students' motivation and confidence to perform well in their classes.

Research Question Social Connections

How do high school freshman mathematics teachers in rural districts describe the impact on students returning to school after being online for 2 years with regard to social connections?

Key Finding 7: Missed Social Development Opportunities for Students

The findings indicate students missed social development situations, which limited their communication skills in person and in their classrooms after the COVID-19 global pandemic. Seven participants (F23) described their students did not communicate with teachers or other students in the classroom up on their return to in-person instruction. Furthermore, these students preferred to communicate on their smartphones,

either through texting or social media apps such as Instagram, Snapchat, or TikTok. All participants (F30) described their students missed important social development years due to limited ability to practice their communication skills. Self-efficacy is an individual's belief in their ability to perform certain tasks and to be able to complete them successfully (Bandura, 1986). The trend of students missing out on crucial social development opportunities and relying heavily on digital communication platforms, particularly after the COVID-19 global pandemic, indicates an impact of their social development and communication skills. Participants described, depending on the year of students, they missed their middle school or late elementary school years of development due to the COVID-19 global pandemic.

Unexpected Findings

For this study, there were five unexpected findings. The following unexpected finding was related to the introduction interview question of "Have you seen a change in your sense of self-efficacy between your time at home, due to COVID-19, and your return to in person education as you work with students?". All participants (F10) explained that their self-efficacy was increased due to COVID-19. The participants mentioned that because they couldn't reach their students in the best way during distance learning, they worked harder when they came back to in person teaching. The next unexpected finding was related to the follow-up question of "Is there anything else that I missed that you would like to share?" All participants (F12) described how they are hopeful for their future students in their classroom after the COVID-19 global pandemic in all variables: academic achievement, behavior, mindset, and social connections. Amid all the negative impacts the COVID-19 global pandemic had on their students,

participants were still hopeful that in the following years, their students will be back to where they were academically, behaviorally, mentally, and socially before the COVID-19 global pandemic. The third unexpected finding related to the interview responses was about how the participants have other teachers that work hard to assist their students. All the participants (F10) mentioned that their departments are trying to do better to assist their students. The department wants their students to succeed and is attempting different methods to improve their students' self-efficacy. When participants mention being nicer to their students, they were practicing trauma-informed practice to focus on creating a safe school culture by building relationships and supporting students' self-efficacy.

Other unexpected findings were related to the study participants' demographic characteristics. The researcher invited potential study participants via email through district staff directories to enlist participants. In this email, he asked potential study participants who met criteria to contact him for interest to participate in the study. Through these methods, the researcher believed he gave participants of any gender, any ethnicity, and any rural district an equal opportunity to participate. The fourth unexpected finding was that there was close to equal representation in gender and ethnicity. Five out of the nine participants were female and the other four were male. Furthermore, five out of the nine participants were Caucasian and the other four were Hispanic/Latino. The fifth and final unexpected finding was that there was a variety of ages of the participants, ranging from 28 years of age to 55 years of age.

Conclusions

This study focused on examining the lived experiences of rural high school mathematics teachers and their perspectives about the impact the COVID-19 global

pandemic had on freshman students returning to school after being online for 2 years. Specifically, the study was interested in students' academic achievement, behavior, mindset, and social connections. The following conclusions were drawn from the findings supported by literature that aligns with the theoretical foundations used to guide the research in this study, which were resilience theory, mathematics framework, psychological trauma theory, social disruption theory, Matthew effect theory, situational crisis communication theory, theory of academic achievement, and social learning theory. Bandura's theory of self-efficacy was used as the theoretical framework to guide the development of this research study. The variables of academic achievement, behavior, mindset, and social connections were used to answer the research questions in relation to the rural highs school freshman mathematics teachers' perspective about the impacts on their student's self-efficacy.

Conclusion 1: COVID-19 Impacted Students Other Than Academics

The COVID-19 global pandemic disrupted the lives of individuals, communities, school systems, and governments worldwide and forced rapid change to minimize suffering of students. The literature discussed student academics would be impacted, but that is only one topic that impacted students due to all the findings (Myers et al., 2021). The key findings of this study demonstrated the social disruption at an alarming level, which affected various aspects of students' lives. The pandemic has taken a toll on students' mental health with social isolation measures and disruptions to daily routines. Students faced the challenge of adapting to new modes of education with the transition to remote learning and, after 2 years, moving back into the classroom as if a major traumatic event didn't even occur (UNESCO, 2023). Rural school districts should have a plan in

place for students to be able to seek assistance. Situational crisis communication theory (SCCT) created an outline for crisis communication; still, it is up to the organization to create this outline and assist their community's reaction to the situation (Coombs, 2007a). Rural high school freshman mathematics teachers were not ready for the other impacts their students were dealing with.

Conclusion 2: The Self-Efficacy of Students Was Affected and Needs Assistance

The key findings from the nine interviews with rural high school freshman mathematics teachers revealed their students' self-efficacy was negatively affected. Student's social development was significantly impacted by the pandemic, as students had limited opportunities for in-person socialization. The absence of traditional school activities, such as sports events, clubs, and social gatherings, deprived students of crucial opportunities to form friendships, develop communication skills, and build a sense of community. Students had to cope with disruptions without an adequate support system and learn to manage uncertainty and adversity the best they could. Social disruption theory discusses the breakdown of social life, often in a community setting where something will emerge that is better (Beck, 2016). Students rely on school systems to assist in their social development. With the key findings in this study, schools should enhance school climate and provide students with the opportunities to improve their self-efficacy after the COVID-19 global pandemic. There is a need for positive school climates that focus on improving self-efficacy after the COVID-19 global pandemic, more than ever.

Conclusion 3: Growth Mindset Is a Must in Schools

The COVID-19 global pandemic showcased the importance of fostering a growth mindset in classrooms as students navigated unforeseen challenges and disruptions to their learning experiences. Promoting a growth mindset among students in the aftermath of the pandemic is necessary for the longevity of student self-efficacy (Hernandez, 2019). The mathematics framework encourages students to view challenges as opportunities for growth and is a fundamental foundation to fostering a growth mindset (CDE, 2013b). In the post pandemic classroom, educators can emphasize the value of resilience and perseverance in overcoming obstacles and being able to thrive in the face of adversity. If teachers can reframe these challenges as learning experiences and celebrate efforts rather than outcomes, teachers can assist their students to approach challenges with confidence and determination. By modeling a growth mindset, teachers can inspire students to adopt a similar mindset and approach their learning with curiosity and determination instead of fear and failure. Students post the pandemic need the hope that they can succeed as they have seen failure before.

Conclusion 4: Family and Peer Environment Need to Be Positive for Education

The key findings discussed how the COVID-19 global pandemic had effects on education in relation to family and peer dynamics. Reynolds and Walberg's (1992) theory of academic achievement discussed how home environment and peer groups have an impact on influencing learning outcomes. The transition to distance learning blurred the boundaries between home and school, placing additional strain on parents who must balance work and having their students focus on their educational responsibilities. Moreover, the COVID-19 global pandemic impacted students' home environments and

overall well-being with a focus on survival instead of education. There is a critical role of family and peer environments in shaping students' educational experiences and outcomes (Deutsch et al., 2012). As students navigate the challenges of returning to in-person learning and adjusting to new educational norms, the support and encouragement they receive from their families and peers play a pivotal role in their academic success and well-being. By creating positive and supportive family and peer environments, characterized by open communication and a shared, mutual respect to education, educators, parents, and communities will nurture students' growth mindset and foster resilience in the classroom (Moore, 2019). By prioritizing positive family and peer environments, these supportive people can create a strong foundation for students to thrive academically, socially, and emotionally in the post pandemic era.

Conclusion 5: Stopping the Reliance on Phones and Promoting Communication

The key findings of the study showcased participants describing how students increased their reliance on phones and decreased other forms of communication. Due to the COVID-19 global pandemic, students had periods of isolation and had to rely on digital communication. This isolation and reliance further hindered students' ability to connect with their peers and develop meaningful relationships after the pandemic. The pandemic accelerated the reliance on technology for education, communication, and entertainment, leading to concerns about excessive screen time and digital dependency among students (Pandya & Lodha, 2021). The shift to remote learning exposed students to prolonged periods of online engagement, which participants mention had negative effects on their social development. The necessity of schools to be able to promote communication among peers and be able to promote face-to-face interaction is essential

in a post pandemic world. The COVID-19 global pandemic had far-reaching implications for students beyond academics. As educators navigate the challenges posed by the pandemic, it is essential to prioritize students' well-being and foster resiliency in their communities where all students can thrive.

Implications for Action

This study's findings suggested the role of rural high school mathematics teachers is important in supporting freshman students' academic and social–emotional outcomes. They play an important role in school systems and their ability to assist their students is their goal above all else. Based on the conclusions identified in this study, the following implications were noted.

Implication 1: Promote Positive Culture and Provide SEL Support

Educators should prioritize the creation of positive and supportive classroom cultures that foster a growth mindset, resilience, and a sense of belonging among students. This culture can be achieved through the implementation of inclusive teaching practices, personalized feedback, and collaborative learning activities. Students missed that for 2 years and need it more now than ever. By providing social–emotional learning (SEL) in the curriculum, educators can equip students with essential skills for navigating social relationships, managing emotions, and developing empathy (Durlak et al., 2022). Educators should integrate SEL lessons and activities that promote positive peer interactions, conflict resolution, and emotional regulation.

Implication 2: Open Communication and Model Positive Mindsets and Behaviors

Parents play a crucial role in supporting their children's educational journey by fostering open communication, active listening, and positivity toward education (Desai,

2023). Parents should create opportunities for dialogue with their children about their academic experiences, challenges, and aspirations, and provide encouragement and support. By demonstrating resilience, perseverance, and a willingness to learn from mistakes, parents can emphasize the value of effort and persistence and will inspire their children to adopt a similar mindset and approach to learning. This persistence and inspiration include monitoring their student's phone at school and home to ensure students are gaining the knowledge they need to succeed. This step is a necessity after the COVID-19 global pandemic, where education was not placed as a priority and now has reemerged as a priority for many.

Implication 3: Invest in Family and Community Engagement and SEL Initiatives

Policymakers should prioritize investments in programs and initiatives that promote family and community engagement in education. This investment may include funding for parent education workshops, community partnerships, and school-based family support. Furthermore, policymakers should advocate for the integration of SEL into school curricula and professional development programs for educators. By prioritizing SEL initiatives, policymakers can equip students with the skills necessary for success in school and beyond. In a post pandemic world, students need community (East, 2021).

Implication 4: Create Supportive Networks and Positive Peer Influences

Community stakeholders, such as local organizations and businesses, can play a vital role in creating supportive networks and resources for families and students. By collaborating with schools and community organizations, stakeholders, or better named partners in education, can provide mentoring, tutoring, and enrichment opportunities that

enhance students' educational experiences (Kaur, 2022). Furthermore, community partners in education can promote positive peer influences by organizing youth leadership programs, peer mentoring initiatives, and community service projects. By providing opportunities for students to connect with their peers in meaningful ways, stakeholders can foster a sense of belonging and civic engagement in a world where it was lost for many years.

Recommendations for Future Research

For this study, the following recommendations for future research have been identified and explained.

Recommendation 1: African American/Black Teacher's Interest in Rural Areas

Given the study participants' demographics, the recommendation is to conduct a study with African American/Black teachers in rural school districts to see what they experience in their classrooms. It is recommended to conduct this study to dive deeper into different demographics other than Caucasian and Hispanic/Latino ethnicities. Being able to understand different demographic representation trends will inform education and school leaders and will add to the body of research.

Recommendation 2: Quantitative Research with Rural School Data

Given this study used qualitive data, the recommendation is to expand on the study by performing quantitative research to see quantifiable data in terms of student's test scores, failure rates, attendance issues, behavioral issues, and other topics discussed in this study. With this method, a recommendation would be to look at the data before the COVID-19 global pandemic and after the COVID-19 global pandemic with rural school districts.

Recommendation 3: Qualitative Research with Rural Versus Urban Districts

There already exist studies that discuss urban/suburban school districts. Given that the study focused on rural high school mathematics teachers, the recommendation would be to compare rural and urban school districts in a qualitative research design. Current studies discuss the disparity between the rural vs urban areas, but a qualitative research design that investigates what teachers from each area have to say about their student population would be a recommendation.

Recommendation 4: Other Subject Areas in Rural School Districts

It is recommended that researchers interrogate how other subject areas, such as English, Science, and History, were affected by the COVID-19 global pandemic related to student self-efficacy. With the rise of AI and the use of ChatGPT, teachers of English and History may experience students who were impacted in terms of academic achievement, behavior, mindset, and social connection. Similarly, Quizlet may have impacted science teachers and their test taking strategies after the COVID-19 global pandemic. A study looking into these situations could gain a view of the school as a whole and not only under the lens of mathematics.

Concluding Remarks and Reflections

In rural high schools, students often face an increase in adverse childhood experiences, rapid changes, and a lack of support to meet their needs, which produces an outlook for their future can appear bleak. Families in these communities rely on school systems not only for academic development but also for social–emotional support. Schools in rural areas are vital, as parents and caregivers seek assistance, with school staff often being the first to discover a child's struggles. Investing in school staff and

resources is crucial for addressing the needs of students, staff, families, and the community.

This study examined the perceptions of rural high school freshman mathematics teachers regarding their student's self-efficacy after the COVID-19 global pandemic regarding academic achievement, behavior, mindset, and social connections. The insights provided by these teachers, from their perspectives, observations, and lived experiences, offer valuable understanding of student needs in rural schools and highlight the positive impact these teachers have on their students overall. Through studies like this one, it is hoped that rural high school mathematics teachers will be recognized as valuable resources and assets in the education system.

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APPENDICES

APPENDIX A

Synthesis Matrix

Author / Researcher	Background Information	Crises In Education	COVID-19	Academics	Mental Health	Distance Learning	California	Schools	Learning Loss	Rural	Mathematics	Students	Teachers	Theoretical Foundations	Theoretical Framework
2U, Inc. (2022)		X						X		X					
Abbas, T. (2023)		X												X	
Abrams, Z. (2023)		X						X	X			X			
Abramson (2010)					X				X			X			
Ackerman, C.E. (2018)					X							X		X	
Ager et al. (2020)	X	X						X				X			
Alabdulaziz, M.S. (2021)			X					X			X				
Aldeman, C. (2021)	X	X	X					X	X			X			
Alexander, B. (2021)		X			X			X				X			
Alhazmi et al. (2022)	X			X								X		X	
Alibudbud, R. (2021)			X		X	X				X		X			
Allen, M. (2017)	X														
Alpugo, H. (2020)	X		X			X						X		X	
Amaresan, S. (2022)	X													X	
American Psychology Association (2023)	X				X									X	
Anderson, J. (2020)	X	X	X	X	X			X	X	X		X			
Ansell, S.E. (2004)		X		X				X				X			
Arsen et al. (2022)			X	X	X	X		X		X					
Arteaga, M.A. (2023)				X								X			
Awan et al. (2011)	X			X				X			X	X			
Bailey, D. (2021)								X		X		X			
Baker, L. (2022)	X		X					X				X			
Ball et al. (2008)	X												X	X	
Bandura (1977a)					X										X
Bandura (1977b)															X
Bandura (1986)														X	X
Bandura (1994)														X	X
Bandura (1997)														X	X
Bartlett et al. (2019)				X	X										
Beck, U. (2016)														X	
Bellock et al. (2010)				X	X						X	X	X		
Beland et al. (2016)		X		X				X				X			
Belay, D. G. (2020)	X	X	X	X		X		X		X		X			
Bellamy L.F. (2021)			X	X		X			X		X	X	X		
Bicard et al. (2012)	X											X		X	
Biehler & Snowman (1997)															X
Bienvenu. G. (2023)															
Bieng Bieng (n.d)	X													X	
Bobyliev & Vihrova (2021)		X	X	X				X			X		X		
Bringula et al. (2021)		X	X	X		X		X			X	X			
Bronfenbrenner, U. (1979)	X													X	
Brookhart, S.M (2018)				X				X				X	X		
Buffington et al. (2020)			X			X		X	X	X		X	X		
Bukhatwa et al. (2022)				X		X					X	X	X		
Cain et al. (2021)	X			X											
Cairns, R. (2020)			X	X		X						X			
California Department of Education (2013)							X				X				
California Department of Education (2013)							X				X				
California Department of Education (2015)	X			X			X	X			X				
California Department of Education (2023)	X						X	X							
Cardona, M.A. (2023)					X			X				X			
Carius, A. C. (2020)			X	X		X				X	X	X	X		
Carson, C. (1995)	X	X		X											
Castillo et al. (2020)	X									X					
Center for Disease Control and Prevention (2018)	X														
Center for Disease Control and Prevention (2022)	X		X												
Center for Disease Control and Prevention (2023)	X		X												
Centers of Public Education (2016)	X														
Chafouleas et al. (2009)	X			X	X									X	
Chen et al. (2004)	X			X								X			
Christ et al (2022)			X		X	X			X			X			
Colbert-Lewis, D (2012)	X														
Coombs, W. T. (2007)														X	
Coombs, W. T. (2007b)		X												X	
Coyne et al. (2018)	X			X				X						X	
Creswell et al. (2018)															
Cromartie et al. (2006)	X									X					
Curriculum Associates (2020)			X	X		X		X	X		X	X			
D'Orville, H. (2020)			X	X					X	X		X			
Dannefer, D. (1987)														X	
Deane et al. (2022)				X	X							X			
Delfino, A.P. (2019)				X				X				X			
DiMenna, M. (2021)	X		X												
DiPrete & Eirich (2006)	X								X					X	
Dlugosz, P. (2022)		X	X		X			X		X		X			
Donalek, J. G. (2004)	X														
Dorn et al. (2020)			X	X					X			X			
Dweck, C. S. (1999)															X
Education Data Partnership (2022)				X			X					X			
Ellis, P. (2016)														X	
Engelbrecht et al. (2023)			X			X			X		X		X		
Engzell et al. (2021)		X	X	X				X	X			X			
Fairlie, R. (2020)			X						X						
Federal Communication Commision (2020)	X														
Fothergill et al. (1999)	X	X													
Freeman et al. (2021)			X	X		X				X		X	X		
Frieze, S. (2015)		X			X							X			
Gamio et al. (2022)		X			X			X	X			X	X		
Gao, N. (2022)		X	X		X			X		X		X			
Garfin, D.R. (2020)		X			X			X				X	X		
George et al. (2016)	X													X	X
Gershoff et al. (2010)		X			X							X			
Goodman et al. (2012)					X			X				X		X	

Author / Researcher	Background Information	Crises In Education	COVID-19	Academics	Mental Health	Distance Learning	California	Schools	Learning Loss	Rural	Mathematics	Students	Teachers	Theoretical Foundations	Theoretical Framework
Greenberg et al. (2003)				X				X				X			
Greene & Greene (2009)	X	X												X	
Gutierrez, R. (2013)											X			X	
Guzmán Rincón et al. (2021)			X	X				X		X		X			
Hanine & Dinar (2022)	X		X											X	
Hartig et al. (2021)		X			X										
Hattie et al. (2007)	X			X				X				X	X		
Hawkins et al. (2013)	X	X			X			X				X			
Hernandez, J. (2019)					X					X		X	X		
Hiebert et al. (2007)		X	X		X										
History.com editors (2013)															
Hodgen et al. (2010)											X	X	X		
Hodges et al. (2020 March 27)		X	X						X						
Hodges et al. (2020)		X	X		X	X			X			X	X		
Hurst, D. F. (2021).			X	X				X			X		X		
Hutchinson, A. (2019)						X									
Iglesias-Pradas et al. (2021)			X	X		X						X			
Ingersoll et al. (2011)				X									X		
Itopia (2023)			X	X				X				X	X		
Itten, A. V. (2018)														X	
John Hopkins University (2022)	X	X													
John Hopkins University (2023)			X												
Keith, C.S. (2018)				X				X				X	X		
Kempe et al. (2011)				X								X		X	
Khan Academy (2023)	X										X				
Khan, P. (2023)					X										
Kluger, R. (1975)	X	X										X			
Koposov et al. (2021)		X			X			X							
Koskinen et al. (2022)	X			X							X				
Kumar et al. (2020)	X														X
Lai et al. (2020)			X			X									
Lane, J. (2011)		X		X								X			
Leung, L. (2015)	X													X	
Li, F. (2022)			X		X	X			X			X			
Li, P. (2023)															
Logan et al (2017)					X									X	
Lou, B. (2018)	X			X				X							
Lumina Foundation (2019)	X									X					
Lynch, M. (2022)		X						X	X						
Main, P. (2022)												X	X	X	
Makkonen & Burr (2022)	X	X			X										
Margolis et al. (2006)					X			X							
Markel, D. H. (2020)	X	X						X				X			
Masten, A.S. (2021)	X														
Mathison, S. (1988)					X							X		X	
Matific (2021)				X				X			X	X	X		
Maynard et al. (2019)		X		X				X				X	X		
McIntyre et al. (2023)			X	X	X			X	X	X		X			
McLaughlin et al. (1997)	X							X		X					
McMillan et al. (2020)	X			X											X
Merriam-Webster (2023)			X						X						
Mesrobian, C. (2022)				X				X				X			
Mokenda, M.H. (2022)				X								X	X		
Molitor et al. (2022)			X			X					X	X			
Morgan, C. (2014)	X										X		X		
Mukuka et al. (2021)			X			X		X			X	X			
Mulenga et al. (2020)			X								X				
Mullis et al. (2016)	X										X				
Murphy et al. (2020)	X													X	
Myers et al. (2021)			X								X	X	X		
National Archives (2021)	X			X									X		
National Center for Education Statistics (2021)	X														
National Council of Teachers of Mathematics (2020a)			X								X	X	X		
National Council of Teachers of Mathematics. (2020b)			X								X	X	X		
National Council of Teachers of Mathematics. (2023)											X	X	X		
National Education Association (2021)	X		X	X		X		X					X		
National Park Services (2023)		X			X										
National School Boards Association (2023)			X					X		X		X			
Neuhauser et al. (2019)	X													X	
Ngo, C. N. (2022)			X							X					
Niveshank, S. (2016)	X			X										X	
Novais et al. (2015)	X				X										
Obersteiner et al. (2018)				X				X		X					
Office of Elementary and Secondary Education (2019)								X		X		X			
Office of Elementary and Secondary Education (2022)								X		X		X			
Park & Stokowski (2009)										X				X	
Park Ridge-Niles School District 64 (2018)				X							X		X		
Parks, C. (2021)		X						X		X					
Patten et al. (2017)	X														X
Patterson, J. T. (2001)	X			X											
Patton, M. Q. (2015)	X														X
Pfitzner-Eden, F. (2016)					X								X		
Pier et al. (2021)			X	X					X			X			
Pietrolungo, L. (2020,				X	X								X		
Quinn et al. (2014)	X														
Regional Educational Laboratory Northeast & Islands.	X														
Research Excellence Framework. (2021)	X			X											
Resilience (2022)	X													X	
Reynolds & Walberg (1992)				X				X			X	X			X
Rhama (2022)			X		X									X	
Ricca, B. (2022)		X						X							
Rich, G. (2020)	X			X		X									
Riley, R. (2020)	X														
Ringel et al. (2012)	X													X	

Author / Researcher	Background Information	Crises In Education	COVID-19	Academics	Mental Health	Distance Learning	California	Schools	Learning Loss	Rural	Mathematics	Students	Teachers	Theoretical Foundations	Theoretical Framework
Roberts et al. (2023)	X	X						X							
Roberts, A. (2021)				X	X							X	X		
Ross et al. (2019)	X			X											
Rossin-Slater (2022)	X	X			X			X				X			
Ruef et al. (2022)		X	X						X		X		X		
Ruiz, V. (2023)	X			X				X					X		
Rutter 2012)	X				X									X	
SAMHSA (2014)	X				X									X	
Samuel et al. (2020)			X	X				X				X			
Schleicher, A. (2020)			X	X									X		
Scott, D. (2020)	X		X												
Seeley, C. (2004)											X				
SENGIL AKAR & KURTOGLU ERDEN (2021)			X			X		X			X		X		
Shah, S. (2019)	X													X	
Siegle, D. (2023)		X	X	X		X			X						
Simonson et al. (n.d)															
Simorangkir et al. (2021)			X		X			X			X	X			
SIUMed (2021)			X		X					X					
Spinney, L. (2017)	X														
Staake, J. (2023)	X												X		
Steele & Kuhun (2011)	X				X									X	
Steele et al. (2009)				X	X				X			X			
Substance Abuse and Mental Health Services	X														
Substance Abuse and Mental Health Services	X	X													
Substance Abuse and Mental Health Services	X	X			X							X			
Suen et al. (2014)	X														X
Sutton et al. (2015)	X														X
Tahan et al. (2021)	X				X									X	
Teach.com. (2023)								X		X					
TeachThought. (2022)				X				X				X	X	X	
Tellß. G., & Altun, D. (2020)			X	X		X		X							
Thordardottir et al. (2016)					X				X						
Tieken et al. (2021)								X		X					
Tomlinson, C. A. (2017)	X			X									X		
U.S. Census Bureau (2023)	X									X					
U.S. Census Bureau. (2017)	X									X					
U.S. Department of Agriculture. (n.d.)	X														
U.S. Department of Education (2007)								X		X		X			
U.S. Government Publishing Office. (2005)		X						X				X			
UNESCO (2012)	X			X											
UNESCO. (2023)			X	X		X		X	X						
UNICEF (2022)		X	X	X				X	X		X	X	X		
United Nations. (2022)			X	X											
University of Washington. (2021)			X			X									
Urtel (2008)				X		X		X							
Vanbuskirk, S. (2022)		X	X			X						X			
Vázquez Toness & Luzye (2022)		X	X			X			X			X			
Viers, C. (2023)															X
Wade (2015)	X	X		X				X				X			
Waggoner, D. (n.d.)	X			X							X				
Walberg et al. (1992)								X				X	X	X	
Walters, D. (2022)			X	X			X	X	X			X	X		
Wang et al. (1997)								X					X	X	
Warner-Griffith et al. (2023)										X		X			
Willens, M. (2013)								X				X			
Wolfe et al. (2022)			X	X					X				X		
Zhou et al. (2020)			X	X				X				X			
Zimmerman, B. J., (2000)														X	X
Zippia, (2023)							X	X			X		X		

Synthesis Matrix - Synthesis Matrix.pdf

APPENDIX B

Introduction Email

02/01/24

Dear _____,

I am a doctoral student at University Massachusetts Global, conducting a study exploring high school mathematics teacher's perceptions on freshman students returning to school after being online after the trauma of a pandemic for two years with regard to academic achievement, behavior, mindset, and social connections. Your name was given to me by _____ at _____. I would very much appreciate including your perceptions of the impact on students returning to school post pandemic. If you volunteer to participate, I would want to schedule a one hour interview at your place of work or via zoom in March or April. All interview responses are confidential, and the interview questions will be available to you before we meet. Please let me know if you would be willing to help contribute to this important study.

Regards,

APPENDIX C

Informed Consent and Audio Recording Release

INFORMATION ABOUT: The perceptions of high school mathematics teachers on the impact on freshman students returning to school post pandemic.

RESPONSIBLE INVESTIGATOR: Joshua Silva

PURPOSE OF STUDY*:*

You are being asked to participate in a research study conducted by Joshua Silva, a doctoral candidate of Organizational Leadership from the School of Education at University of Massachusetts Global. The purpose of this phenomenological study to examine high school mathematics teacher's perceptions on freshman students returning to school after being online after the trauma of a pandemic for two years with regard to academic achievement, behavior, mindset, and social connections. Your participation in this study is voluntary and will include an interview with the identified student investigator. The interview will take approximately 60 minutes to complete and will be scheduled at a time and location of your convenience. The interview questions will pertain to your perceptions and your responses will be confidential. Each participant will have an identifying code and names will not be used in data analysis. The results of this study will be used for scholarly purposes only.

I understand that:

a) The researcher will protect my confidentiality by keeping the identifying codes safe guarded in a locked file drawer or password protected digital file to which the researcher will have sole access.

b) The interview will be audio recorded. The recordings will be available only to the researcher and the professional transcriptionist. The audio recordings will be used to capture the interview dialogue and to ensure the accuracy of the information collected during the interview. All information will be identifier redacted, and my confidentiality will be maintained. Upon completion of the study all recordings, transcripts and notes taken by the researcher and transcripts from the interview will be destroyed.

c) My participation in this research study is voluntary. I may decide not to participate in the study and I can withdraw at any time. I can also decide not to answer particular questions during the interview if I so choose. Also, the Investigator may stop the study at any time.

d) If I have any questions or concerns about the research, please feel free to contact Joshua Silva, at xxxxx@mail.umassglobal.edu or by phone at XXX-XXX-XXXX; or Dr. Sziraki (chair) at xxxxx@umassglobal.edu.

e) No information that identifies you me will be released without my separate consent and all identifiable information will be protected to the limits allowed by law. If the study design or the use of the data is to be changed, you I will be so informed and consent re-obtained. There are minimal risks associated with participating in this research.

f) If I have any questions, comments, or concerns about the study or the informed consent process, I may write or call the Office of the Vice Chancellor of Academic Affairs, University of Massachusetts Global, at 16355 Laguna Canyon Road, Irvine, CA 92618, (949) 341-7641.

I acknowledge that I have received a copy of this form and the "Research Participant's Bill of Rights." I have read the above and understand it and hereby consent to the procedure(s) set forth.

_____ Date:

Signature of Participant or Responsible Party

_____ Date:

Signature of Principal Investigator

APPENDIX D

Interview Questions

1. Overall, have you seen a change in your sense of self-efficacy between your time at home, due to covid, and your return to in person education as you work with students?

Academic Achievement:

2. Which academic achievements do you feel impacted your student's self-efficacy more and why?
Prompt: *What might be an experience in which your students were able to perform the necessary tasks successfully? (What happened? When did it happen? What are some factors that lead to your student's success?)*

Behavior:

3. Which behaviors do you feel impacted your student's self-efficacy more and why?
Prompt: *What might be an observation you have had through instructional time, walkthroughs, etc. that influenced your student's perceptions of being able to perform tasks? (What specifically were the observations? In what ways did this impact your student's self-efficacy?)*

4. What might be another experience that impacted your student's self-efficacy differently? In what ways did that impact your student's self-efficacy?

Mindset:

5. What mindsets do you feel impacted their self-efficacy and why?
Prompt: *What might be an experience where your students received verbal input from teachers, parents, administrators, peers, etc. that impacted their efficacy? (How did this impact their self-efficacy? What happened? When did it happen?)*

6. What might be another experience that impacted your student's self-efficacy/mindset differently? In what ways did that impact their self-efficacy?

Social Connections:

7. What social connections do you feel impacted your student's self-efficacy and why?
Prompt: *What might be a situation where your student's environment, such as teachers, parents, administrators, peers, etc. impacted their efficacy? (What happened? Who was involved? When did it happen? In what ways did this impact their self-efficacy?)*

8. Is there anything I missed that you would like to share?

Demographic Questions

1. Age:
2. Gender:
3. Ethnicity:
4. Highest level of education:
5. How long have you been a high school mathematics teacher:
6. What grade(s) do you teach:

APPENDIX E

Thematic Interview Protocol With Script

Start Interview: "My name is Joshua Silva and I am a high school mathematics teacher. I am a doctoral candidate at University of Massachusetts Global in the area of Organizational Leadership. I am a part of a team conducting research to examine high school mathematics teacher's perceptions on freshman students returning to school after being online after the trauma of a pandemic for two years with regard to academic achievement, behavior, mindset, and social connections.

Our team is conducting interviews with high school mathematics teachers like yourself. The information you give, along with the others, hopefully, will provide a clear picture of high school mathematics teacher's perceptions on freshman students returning to school post pandemic and will add to the body of research currently available. The questions I will be asking are the same for everyone participating in the study. I will be reading most of what I say. The reason for this is to guarantee, as much as possible, that my interviews with all participating teachers will be conducted pretty much in the same manner."

Informed Consent (*required for Dissertation Research*)

"I would like to remind you that any information obtained in connection to this study will remain confidential. All the data will be reported without reference to any individual(s) or any institution(s). After I record and transcribe the data, I will send it to you via electronic mail so that you can check to make sure that I have accurately captured your thoughts and ideas. Did you receive the Informed Consent and University of Massachusetts Global Bill of Rights I sent you via email? Do you have any questions or need clarification about either document?" *(collect the signed documents at this point, bring blanks in case they do not have it on hand, get it signed before proceeding)*

"We have scheduled an hour for the interview. At any point in time during the interview, you may ask that I skip a question or stop the interview altogether. For the ease of our discussion and accuracy, I will record the conversation as indicated in the Informed Consent. Do you have any questions before we begin? Just a reminder that this study is about your perceptions on students returning to school post pandemic with regards to

behavior, academic achievement, mindset, and social connections. Okay, let's get started, and thanks so much for your time."

The definitions for self-efficacy, academic achievement, behavior, mindset, and social connections (and the questions for today) were sent out a week ago. (*Bring an extra copy and give it to them in case they do not have it in front of them).*
(Introduce definition of key concepts before start and pause before moving on to the next one - so they can follow along. Suggestion: Thank you and we are now moving to the next section.)

Probes

Possible Probes,

1. *"Would you expand upon that a bit?"*
2. *"Do you have more to add?"*
3. *"What did you mean by ..."*
4. *"Why do think that was the case?"*
5. *"Could you please tell me more about…. "*
6. *"Can you give me an example of …."*
7. *"How did you feel about that?"*

When you review, please add others you think would be appropriate.

End Interview: "Thank you very much for your time. If you like, when the results of our research are known, we can send you a copy of our findings."

APPENDIX F

Field Test Questions

Interviewer Reflection Questions

1. How long did the interview take? Did the time seem to be appropriate?
2. How did you feel during the interview? Comfortable? Nervous?
3. Going into it, did you feel prepared to conduct the interview? Is there something you could have done to be better prepared?
4. What parts of the interview went the most smoothly and why do you think that was the case?
5. What parts of the interview seemed to struggle and why do you think that was the case?
6. If you were to change any part of the interview, what would that part be and how would you change it?
7. What suggestions do you have for improving the overall process?

Observer Field Test Questions

1. How long did the interview take? Did the time seem to be appropriate?
2. How did you feel during the interview? Comfortable? Nervous?
3. Going into it, did you feel prepared to conduct the interview? Is there something you could have done to be better prepared?
4. What parts of the interview went the most smoothly and why do you think that was the case?
5. What parts of the interview seemed to struggle and why do you think that was the case?
6. If you were to change any part of the interview, what would that part be and how would you change it?
7. What suggestions do you have for improving the overall process?

APPENDIX G

Field Test Participant Feedback Questions

While conducting the interview you should take notes of their clarification request or comments about not being clear about the question. After you complete the interview ask your field test interviewee the following clarifying questions. Try not to make it another interview; just have a friendly conversation. Either script or record their feedback so you can compare with the other two members of your team to develop your feedback report on how to improve the interview questions.

Before the brief post interview discussion, give the interviewee a copy of the interview protocol. If their answers imply that some kind of improvement is necessary, follow up for specificity.

1. How did you feel about the interview? Do you think you had ample opportunities to answer the question?
2. Did you feel the amount of time for the interview was ok?
3. Were the questions clear or were there places where you were uncertain what was being asked? *If the interview indicates some uncertainty, be sure to find out where in the interview it occurred.*
4. Can you recall any words or terms being asked about during the interview that were confusing or not properly explained? Please give specifics.
5. And finally, did I appear comfortable during the interview… (I'm pretty new at this)?

APPENDIX H

CITI Program Certificate of Completion

Completion Date 23-May-2022
Expiration Date N/A
Record ID 48762491

This is to certify that:

Joshua Silva

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

Human Subjects Research
(Curriculum Group)
Social-Behavioral-Educational Researchers
(Course Learner Group)
1 - Basic
(Stage)

Under requirements set by:

University of Massachusetts Global

CITI
Collaborative Institutional Training Initiative
101 NE 3rd Avenue, Suite 320
Fort Lauderdale, FL 33301 US
www.citiprogram.org

Generated on 15-Feb-2024. Verify at www.citiprogram.org/verify/?wdc3821e7-65a1-4e24-8c53-b8c97a779918-48762491

APPENDIX I

IRB Approval to Conduct Research

Dear Joshua Saul Silva,

Congratulations! Your IRB application to conduct research has been approved by the UMass Global Institutional Review Board. Please keep this email for your records, as it will need to be included in your research appendix.

If you need to modify your IRB application for any reason, please fill out the "Application Modification Form" before proceeding with your research. The Modification form can be found at IRB.umassglobal.edu

Best wishes for a successful completion of your study.

Thank You,

IRB
Academic Affairs
UMass Global
16355 Laguna Canyon Road
Irvine, CA 92618
irb@umassglobal.edu
www.umassglobal.edu

This email is an automated notification. If you have questions please email us at irb@umassglobal.edu.

APPENDIX J

Informed Consent and Audio Recording Release

INFORMATION ABOUT: The perceptions of high school mathematics teachers on the impact on freshman students returning to school post pandemic.

RESPONSIBLE INVESTIGATOR: Joshua Silva

PURPOSE OF STUDY*:*

You are being asked to participate in a research study conducted by Joshua Silva, a doctoral candidate of Organizational Leadership from the School of Education at University of Massachusetts Global. The purpose of this phenomenological study to examine high school mathematics teacher's perceptions on freshman students returning to school after being online after the trauma of a pandemic for two years with regard to academic achievement, behavior, mindset, and social connections. Your participation in this study is voluntary and will include an interview with the identified student investigator. The interview will take approximately 60 minutes to complete and will be scheduled at a time and location of your convenience. The interview questions will pertain to your perceptions and your responses will be confidential. Each participant will have an identifying code and names will not be used in data analysis. The results of this study will be used for scholarly purposes only.

I understand that:

a) The researcher will protect my confidentiality by keeping the identifying codes safe guarded in a locked file drawer or password protected digital file to which the researcher will have sole access.

b) The interview will be audio recorded. The recordings will be available only to the researcher and the professional transcriptionist. The audio recordings will be used to capture the interview dialogue and to ensure the accuracy of the information collected during the interview. All information will be identifier redacted, and my confidentiality will be maintained. Upon completion of the study all recordings, transcripts and notes taken by the researcher and transcripts from the interview will be destroyed.

c) My participation in this research study is voluntary. I may decide not to participate in the study and I can withdraw at any time. I can also decide not to answer particular questions during the interview if I so choose. Also, the Investigator may stop the study at any time.

d) If I have any questions or concerns about the research, please feel free to contact Joshua Silva, at xxxxx@mail.umassglobal.edu or by phone at XXX-XXX-XXXX; or Dr. Sziraki (chair) at xxxxx@umassglobal.edu.

e) No information that identifies you me will be released without my separate consent and all identifiable information will be protected to the limits allowed by law. If the study design or the use of the data is to be changed, you I will be so informed and consent re-obtained. There are minimal risks associated with participating in this research.

f) If I have any questions, comments, or concerns about the study or the informed consent process, I may write or call the Office of the Vice Chancellor of Academic Affairs, University of Massachusetts Global, at 16355 Laguna Canyon Road, Irvine, CA 92618, (949) 341-7641.

I acknowledge that I have received a copy of this form and the "Research Participant's Bill of Rights." I have read the above and understand it and hereby consent to the procedure(s) set forth.

_____ Date:

Signature of Participant or Responsible Party

_____ Date:

Signature of Principal Investigator

APPENDIX K

Research Participant's Bill of Rights

UMASS GLOBAL
A nonprofit affiliate of the University of Massachusetts

UMASS GLOBAL INSTITUTIONAL REVIEW BOARD Research

Participant's Bill of Rights

Any person who is requested to consent to participate as a subject in an experiment, or who is requested to consent on behalf of another, has the following rights:

1. To be told what the study is attempting to discover.
2. To be told what will happen in the study and whether any of the procedures, drugs or devices are different from what would be used in standard practice.
3. To be told about the risks, side effects or discomforts of the things that may happen to him/her.
4. To be told if he/she can expect any benefit from participating and, if so, what the benefits might be.
5. To be told what other choices he/she has and how they may be better or worse than being in the study.
6. To be allowed to ask any questions concerning the study both before agreeing to be involved and during the course of the study.
7. To be told what sort of medical treatment is available if any complications arise.
8. To refuse to participate at all before or after the study is started without any adverse effects.
9. To receive a copy of the signed and dated consent form.
10. To be free of pressures when considering whether he/she wishes to agree to be in the study.

If at any time you have questions regarding a research study, you should ask the researchers to answer them. You also may contact the UMASS GLOBAL Institutional Review Board, which is concerned with the protection of volunteers in research projects. The UMass Global Institutional Review Board may be contacted either by telephoning the Office of Academic Affairs at (949) 341-9937 or by writing to the Vice Chancellor of Academic Affairs, UMASS GLOBAL, 16355 Laguna Canyon Road, Irvine, CA, 92618.