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Lived Experiences of Emergency Remote Teaching Use by High School Mathematics
Teachers During the COVID-19 Pandemic

by
Glenn E. Gonzalez

An Applied Dissertation Submitted to the
Abraham S. Fischler College of Education
and School of Criminal Justice in Partial
Fulfillment of the Requirements for the
Degree of Doctor of Education

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Approval Page

This applied dissertation was submitted by Glenn E. Gonzalez under the direction of the persons listed below. It was submitted to the Abraham S. Fischler College of Education and School of Criminal Justice and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova Southeastern University.

Susanne Flannelly, EdD
Committee Chair

Michael Simonson, PhD
Committee Member

Kimberly Durham, PsyD
Dean

Statement of Original Work

I declare the following:

I have read the Code of Student Conduct and Academic Responsibility as described in the *Student Handbook* of Nova Southeastern University. This applied dissertation represents my original work, except where I have acknowledged the ideas, words, or material of other authors.

Where another author's ideas have been presented in this applied dissertation, I have acknowledged the author's ideas by citing them in the required style.

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Glenn E. Gonzalez

Name

June 5, 2023

Date

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Abstract

Lived Experiences of Emergency Remote Teaching Use by High School Mathematics Teachers During the COVID-19 Pandemic. Glenn E. Gonzalez, 2023: Applied Dissertation, Nova Southeastern University, Abraham S. Fischler College of Education and School of Criminal Justice. Keywords: emergency remote teaching, distance education, remote education, online education, COVID-19, pandemic, high school education, interpretative phenomenological analysis, qualitative study

This qualitative study aims to understand further the lived experiences of high school mathematics teachers who underwent a sudden transformation into emergency remote teaching due to the COVID-19 pandemic. The study used a qualitative approach, specifically an interpretative phenomenological analysis. Emergency remote teaching has been a new phenomenon that has presented itself worldwide.

This study used two methods for data collection. The first method used was the general participant demographic information survey, a demographic tool collection instrument created by the researcher. The second method for data collection included responses from one-on-one semi-structured interviews. A total of 13 participants completed the data collection process and were included in the data set for this study.

The results of the data analysis processes revealed seven emergent themes. These themes were technology training, low student engagement, availability of technology, providing services, co-worker support, low student achievement, and preparation for future emergency remote teaching.

Findings suggest that ERT is sustainable as a method of effective education should a crisis occur. However, the findings show that there are still significant challenges in improving the implementation of ERT in a K-12 setting. Finally, the results of this study show that educational organizations need to realize that the time to prepare for ERT is before the crisis occurs.

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Chapter 1: Introduction

Health officials identified a new virus in Wuhan, China, in December 2019. As a result, the World Health Organization (WHO) named the virus Coronavirus disease 2019 (COVID-19). The virus quickly spread via human-to-human contact and was eventually found in most countries worldwide. As a result, on March 11, 2020, the WHO declared COVID-19 a global pandemic (WHO, 2021).

The COVID-19 pandemic created an almost instantaneous shift in the educational community. Uncertainty about the spread of the virus and the need to remain away from social gatherings made the face-to-face classroom educational environment impossible. As a result, educators and students faced shifting teaching and learning using distance education with minimal warning and only a few days to prepare. Hodges et al. (2020) discussed the immediate and temporary shift of instructional delivery methods from face-to-face to distance education and called it Emergency Remote Teaching (ERT). Other terms used for a sudden change to distance education are Emergency Distance Education (Durak et al., 2020), Emergency Online Schools (Rush et al., 2016), and Crisis Distance Education (Al Lily et al., 2020). This study uses Hodges' term and definition of ERT.

Statement of the Problem

The implementation of ERT has created a problem in the educational community as the use of ERT has occurred. As a result, a better understanding of what educators go through as they experience this phenomenon is needed. Therefore, this dissertation considered the lived experiences of high school mathematics teachers in a southeast Florida school.

Hodges & Fowler (2020) reported problems during ERT by struggling faculty members with their transition into ERT. However, struggles during ERT went beyond faculty members. Students and parents have also reported challenges during ERT (Abbot, 2020). Implementing ERT has realized many challenges worldwide, as evidenced by communications among educational stakeholders. However, the continued difficulties indicate a possible trend in how individuals reflected on ERT use.

Before the COVID-19 pandemic, research in ERT involved situations regarding crises or disasters (Baytiyeh, 2017; Burde et al., 2017; Rush et al., 2016). The current pandemic has now brought ERT to the front of research topics. Studies on the worldwide use of ERT have now started to appear in academic journals (Hodges & Fowler, 2020). However, the need for ERT research is critical to returning to face-to-face instruction and a better understanding of the impact of ERT moving forward. Moreover, this pandemic has shown that situations can change, requiring ERT at any moment. School systems have already reported the development of many ERT lessons during the COVID-19 pandemic (Abbot, 2020). Additional research on ERT adds to how organizations worldwide process and learn from the lessons presented by the COVID-19 pandemic.

According to Marshall et al. (2020), study participants reported several probable causes for challenges during ERT use during the COVID-19 pandemic. Reported causes of ERT use problems include insufficient training, lack of prior use by teachers and students, parenting difficulties with at-home learning, technology issues, and mental and social issues (Marshall et al., 2020). This study focused only on high school mathematics teachers who experienced ERT. The knowledge gained from this study adds to the

understanding of the more significant impact of using ERT during the COVID-19 pandemic.

Phenomenon of Interest

The phenomenon of interest in this study explored the lived experience of high school mathematics teachers using ERT during the COVID-19 pandemic. While the use of ERT is not new, the worldwide application of ERT and ERT use in this study's site is a new phenomenon. Earlier research studies on ERT have described its use during national emergencies such as disasters or political unrest. Other studies have examined online delivery methods for teaching mathematics before the COVID-19 pandemic. Using online methods and resources has shown mixed results with some studies on student achievement levels and perceptions.

A research phenomenon is a problem, issue, or investigated topic (Van de Ven, 2016). This study discovered and described the experiences of high school mathematics teachers who experienced ERT during the COVID-19 pandemic.

The literature and results of this study provide the education community with a better understanding of high school mathematics teachers' experiences during ERT. The findings of this study add to the literature on how ERT use during COVID-19 has affected teachers in a high school setting. Moreover, the findings add to the educational communities' knowledge of COVID-19 experiences.

Teachers play the most critical part in a student's education. The teachers determine how students learn and what experiences students have in school. It is, therefore, essential to explore how teachers experienced and changed due to using ERT

during COVID-19. This study and others in the academic community could affect how education progresses worldwide.

Background and Justification

A review of the initiatives implemented by the district provides a better understanding of the experiences this study's participants had using technology tools in the classroom. Therefore, the following are some district-provided technology-related resources used before the COVID-19 pandemic and a breakdown of the event preceding ERT implementation.

Online delivery methods for instructional purposes are nothing new in the district. The district runs a fully online education system in Florida. The online district system opened in 2001 and today offers K-12 students the opportunity to pursue their education online. While different from the traditional face-to-face environment, the online district system remained a part of the school district and courses taught by certified district educators. Educators assigned to the online district system, through an application process, are assigned to teach via online methods only. The move to ERT for teachers assigned to the district's online system would be drastically different from face-to-face ones. Therefore, this study did not include participants in the district's online system.

The district's online system provides the district with some experience in providing education using an online delivery method; most district educators do not have much experience teaching online. The school district has proactively purchased a district-wide license for the learning management system Canvas. Canvas' integration has provided additional support to teachers, students, and parents over the past few years. Teachers have attended professional development on Canvas and best practices for use in the

classroom. This initial introduction to online education would serve as a stepping-stone to the eventual use of ERT.

The Florida Department of Education (FL DOE) issued directives to schools to prevent the spread of COVID-19 in the classrooms. On March 9, 2020, the CDC issued interim guidance for schools. In the district, educators received notifications to prepare for possible closures of schools and a shift to distance education methods of instruction. On March 16, 2020, the district announced the closure of all schools for students and faculty. Teachers and district personnel used the preceding week to prepare appropriately to move their instruction to an online format. In addition, the district offered teachers online workshops to assist them with the upcoming changes.

On March 30, 2020, all the districts moved to distance education learning. Teachers began providing instruction using the district's Learning Management System (LMS), Canvas. Canvas had already been in the district for a few years but was never used to provide full-time remote teaching. In addition to Canvas, the district used Microsoft Teams to allow teachers and students to collaborate in real-time. The 2020 school year ended in June 2020, with teachers providing only distance learning.

As the school year started in August 2020, the situation regarding the pandemic has remained the same. Local and federal governments mandated lockdowns and social gatherings restrictions worldwide. The district instructed all students to remain to learn through online methods from home. Teachers were also required to work from home and provide complete curriculums for their classes. In October 2020, the district opened schools for all teachers and students in collaboration with FL DOE directives. Teachers were required to report to their classroom daily but continued instruction using distance

learning. Students were allowed back into the school but voluntarily. Allowing students to remain learning from home meant that all teachers were required to continue using Canvas and Microsoft Teams as the platforms for their classes.

The school year ended in June 2021 with minimal instruction delivery changes. Following FL DOE directives, the district continued to allow students to remain using distance education from home. As previously stated, schools were opened to students voluntarily, with approximately 25% of the student population reporting to class in person. Most activities were conducted virtually or modified to consider Center for Disease Control (CDC) and FL DOE guidelines.

Starting in August of 2022, the school district and most educational districts in the U.S. have shifted back to a face-to-face educational setting. However, the COVID-19 pandemic is not over, and infection rates remain an issue of concern. In addition, moving all schools back to traditional educational settings has not eliminated ERT. ERT is now used on a case-by-case basis to meet student needs. As of the writing of this paper, online education is for students quarantined due to COVID-19 protocols. All teachers are back in the classrooms, and all students, except those with approved quarantine status, must report to school regularly.

There are decades of studies on distance education. Most educational organizations have a distance education program designed and implemented carefully and with much preparation. By design, distance education programs provide some or all parts of the educational process using remote methods. However, ERT is distinctly different from the traditional form of distance education. ERT is a temporary, alternate, and rapid shift of all educational activities. Activities that teachers would otherwise be delivering

face-to-face (Al Lily et al., 2020; Hodges et al., 2020). While distance education programs purposely use online delivery methods for standard instruction, ERT is not traditional. Instead, it uses the available resources, expertise, and various technology tools, at the current time to continue to provide educational activities to students who would otherwise be unable to continue due to the current crisis.

Deficiencies in the Evidence

The use of ERT due to the COVID-19 pandemic is a new phenomenon. Research on the various aspects of ERT is starting to appear in academic journals. Chapter 2 of this dissertation includes a literature review of ERT use during the COVID-19 pandemic. However, there remains a literature gap on several aspects of ERT. First, a gap in the literature remains on ERT's impact on educational organizations moving forward (Edmunds, 2020; Viner et al., 2020). Second, a gap in the literature remains on stakeholders' lived experiences, such as students and teachers who dealt with ERT during COVID-19 (Mantzikos et al., 2020; Jameson et al., 2020). Finally, an exhaustive literature review of ERT during COVID-19 has found several published studies at the higher education level. However, this leaves a literature gap on ERT experiences for teachers at the secondary level.

This dissertation aims to fill literature gaps by addressing the following:

1. The study adds to the literature on how ERT has impacted education moving forward. The descriptions and analysis of the teachers' lived experiences help better understand ERT's impact.
2. The dissertation fills the gap in the literature by giving a voice to teachers.

Through teachers' experiences, researchers, and policymakers can make more

informed decisions affecting their educational organizations.

3. Participants for this study are from a secondary-level high school mathematics department. This requirement will fill the gap in the literature of studies at the secondary educational level.

The selection of high school teachers addresses the literature gap, as there are very few studies at this level. In addition, by filling the gaps in the literature, this study adds to the ongoing body of work examining how the educational community experienced and adapted to using ERT during the COVID-19 pandemic.

Audience

This study provides information for a wide range of professionals. Educators, parents, school decision-makers, and resource developers can use it to guide resource decisions, strategic planning, and teaching strategies. Researchers and instructional technologists could use the findings from this study to expand their work in academia or remote education technologies. Phenomenological researchers interested in the impact of the COVID-19 pandemic also benefit from this study's findings. Finally, the conclusions from this study add to the literature for decision-making during situations, such as a crisis or natural disaster, that require ERT.

Definition of Terms

This applied dissertation used the following terms and definitions.

Diffusion

Processes in which innovations are communicated throughout a social system (Rogers, 2003). In the context of this applied dissertation, the diffusion that occurred was spreading information and using ERT throughout the school district.

Emergency Remote Teaching (ERT)

Hodges and Fowler (2020) define ERT as “a temporary shift of instructional delivery to an alternate delivery method due to crisis circumstances.” There are several other names for what constitutes the same action of ERT. Examples include emergency distance education, crisis education, and emergency online schools. For this study, regardless of the name given, all emergency education instances with the same ERT characteristics are labeled as ERT.

Exceptional Student Education (ESE)

A category of students who require individually designed instruction and special services (FL DOE, 2011). Eligibility for ESE services is established after an evaluation process and a determination that a child meets the criteria.

Individual Educational Plan (IEP)

An individually designed plan designed to provide necessary services to ESE-eligible students (FL DOE, 2011). The IEP team periodically completes reviews and revisions to IEP plans.

Innovation

A practice, object, or idea that is new (Rogers, 2003). Rogers points out that innovation and technology are often synonyms. In this context, ERT is an innovation since the use of ERT had not been widely adopted by educational organizations before COVID-19.

Pandemic

A disease in an entire area (Cambridge University Press, n.d.). The COVID-19 outbreak is a pandemic found in almost all areas worldwide.

Purpose of the Study

This qualitative study aimed to understand further the lived experiences of high school mathematics teachers who underwent a sudden transformation into ERT due to the COVID-19 pandemic. The study used a qualitative approach, specifically an Interpretative Phenomenological Analysis (IPA). The use of ERT has been a new phenomenon that has presented itself worldwide. Researchers have begun investigating the many aspects of ERT use during the COVID-19 pandemic. As described earlier, several gaps remain in the literature, and this qualitative study addressed those gaps. This study's overall purpose was to provide a voice to the teachers who lived through having to teach during the pandemic. This study also explored teachers' experiences using ERT for students with disabilities. The participating teachers and the analysis of their experiences provide a better understanding of ERT.

Chapter 2: Literature Review

Introduction

This chapter synthesizes a literature review on topics relevant to this study and divides the content into several sections by topic area. The first section discusses where ERT fits into the umbrella of distance education, including theories within distance education. The following section is a thorough literature synthesis of ERT studies before, during, and after the COVID-19 pandemic. Next is a discussion on Roger's (2003) Diffusion of Innovation Theory and its application to this study. The final discussion topics include services provided to students during ERT and a discussion on research involving online mathematics education. A summary of the main elements found in the literature closes out the chapter.

Distance Education

To better understand the central issue of experiences of ERT, a foundational understanding of distance education is essential. ERT falls within the umbrella of distance education. The following section will describe the characteristics of distance education and why ERT is a subset of distance education (Stewart & Lowenthal, 2022).

The term "distance education" originated in the 1960s when researchers first described the separation of parties within an educational setting (Moore, 2013). Over the following decades, there have been several definitions of what constitutes distance education (Bozkurt, 2019). Distance education, according to Garrison and Shale (1987), has three characteristics:

1. There must be a distance between the teacher and the student.

2. There must be two-way communication between teacher and student for educational purposes.
3. Technology is used to facilitate communication between teacher and student.

Similar definitions for distance education include a more formal education setting, such as through an educational organization (Simonson et al., 2015). However, researchers are still debating adding criteria for the definition of distance education (Johnston, 2020).

The concept of distance education has been around since the 1800s. Correspondence courses started delivering instruction at a distance using postal services (Casey, 2008; Simonson et al., 2015). In 1989, Nipper categorized three generations of distance education models based on production, distribution, and communication technologies. The first generation involved distance education through correspondence. Students and teachers sent printed material back and forth during the first generation. The next generation used multi-media and started in the 1960s. The third generation, which applies to the current distance education model, includes interactive technologies and the social processes used during distance education (Nipper, 1998). The third generation has also been called computer-based distance education (Anderson & Simpson, 2012; Bozkurt, 2019).

The first and second generations of distance learning had high student independence due to the lack of interactive technologies. The lack of interaction between teacher and student created an absence of social presence during the initial generations (Anderson & Dron, 2011). The advances in communication technology seen in the current generation of distance education have bridged the gap and added a social aspect

to distance education. Reducing time and space allowed the shift from teacher-centered to learner-centered education (Bozkurt, 2019).

Based on Garrison and Shale's (1987) three characteristics of distance education and Simonson et al. (2015) characteristics of a formal setting, ERT falls within the umbrella of distance education:

1. ERT does have a distance between teacher and student. The COVID-19 pandemic forced faculty and students to remain out of schools worldwide. Face-to-face education was temporarily not possible due to social distancing restrictions.
2. ERT used two communications to provide continued education to students. Students and faculty communicated using online tools such as email, texting, social media, and course management systems. The communication could have been synchronous or asynchronous, depending on the location and available resources.
3. Using ERT was only possible with electronic and network-based technologies.

Students and faculty use the available electronic devices such as laptops, tablets, and intelligent devices for educational purposes. Finally, Simonson et al. (2015) institutional based, more formal characteristics of distance education also apply to ERT. The COVID-19 pandemic forced most educational institutions worldwide to shift to ERT. Therefore, ERT is a subset of distance education as it falls within the characteristics of distance education (Stewart & Lowenthal, 2022).

Theories of Distance Education

Research in the field of educational communication and technology is grounded on the works of theories in other areas. One of these areas is the psychology of learning,

first discussed by Spector (2008) as one of the four basic theoretical foundations for research in educational communication and technology. According to Spector, the psychology of learning deals with how problem-solving takes place, how memory works, and the systems related to how we teach. The psychology of learning has seen many changes, from behaviorism to cognitivism to constructivism. Educational communication and technology researchers are now building on previous works to expand the field in theory and practice.

Theory of Transactional Distance

Distance education is unique in that it contains a separation between student and teacher (Shearer, 2021). Researchers widely use the theory of transactional distance to understand the unique separation between students and teachers (Moore, 2013). According to Moore (2013), the transaction in distance education is the interplay between teacher and student when they are spatially apart.

The theory of transactional distance has three variables: (a) dialog, (b) structure, and (c) autonomy, that describe the educational environment during distance education. Dialog involves the communication between student and teacher. Dialog is the conversation within education that creates knowledge (Shearer, 2021). The dialog is dependent on other variables, such as the availability of resources or the needs of the participants. The structure is how the educational system responds to the needs of the students. The amount of dialog and structure are measurable in a distance education environment (Simonson et al., 2015). Dialog and structure vary on the specifics of each educational transaction. As structure increases or dialog decreases, the transactional distance increases. (Moore, 2013). The last variable is autonomy which is at the center of

distance education (Shearer, 2021). Distance education separates student and teacher and thus requires some learner autonomy. Some students can succeed with high levels of autonomy, while others require more guidance and much less autonomy. Course designers and faculty members determine the amount of autonomy based on the expected needs of the course. Properly designed courses have a proper balance of the amount of autonomy based on the needs of the students.

Cognitive Theory of Multimedia Learning

Richard Mayer established a cognitive theory relating to using multimedia for instructional purposes, the Cognitive Theory of Multimedia Learning (CTML). Mayer's CTML uses Paivio's (1986) work on mental representations and studying how humans learn.

Paivio claimed that humans learn from verbal and non-verbal events, eventually leading to the establishment of Paivio's dual coding theory, used in CTML. In 2001, Mayer published the first edition of his Multimedia Learning book. CTML is established in this book and designed as a research-based theory to study the learning process when instruction involves pictures and words (Mayer, 2008). In addition, CTML is interested in the cognitive process and best practices for using multimedia in instruction. With the proliferation of multimedia in today's education field, CTML is critical for researchers, instructors, instructional designers, and technology experts.

Multimedia. There are several definitions for what constitutes multimedia. Mayer (2008) defines *multimedia* as presenting information using visual and verbal forms. By extension, multimedia instruction can use visual and verbal forms in any instructional

activity. Mayer designed CTML to study the learning process during multimedia instruction.

However, not all multimedia is equal, and adding multimedia does not guarantee improvement in the learning process. The overuse or improper use of multimedia instruction could cause cognitive overload and harm learning (Leahy & Sweller, 2016; Dindar et al.,2014; Mayer & Moreno, 2003).

Concepts of CTML. CTML has a set of basic concepts that form the foundation for the theory. From Paivio's work, CTML assumes a dual-channel system for receiving information. Information enters through either the visual sensors (eyes) or the auditory sensors (ears). Each channel is independent of the other and may receive information simultaneously. Borrowing from fundamental concepts of other theories, storing information is also assumed to be held in either working or long-term memory, according to CTML. Although CTML assumes that working memory and long-term memory are separate psychological structures, other researchers have suggested looking at both memory banks as one structure, with working memory as part of the long-term structure (Schweppe & Rummer, 2013).

CTML uses the concept of three types of cognitive loads. In CTML, the three types of cognitive load are: (a) extraneous, (b) essential, and (c) generative. Finally, CTML assumes that working memory is limited in the amount of information held and processed simultaneously.

CTML aims to find the best way to use cognitive resources during the instructional process while using multimedia. Many principles have been established and researched in CTML. While the academic community widely shares these principles, the

principles require further research to expand and confirm the indications of each principle (Cavanagh & Kiersch, 2022; Clark & Feldon, 2014).

Some recent studies have shown contradictory or cautionary results regarding the principles of CTML (Andrade et al., 2014; Clinton et al., 2017; Cook & Visser, 2014; Knoster & Goodboy, 2023; Liberman & Dubovi, 2023; Zhang et al., 2016). Many studies have shown results in alignment with the principles of CTML. However, some results provide a different approach to the principles. A reoccurring concept of these contradictory results shows a reversal effect for some principles of CTML. Sometimes, multimedia creates a reversal effect and has demonstrated increased cognitive loads and lower educational effectiveness. Therefore, it is incumbent on researchers to continue the research on CTML to ensure best practices in instructional multimedia.

The transactional distance theory applies to the use of ERT and this study. ERT uses the three variables of transactional distance dialog, structure, and autonomy. The prevention of face-to-face learning forced students and teachers to be separated and communicate using digital technology. The dialog between student and teacher was dependent on the available communication tools. Communication tools included email, text, social media, or learning management systems. The structure depended on how the educational organization's system adjusted to meet the student's needs during ERT. This measurable variable was fluid throughout the use of ERT. Educational organizations and faculty had to learn what techniques and systems supported their students best. Finally, ERT left many students with a high level of autonomy. The effects of such sudden levels of autonomy are yet undiscovered. This study investigated such effects from the perspective of educators.

Given that ERT uses many types of multimedia to present information, CTML is also applicable. The concepts of CTML provide a theoretical background on how using multimedia in ERT can be beneficial if used correctly. However, CTML also shows that misusing multimedia can negatively affect students' learning process. Educators designing course materials during ERT, or any distance educational setting should know how students learn using multimedia. Applying the concepts of CTML directly affects students' learning in an online environment (Knoster & Goodboy, 2023).

Emergency Remote Teaching

For the first time in human history, the educational process worldwide faced an almost instantaneous shift from traditional face-to-face delivery to some version of distance education using technology. This seismic shift was due to the COVID-19 pandemic, which started in late 2019 and early 2020 and quickly spread worldwide. With little notice, educational organizations worldwide implemented ERT to continue the educational process of their students as best they could. In addition, the use of ERT affected all levels of education, from preschool to universities. The local and national restrictions on social gatherings forced all teachers and students to use ERT.

ERT, having the characteristics of distance education, is a subset of distance education. However, ERT differs from traditional distance education programs (Stewart, 2021). While distance education programs are pre-planned and have implementation phases, ERT does not provide preparation time. The essence of ERT is the rapid change of delivery methods. Hodges and Fowler (2020) define ERT as “a temporary shift of instructional delivery to an alternate delivery model due to crisis circumstances” (p. 119). The nature of ERT’s rapid change of delivery method can amplify various barriers to

online learning. Challenges such as teacher inexperience, lack of technical knowledge, or communication issues become more significant during ERT (Marshall et al., 2020).

ERT is a widely accepted term for the global shift in the education community due to the COVID-19 pandemic (Stewart, 2021). A search of the literature on the topic of ERT in academic literature databases dated from January 2020 to October 2020, the initial ten months after COVID-19 was identified (WHO, 2021), found 101 articles. Of the 101 articles, 38 were empirical studies set within higher education. Of those 38 empirical studies, the most significant percentage came from the United States (23.1%) and the United Kingdom (10.3%). The breakdown of study methods included Qualitative (52.6%), Quantitative (31.6%), and Mixed Methods (15.8%) (Stewart, 2021).

Emergency Remote Teaching Before COVID-19

Research in ERT dates back as far back as 2016, and there are many published articles regarding its use worldwide (Rush et al., 2016). However, the use of ERT was usually due to a crisis or disaster occurring in localities. Examples are war zones, natural disasters, or political uprisings. Therefore, these earlier studies of ERT provide researchers of COVID-19 studies with a benchmark to compare. Together, studies on ERT before, during, and after the COVID-19 pandemic allow more informed future ERT use when circumstances dictate.

ERT is not used to address the challenges presented by the COVID-19 pandemic. ERT has been used for some time but relegated to a particular locality or region. The use of ERT for the continuation of education was due to crises in the immediate area. Crises such as natural disasters, civil unrest, or military interventions would make traditional face-to-face education impossible or dangerous. For example, in 2005, Hurricane Katrina

affected almost 200,000 students and caused schools to be closed for three months. In 2010, an earthquake in Haiti devastated Port-au-Prince, involving 2.5 million students and causing months of school closures. A 2015 earthquake in Nepal caused thousands of schools to be damaged and affected 870,000 students. Floods also cause extensive damage, affecting millions of students worldwide. (Save the Children, n.d.) These are just a few examples of crises that have caused ERT use.

Baytiyeh's (2017) research on ERT use in earthquake zones shows many challenges associated with using ERT. The main component of the success or obstacles of using ERT is the communication or information technology infrastructure to support the ERT process. Baytiyeh proposes that educational administrators should be forward-thinking about future challenges that require ERT. The proposal involves the following four steps to ensure the continuation of effective education: (a) a solid information technology system that will ensure the functionality of online communication and access to instructional materials (b) maintaining effective communication channels between administrators, teachers, parents, and students, (c) teachers can begin to use the provided learning management system and other applications to provide student resources, and class interaction and (d) parent involvement is required to provide support to the online learning environment.

ERT uses social media, email, TV, and telecommunications. Using ERT, the primary education of students by teachers requires an effective learning management system. Various systems are available to schools. Some systems are free, while others require licensing agreements. In addition, the connection of teachers, students, course materials, and parents makes it possible to continue education via online methods.

Finally, Baytiyeh's (2017) research in natural disaster areas has shown that mental health is critical to the success of the educational process when using ERT. Using ERT many individuals, both adults, and children, using ERT have experienced recent catastrophic events, and mental conditions such as PTSD need to be addressed by educational administrators. Therefore, Baytiyeh proposes including mental health support during ERT use.

Like Baytiyeh (2017), Rush et al. (2016) studied the use of ERT in areas affected by crises. Rush et al.'s plan has five stages designed to use emergency online schools after a disaster. Stage one considers gathering input from all stakeholders and deciding to use ERT. ERT occurs when conditions leave no choice but to continue the educational functions of schools. Stage two considers the development and implementation of ERT and has three phases; (a) to develop the infrastructure of ERT after a disaster has occurred, (b) to implement ERT using the available technology and resource, and (c) to adjust the needs of all involved in using ERT.

Stage three gathers resources and support from within the community and outside areas. Stage four is for outreach to the community and includes providing information, support, and resources necessary after any disaster and throughout the use of ERT. Finally, stage five is the execution of ERT using the planning, information, and resources from the other stages. Stage five also includes monitoring the situation for adjustments and eventual return from ERT use.

While the nature of ERT provides little preparation time, both Baytiyeh (2017) and Rush et al. (2016) provide a plan for ERT implementation. Critical to both plans is the need for communication tools and resources to continue the education process. Also

noteworthy was Baytiyeh's recommendation that mental health support is part of the ERT implementation process. This study investigated teachers' lived ERT experiences and included experiences in the stages of Baytiyeh and Rush et al.'s plans.

A survey of 328 PreK-12 teachers found that 92.4% lacked training in online teaching (Marshall et al., 2020). Teachers also reported that most professional development is for a face-to-face delivery method. The lack of preparation is one of the ways ERT becomes significantly different than distance education. While distance education is a planned process where teachers and students use an online method by design, ERT creates a forced scenario of alternate educational activities. Therefore, students need preparation for ERT use. A study of student perceptions regarding the use of ERT showed negative experiences during the use of ERT. Students expressed concerns about a lack of engagement, increased anxiety, and reduced ability to interact with instructors (Petillion & McNeil, 2020). Both Marshall et al. (2020) and Petillion and McNeil (2020) recommend that educational organizations provide faculty and students with training opportunities to use technologies to alleviate many of the challenges presented in their studies.

With the lifting of many social gathering restrictions worldwide, educational systems will move away from ERT and back to the traditional face-to-face classroom environment. ERT research shows that many organizations and stakeholders faced many challenges with such a sudden and drastic change (Trust & Whalen, 2020). Therefore, additional research in ERT is needed to support decision-makers as they make necessary changes to address the challenges faced during ERT.

A study by Kearns (2016) aimed to provide a greater understanding of how the

experience of teaching online influences instructors thinking, planning, and enactment in their teaching practice across delivery methods. The four overall themes that emerged during Kearns' study are; (a) reflection on practice, (b) structure, (c) conducting class, and (d) facilitation of learning. Online teaching allowed instructors to reflect on how they were conducting the class. The reflection process also allowed teachers to reflect on their teaching strategies and try new approaches. After teaching online, instructors also reported a better understanding of how best to plan and organize the course. One instructor reported that teaching online expanded their ability to present content and student expectations better. Since students are not in a classroom, explicit instructions and expectations are essential for online courses.

Another theme reported by instructors involved the actual activities completed during class. Online teaching allows instructors to see which activities serve the best purpose for the desired result. For example, a participant reported identifying activities in her class that were time wasters and making changes to increase the desired effect. The final theme identified by the study was the facilitation of learning. This facilitation includes three areas; (a) active learning, (b) peer interactions, and (c) establishing a connection. The Kearns (2016) study describes the benefits instructors found by online education but did not have the stress and challenges presented by the COVID-19 pandemic.

The research described in this section provides a benchmark for this study. Research on ERT in disaster zones, such as Baytieh (2017) and Rush et al. (2016), showed several challenges to ERT. Marshall et al. (2020) and Petillion and McNeil (2020) recommended a plan of action to alleviate the challenges presented by ERT.

Finally, the research by Kearns (2016), albeit before the COVID-19 pandemic, provides a glimpse of the possible benefits of using ERT as education moves forward.

Current Research in Emergency Remote Teaching

The use of ERT during the COVID-19 pandemic has dramatically increased the number of published research studies. For example, a basic search for “emergency remote teaching” on the ERIC database shows only a handful of articles before 2019. However, searching the same term for the years covering the pandemic up to 2023 shows 424 published works (academic journals only). The following is a synthesis of the current state of research on the topic of ERT.

A study from Saudi Arabia (Al-Freih, 2021) aimed to find the impact of ERT on university faculty members. The three main themes found by the study were enhancing online student engagement, increased awareness of technology issues, and the transition after ERT. The participants reported needing more student engagement in the class when they shifted to ERT. The inability to gather immediate feedback from students’ expressions also caused challenges as teachers could not monitor and adjust the class’s needs. Teachers reported adjusting their activities from asking questions to more interactive activities such as chat rooms and open-ended questions. Teachers also reported challenges with changing students learning more passively. Students were listening and understanding but not necessarily actively participating. As ERT progressed, participants reported becoming more aware of the available technology, such as video lessons, chat rooms, and other communication tools. These tools could enhance the course and assist with student engagement. However, participants reported limitations when using certain technologies. Having many students was also a point of concern when

using technology. Finally, participants reported changing their perspective on using technology moving forwards. Teachers reported using their experience with ERT and integrating some of the better practices into their standard classrooms after ERT use had ended.

The findings of the Al-Freih (2021) study align with a previous study done in 2016 by Kearns. Kearns studied university faculty experiences with online teaching and the impact of teaching. The study included 78 university-level faculty members from all ranks and identified three themes. These themes shifted focus from teaching to learning, awareness of technology, and the weakening of boundaries between face-to-face and online teaching.

Van Heuvelen et al. (2020) examined a General Chemistry course at a university in California study that looked at several student performance indicators and the experiences of course instructors. Four hundred forty-eight students were used and included two semesters of student data. The student data showed that students submitted assignments in higher numbers when they were worth more than their final grades. The pandemic disrupted in different ways to everyone. Therefore, it was unclear if the assignment submission was due to the weight of the assignments or other external factors. The instructors mentioned a lack of ability to provide services to students with disabilities or low-socioeconomic status. The pandemic and the move to ERT only magnify the inequities some student populations suffer. The instructors in this study were all tenured professors who had never taught online and found working together an effective method of overcoming the challenges presented by ERT. As a group of instructors, they could assist each other and divide the workload required for the course. The dividing workload

allowed the instructors more time to make necessary course adjustments as they transitioned to ERT.

Petillion and McNeil (2020) examined student experiences during ERT in a university-level Chemistry course. The phenomenological study used surveys and interviews with 64 faculty members at Canadian universities and found the main concern expressed by participants to be the diminished engagement of students within the class. Other factors that participants described included additional stress and anxiety. Overall, students had an unfavorable view of their learning during ERT. Participants reported an inability to maintain an organized schedule and a need for more connection between students and instructors. However, some participants did identify synchronous learning and helping with the issue of maintaining an organized schedule. Likewise, some participants viewed asynchronous learning as a benefit of ERT. Another area viewed as unfavorable was the administration of assessments. Students reported difficulty with proctoring software and added anxiety caused by exams. Some participants volunteered open-ended follow-up questioning and gave several suggestions for improving ERT. Recommendations included more assessment flexibility, practice opportunities, collaboration with students and instructors, and regular instructor communication.

The Alvarez (2020) study in the Philippines was a phenomenological study to discuss the lived experiences of five university-level students who experienced ERT due to COVID-19. Four themes emerged from the study. These themes were internet connection issues, budgetary constraints, technical device issues, and emotional concerns. The participants reported having difficulties with internet connection which caused the inability to download or upload files, lag in accessing course resources, or experiencing

no connection. These connection issues created difficulties in-class participation and the ability to understand lessons. One student commented on his inability to understand the professor because the connection was lagging, and the professor showed up blurred.

Budgetary concerns affected participants in many ways. Internet connection costs money, and ERT's increased use of data has strained students' budgets.

Moreover, budgetary concerns also affect the next theme found in the study regarding devices. Participants reported needing more funds to purchase equipment needed for ERT, such as computers. Participants found themselves borrowing equipment whenever possible to continue their education during ERT. The final theme reported was the need for emotional support. Participants found themselves feeling unsafe, isolated, and uncertain of the future. The pandemic and the social gathering restrictions left participants missing their families and wondering if they would get COVID-19.

Bhamani et al. (2020) collected data from 19 parents in Pakistan whose children experienced ERT to examine the lived experiences of parents at home with children during the COVID-19 pandemic. The study found three emerging themes. These themes were the impact of children learning during ERT, the support given by the educational organization, and strategies used by parents to support ERT and the learning process. First, parents reported difficulty with the sudden change in the educational routine of students. The school provides a structured routine that helps in maintaining organization and scheduling. The sudden shift to ERT disrupted the rigid educational routine. Parents also reported a need for more trust in the ERT process. Parents stated that teachers needed ERT training, and many activities and assessments were untested, creating an uncertain environment for the learning process. Finally, parents were concerned that the

isolation forced by social distancing restrictions could have negative social implications for their children.

The next theme reported by parents was the support provided by the schools. Parents stated that schools posted content on course management systems, requiring parents to ensure their child has an adequate internet connection and technological devices needed during ERT. The schools also positively spread COVID-19 awareness and attempted to inform students on how to best deal with the challenges presented. The final theme was parents' support to give their child during ERT and included maintaining a strict schedule to ensure a balanced time approach for school, play, family, and rest. Finding engaging activities also assisted parents so that children remained on task. The Bhamani (2020) study gave insight into how parents experienced ERT. Undoubtedly, parents repeated the challenges and adjustments presented in this study worldwide.

Durak and Cankaya (2020) examined university students' views on ERT during the COVID-19 pandemic. Thirty-two students from four universities participated in the study using an online open-ended questionnaire. The study found that students and instructors tried their best to quickly adapt to ERT even though many had no prior online education experience. The nature of ERT allowed for very little time to train instructors. The instructors' training is a scenario found in most educational organizations worldwide during ERT implementation due to the COVID-19 pandemic.

The study found that students from two universities who used Microsoft Teams as their communication platform were satisfied with the system. Those participants who used Microsoft Teams claimed benefits from interacting and watching recorded lessons. Participants in the other two universities that did not use Microsoft Teams found the

educational system complicated and negatively viewed. The participants who did not use Microsoft Teams complained of a lack of synchronous lessons and difficulty understanding content and interaction. The lack of interaction also caused students to lose motivation and performance. Some students did not feel like students in a classroom simply by accessing pdf files. Other students found the studying-from-home aspect of ERT as beneficial as it allowed them to study in the comfort of their homes.

Overall, the students who were more connected to their instructor and course, like those who used Microsoft Teams, had a more positive view and felt their anxiety about the ERT process was alleviated more effectively. In contrast, less contented students, such as those who did not use Microsoft Teams, had opposing views and increased anxiety.

A study of K-12 teacher experiences during ERT in 2020 included 328 teachers (Marshall et al., 2020). The average participant experience was 7.1 years, and more than half of the participants taught at Title I schools. Most (92.4%) teachers reported having never taught an online course. The teachers reported needing help providing quality instruction. Reasons reported by teachers for lack of quality instruction included time constraints, lack of resources, and inability to hold students accountable. Many school districts and states changed grading systems to address equity. Other teachers reported policy issues such as assigning homework and lack of communication. Providing services to special education students was also a concern for teachers. Outside the classroom, teachers reported personal situations as being challenging. Many teachers also have children at home, which forces them to juggle teaching a class while monitoring their children involved in ERT.

A 2023 Duke University study of students found that using ERT had no effect on student individual or team assessment scores (Aziz et al., 2023). The study compared scores from courses taught by the same instructor in the years 2020-2021 and 2021-2022. It concluded that using ERT does not affect academic achievement scores. However, in direct contradiction to this study, a Harvard University report on the consequences of instruction during the pandemic found that achievement growth from 2020 to 2021 was lower in math and reading (Goldhaber et al., 2022).

The research reported in this section gives an overview of studies investigating ERT use in different settings and found main themes. First, instructors, teachers, students, and parents reported many challenges. Challenges included technology issues, budgetary concerns, providing services and support, and mental and emotional health issues. The other overall theme found in the literature involves the benefits of ERT and possible recommended changes to the educational system that can incorporate some of the aspects of ERT moving forward.

The synthesis of the current ERT research guided this study's questioning, including themes found in the literature. Each theme addressed one or more of the research questions of this study. In addition, the following themes were part of the interview process:

1. Training, including teacher and student training with the technologies involved in ERT (Al-Freih, 2021; Chirinda et al., 2021; Durak & Cankaya, 2020; Van Heuvelen et al., 2020). This theme addresses research question number 1.

2. Engagement includes teacher and student interaction (Al-Freih, 2021; Bhamani et al., 2020; Durak & Cankaya, 2020; Petillion & Mcneil, 2020; Elhaty & Elhadary, 2023). This theme addresses research question number 2.
3. Technology, including all technologies needed for ERT use (Alvarez, 2020; Bhamani et al., 2020; Marshall et al., 2020; Sabier & Uysal, 2022). This theme addresses research question number 2.
4. Providing services to students with disabilities (Van Heuvelen et al., 2020; Marshall et al., 2020; Pihlainen et al., 2023). This theme addresses research question number 2 and 3.
5. Emotional support, including social or emotional support, is provided to or by schools, students, or parents (Alvarez, 2020; Bhamani et al., 2020; Petillion & Mcneil, 2020; Van Heuvelen et al., 2020; Stewart & Lowenthal, 2022). This theme addresses research question number 2 and 3.
6. Learning, including the effectiveness of student learning or teacher learning of ERT (Aziz et al., 2023; Bhamani et al., 2020; Goldhaber et al., 2022; Marshall et al., 2020; Petillion & Mcneil, 2020). This theme addresses research question number 2.
7. Transition, including perspective on the use of ERT (Al-Freih, 2021; Durak & Cankaya, 2020; Elhaty & Elhadary, 2023). This theme addresses research question number 4.

Based on the literature, ERT causes significant challenges to all stakeholders.

However, there are possible benefits gained from ERT use. It is, therefore, essential that research on this topic incorporates different settings and environments. This study adds to

the literature on how high school-level mathematics teachers experienced ERT and how it impacts their teaching as they progress beyond ERT.

Theoretical Framework: The Diffusion of Innovations Theory

Diffusion is the communication process of innovation with other social system members (Rogers, 2003). The diffusion of innovation theory is appropriate for examining how organizational ideas and practices spread (Valente & Davis, 1999). Many fields have used the diffusion of innovations approach to research innovations. (Barrett et al., 2020). This study examined the use of ERT through the diffusion of innovations framework. Rogers' (2003) diffusion of innovations provides four elements to any diffusion research study: "(a) innovation, (b) communication channels, (c) time, and (d) social system" (p. 11). This study considered these elements and the impact ERT has on each. Moreover, the study also considered the diffusion of ERT innovation within the context of a high school mathematics department.

Rogers (2003) defined *innovation* as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 12). As previously discussed, distance education has a long history, and many organizations have some version of a distance education program.

Florida statute requires graduating high school students to take at least one class via distance education (FL DOE, 2012). Exposure to online instruction is an innovation planned and implemented for all students. While the use of online technologies for education is not new, the enacting of ERT is unfamiliar to most organizations and individuals worldwide. For an innovation to be considered unique, it does not have to be something new or that an individual lack previous knowledge. Innovation is unique if the

individual still needs to form an opinion of the innovation (Rogers, 2003). In this study, ERT's innovation is unique even though most individuals and organizations know and may have used online instruction.

The means through which information about innovation transfers from one entity to another are communication channels (Rogers, 2003). ERT, by definition, causes a forced change in the delivery method used for education. For many organizations, it meant going from traditional face-to-face to distance education. ERT disrupts the usual communication channels. The exchange of information about the innovation was on a mass scale. In this study, communication channels rapidly informed all stakeholders of ERT implementation. This study examined the disruption caused by ERT on communication channels as diffusion occurs.

Time was the element most significantly impacted by ERT. Most diffusion of innovations provides adequate time for passing information through communication channels, a comparison made, and decisions on adoptions or rejections made (Rogers, 2003). However, the COVID-19 pandemic brought worldwide closure in an almost instantaneous fashion. As a result, little to no time was allowed for proper preparation to shift to ERT. This study considered how the lack of appropriate time affected the use and experience of using ERT.

A group of units, part of one system with a common goal, is a social system (Rogers, 2003). Pandemics are considered a social phenomenon (Leach et al., 2020). The diffusion of innovation explains social changes (Rogers, 2003). This study examined the experiences of individuals, but these individuals are part of the social system made up of stakeholders of the educational organization.

The theoretical framework of this study used the elements of the diffusion of innovation. The four elements, innovation, communication channels, time, and social system, are used to examine ERT. Research questions gathered data on how the participants lived experiences reflected the four elements.

Innovation Decision Process

Innovations go through a process that shows the changes experienced by individuals from the initial innovation exposure to the final confirmation of the decision to either adopt or reject the innovation. The adoption or rejection of any innovation requires a process. Innovations take time in large organizations, such as sizable educational districts. Therefore, final decision-making requires several layers of discussion and approvals.

This process is called the innovation-decision process (Rogers, 2003). The innovation-decision process's five sequential stages are (a) knowledge, (b) persuasion, (c) decision, (d) implementation, and (e) confirmation.

Exposure to the innovation of an individual begins the knowledge stage. According to Rogers (2003), there are three types of knowledge about innovation. The three types are awareness-knowledge, how-to-knowledge, and principles-knowledge. Awareness knowledge is when an individual becomes aware of the existence of an innovation. Distance education has been going on for decades, and ERT has occurred in years past. So, the function of delivering education online is nothing new to educational organizations, teachers, students, and parents. For example, the school district has a dedicated online course delivery system. Florida has a school district that provides courses via distance education called Florida Virtual School. However, since this study

makes a point to differentiate standard distance education programs from ERT, using ERT would be an unknown innovation for many stakeholders. How-to-knowledge is the information needed to use the innovation (Rogers, 2003). Many teachers have reported having never done online teaching or using ERT. Therefore, how-to-knowledge required improvement before the start of ERT for most educational organization and their stakeholders. The last type of knowledge is the principles knowledge which involves the functioning principles of innovation.

Most teachers know proper educational pedagogy for ERT but need more knowledge and experience to determine if pedagogy is transferable from face-to-face to ERT. Rogers claims that a lack of principles-knowledge does not mean the innovation will not be adopted but creates possible challenges for the innovation's future use. This study adds to the body of literature on the principles and knowledge regarding ERT. Overall, teachers have been aware of the concepts of distance education, but most only contained an initial awareness-knowledge level of ERT. ERT use has moved teachers to gain other levels of knowledge, how-to-knowledge, and even principles-knowledge.

The second stage is persuasion, where "the individual forms a favorable or unfavorable attitude toward the innovation" (Rogers, 2003, p. 174). Many factors affect an individual's decision to form a favorable or unfavorable attitude toward innovation. ERT addresses the disruption of the educational process, as seen during the COVID-19 pandemic. Educational organizations worldwide faced the possibility of not continuing the education of millions of students. The discontinuation of students would have been a catastrophic injustice, and with no end to the pandemic, educational organizations had to find an alternative. ERT provided this alternative and what Rogers identifies as a

preventive innovation. A preventive innovation is adopted to avoid a possible adverse event. In this case, ERT's adoption prevented the lack of education among students worldwide. Being a preventive innovation could influence favorable attitudes due to ERT use during significant needs.

The third stage is the decision stage, which involves adopting or rejecting the innovation (Rogers, 2003). Some trial of the innovation usually characterizes this stage. There is much uncertainty when deciding to adopt or reject an innovation. Trials provide insight into whether the innovation is worthy of full adoption or rejection. ERT did not allow for any specific trial or demonstration. The COVID-19 pandemic almost stopped education instantaneously worldwide. However, schools and educators still went into ERT blindly. As previously discussed, most schools had a distance education system in place. This South Florida School district had experience with distance education, albeit not the scale required for ERT.

The school district previously moved teachers and students toward incorporating more digital tools with face-to-face education years before the pandemic. The district had purchased a license for Canvas, LMS, and Microsoft Office, which provide Microsoft Teams. This forward-thinking provided the district with a glimpse of how ERT would function. As such, the district decided to adopt ERT for all students. However, it is essential to understand that the district decision, even though it is understandable, did not provide adoption or rejection options to other stakeholders such as teachers, students, or parents. This type of adoption is an authority innovation decision, where an organization decides to adopt, and employees must comply (Rogers, 2003).

The implementation stage is when innovation is used (Rogers, 2003). Uncertainty

is still present during the implementation stage as the effectiveness of innovation upon initial implementation is undetermined. Many issues arise within an organization, such as a school, when implementing an innovation. Individuals within organizations have individual skills and beliefs which play a part in implementing innovations. Usually, implementation stages can continue for a long time. Implementing ERT in schools such as this South Florida School district caused the implementation stage to be cut short. The normalization of innovation within the organization is considered the end of the implementation stage. At the district, the nature of the pandemic caused ERT to be implemented and normalized in a brief period.

The final stage, the confirmation stage, involves the decision to continue using the innovation (Rogers, 2003). Organizations or individuals can continue or discontinue an already adopted innovation for many reasons. Examples are when innovation is affected by a need, when newfound information may provide a superior innovation, or new information that presents the adopted innovation more unfavorably. In this South Florida School district and educational organizations worldwide, the innovation of ERT is still in this final stage. The district has moved out of ERT, so the innovation was discontinued, but that is not to say that all the parts of ERT will not continue moving forward. This study and many other studies on ERT and the COVID-19 pandemic examine how ERT has changed the educational process. Full-time ERT for all students will not likely remain in any area, but some delivery methods will remain. By examining the lived experiences of teachers who experienced ERT, this study adds to the literature on the impact of ERT moving forward.

Innovation Process in Organizations

Similar to the Innovation-Decision Process, organizations also go through five stages for processing innovation (Rogers, 2003). Below is a model of Roger's Five Stages in the Innovation Process in Organizations (Rogers, 2003).

The Innovation Process in Organizations emphasizes the implementation rather than the decision to adopt or reject (Rogers, 2003). Organizations make decisions, usually by a group of leaders, to adopt an innovation. Upon adoption, the organization implements the innovation. For example, the district is the sixth-largest educational district in the United States. The district's school board, superintendent of schools, and school leaders decided to implement ERT without providing options to other stakeholders such as teachers, students, or parents.

The five stages of the innovation process in an organization are (a) agenda setting, (b) matching, (c) redefining, (d) clarifying, and (e) routinizing. The agenda-setting stage is where an organization requires innovation. For example, the pandemic disrupted students' education process in the district, and ERT was needed to continue education. The second stage is the matching stage, where innovation and need match. ERT matched the need created by the pandemic since it would allow education to continue even with social distancing restrictions. Finally, the redefining stage is where the innovation becomes normalized or routine. The organization has learned to adapt to innovation and adopted the innovation to meet its needs. For example, ERT was implemented in the district at the end of the 2020 school year and continued the following year.

This study describes how teachers experienced ERT and how teachers adapted to its use. The clarifying stage is when the innovation used is more stable, with minor adjustments made as experience with the innovation increases. At the district, directives

came down from the district office to address concerns raised during ERT use. Finally, innovation has become part of the organization's everyday operations in the routinized stage.

As previously discussed, the district used ERT for over a year. Using ERT for a long time created a mental routine for students attending school. This study examines how teachers continue using ERT concepts as schools transition to traditional face-to-face educational settings.

Emergency Remote Teaching and Students With Disabilities

While the topic of students with disabilities is not directly addressed in the title of this study, addressing this particular category of students is inherent in the teaching process in the district. The school district records report that over 37,500 students are eligible for services as students with disabilities (Broward Schools, 2022). Students requiring services integrate into the standard mathematics courses. Therefore, every mathematics class may have any number of students eligible for services. Given the frequency of mathematics teachers providing services to students with disabilities, the state has mandated all teachers to take an additional course on special education to obtain certification. Therefore, this study considers this category of students as it explores teachers' lived experiences as they experienced ERT during the COVID-19 pandemic. The following section gives a snapshot of current research and cases regarding the connection between ERT and students with disabilities.

The pandemic has affected the educational process of millions of students worldwide. As a result, stakeholders in education have faced challenges. The move to ERT greatly affected the services schools provided to students with disabilities (Van

Heuvelen et al., 2020). In the United States, students with disabilities receive free and appropriate education (FAPE) mandated by federal laws, the Americans with Disabilities Act (ADA), and the Individuals with Disabilities Education Act (IDEA). These two acts provide equity to students with disabilities by establishing protections, processes, and rights for students and their families. The Council for Exceptional Children (CEC, 2020) states that IDEA covers 7.1 million students aged 6-21, and ADA's 504 plans cover another 700,000. Moreover, both federal statutes cover an additional 1.2 children aged 0-5. Therefore, approximately 10 million children with disabilities are eligible to receive services from educational organizations.

The 116th U.S. Congress passed the Coronavirus Aid, Relief, and Economic Security (CARES) Act, signed into law by then-U.S. President Donald J. Trump on March 27, 2020 (Congress.Gov, 2020). The CARES Act tasked the U.S. Department of Education Secretary, then Betsy DeVos, to recommend changes to any federal education laws that may need adjustment due to the COVID-19 pandemic. Secretary DeVos made several recommendations to the U.S. Congress but did not include IDEA or ADA requirements waivers. Instead, the Department of Education published a memorandum stating, "U.S. Secretary of Education Betsy DeVos today reaffirmed her long-held position that individualized education must take place for all students, including students with disabilities" (U.S. DOE, 2020).

The U.S. Department of Education's memorandum instructing educational institutions to comply with IDEA and ADA requirements caused many challenges. Both schools and parents reported issues with equity and implementation of how individualized education plans (IEP). State and local school boards rushed to determine

how to provide the best services needed by students with disabilities during ERT. For example, in California, several school districts changed the grading of courses to ensure equity for all students, including students with disabilities. (Education Trust, 2020) The New Jersey Department of Education issued guidelines and recommendations for schools in the state to ensure that each student eligible for student education services receives the best implementation of their IEPs or 504 given ERT use (Advocates for Children of New Jersey, 2020). This South Florida school district also implemented changes to the grading policies during the last semester of the 2021 school year. No student received a grade of "F" during that term. Moreover, IEP and 504 remained in effect for all students eligible for the services.

School districts and parents reported challenges worldwide regarding implementing IDEA and ADA requirements. (Jameson et al., 2020; Mantzikos & Lappa, 2020). In Pennsylvania, a court case, Brennan and James v. Wolf, Rivera, and the Pennsylvania Department of Education, is a class-action lawsuit filed to address the failure of the state to provide FAPE by not meeting all the requirements of IDEA or ADA. In Chicago, the Teachers Union filed a lawsuit, Chicago Teachers Union v. Betsy DeVos, Department of Education, the Board of Education of the City of Chicago, against the U.S. Department of Education and others. The Chicago case was regarding Secretary DeVos and the local school board's failure to request a waiver of IDEA or ADA requirements as allowed by the CARES Act. The teacher's union claimed that the failure to request the waivers would require 60,000 IEPs or 504 to be reviewed and possibly adjusted for implementation during ERT. The teacher's union stated that an enormous task would divert too many educational resources, already strained by ERT (Jameson et

al., 2020). The issue of services for students with disabilities was not limited to the U.S. Students with disabilities and the organizations providing services faced similar challenges. In Greece, a study on students who receive services for disabilities with hearing also faced similar challenges. Hearing issues made ERT difficult for these students (Mantzikos & Lappa., 2020).

To assist schools in implementing IDEA and ADA requirements during ERT, the CEC (2020) issued some recommendations. The following are the three main recommendations given.

1. Schools should ensure equity for all students. CEC recommends that schools prioritize in-person services for students with disabilities.
2. Schools should protect special education programs and resources. Such protections include safeguarding the jobs of special education teachers and not expanding their caseload. In addition, schools should protect mental health programs and provide such programs to students with disabilities.
3. Schools should maintain the integrity of IDEA and ADA. Maintaining integrity requires using data to make decisions, recognize the vulnerability of students with disabilities, and provide support services to meet educational, behavioral, and social-emotional needs.

This South Florida School district faced the same challenges reported in the cited sources in this section. Given the U.S. Department of Education directives and applicable laws such as IDEA, ADA, and CARES Act, BCPS continued to provide services to

students with disabilities. District leaders followed the recommendations made by CEC and directed teachers to provide services to eligible students during ERT. One of the research questions this study investigates is the lived experiences of high school mathematics teachers as they provide services to students with disabilities. The participants' experiences in this study and other studies and settings provide a better understanding of how ERT impacted students' services.

Online Mathematics Teaching

Mathematics courses were not at the forefront of innovations for teaching online (Engelbrecht & Harding, 2005). During the initial push for teaching online, mathematics did not lend itself to an easy transition to online delivery. Social sciences teaching online differed from teaching applied fields such as mathematics (Akdemir, 2010). The availability of software and conceptual ideas of mathematics teaching prevented online teaching early on. However, creating new software makes teaching mathematics possible, and today, most online programs contain mathematics courses.

Research in teaching and learning mathematics online has been ongoing for over a decade. The literature has identified several aspects of online mathematics instruction and learning. First, using online resources is a common theme in the literature. Second, there are many mathematics resources available to students. Third, many students consistently use online resources such as Khan Academy and YouTube videos (Ni She et al., 2017).

Kersey (2019) conducted a study to determine the impact of online resources in Calculus courses. The study was conducted in the Fall of 2017 using four post-secondary classes. Each class contained 70 students. Two classes used traditional resources and served as the control group, while the other two used online resources. Kersey's study

showed that final course grades were higher for students who used online resources than traditional ones.

Within Florida, mathematics courses have online resources teachers and students use to supplement instruction. Starting in 2013, a grant provided to the University of Florida, Florida, made available an online teaching and tutoring program called Math Nation (MN). MN is available to all Florida students free of charge and offers various tools to assist students in mastering the skills needed to achieve passing scores on end-of-course exams (Leite et al., 2019).

Leite et al. researched the effectiveness of MN in a 2019 study to find the relationship between the passing rates of students who used MN and their scores on end-of-course exams. The study results indicated a positive relationship between the use of MN and the passing rate of students who retook an end-of-course exam. The MN developers claim that the end-of-course exam scores for Algebra 1 have improved by 9% since the program's rollout in 2013 (Algebra Nation, n.d.). BCPS has been using MN in classrooms since its inception. The switch to ERT due to COVID-19 has created a greater demand for online resources such as MN as it provides asynchronous resources to teachers and students (Alabdulaziz, 2021).

Another commonly used online resource is Khan Academy. Khan Academy provides tutorial lessons and practices for mathematics content at all levels. Vanegas and Westermann (2019) found that students using Khan Academy had better examination scores when compared to other traditional resources. These findings align with Chan et al. (2016), who found a positive correlation between the use of Khan Academy and final grades.

The literature shows that online resources can benefit mathematics courses (Chan et al., 2016; Kersey, 2019; Leite et al., 2019; Vanegas & Westermann, 2019). However, there is still a contradiction in the literature results as some researchers have found online resources showing no benefit (Delgado et al., 2019; Winitzky-Stephens & Pickavance, 2017). Therefore, it remains to be determined which online mathematics online resources, such as MN, Khan Academy, and YouTube, are most beneficial to students. (Ni She et al., 2017).

Summary

Chapter 2 synthesizes the literature review on topics relevant to this study. The first topic was distance education and how ERT fits within the field. ERT is a subset of distance education meeting all the qualifications of what constitutes distance education. An analysis of theories within the field of distance education and how those theories apply to ERT followed.

The next topic discussed was ERT, which included studies before COVID-19, during the pandemic, and ERT studies relating to students with disabilities. The literature review found that ERT occurred during natural disasters or crises (Baytiyeh, 2017; Rush et al., 2016). Researchers gave several challenges and recommendations at that time. The research on ERT use during the COVID-19 pandemic found that most of the world faced the same situation. Educational institutions face some of the same challenges (Marshall et al., 2020).

The Diffusion of Innovations Theory was discussed within the context of this study. Rogers (2003) first established the Diffusion of Innovation Theory. The literature review found that the theory applies to many research areas, including education. The

theory had three elements, along with two decision-making processes. These processes, the Innovation Decision Process and the Innovation Process in Organizations were described along with their application to this dissertation.

Finally, the literature review included studies concerning the online teaching of mathematics. The review found that teaching mathematics online has been going on since the inception of online teaching in the early 2000s (Engelbrecht & Harding, 2005). Studies on the effectiveness of online mathematics teaching have shown mixed results.

Research Questions

The following central question, followed by research questions, provided structure during the participant interview process. In addition, the questions provided the ability to gather data on the lived experiences of high mathematics teachers using ERT during the COVID-19 pandemic.

Central Question: What are mathematics teachers' perceptions regarding their ERT experience during the COVID-19 pandemic at a high school in Southeast Florida?

RQ1. How do mathematics teachers describe their ERT preparedness during the COVID-19 pandemic at a high school in Southeast Florida?

RQ2. How and in what ways do mathematics teachers describe their ERT experience providing education to their students during the COVID-19 pandemic at a high school in Southeast Florida?

RQ3. How and in what ways do mathematics teachers describe their ERT experience providing services to students, including students with disabilities, during the COVID-19 pandemic at a high school in Southeast Florida?

RQ4. In what ways do mathematics teachers think that their ERT experience

during the COVID-19 pandemic will influence their teaching techniques at a high school in Southeast Florida?

Chapter 3: Methodology

Introduction

This chapter describes the methods for completing this dissertation and uses a logical order of organization pattern (Joyner et al., 2013). A logical order organizes content by their relationship. In addition, this chapter incorporates the university's template for submitting qualitative method dissertations. Annesley (2010) describes the parts of the methods section as ingredients in a recipe. According to Annesley, an informative methods section should contain the study's *who, what, when, where, how, and why*. This chapter includes descriptions of the aim of the study, the selected research approach, participants, data collection instruments, procedures, and data analysis. The conclusion of the chapter includes a discussion on topics of ethics, trustworthiness, bias, and limitations relating to this study.

Aim of the Study

This study aims to understand further the lived experiences of high school mathematics teachers as they experienced ERT during the COVID-19 pandemic. A better understanding of how teachers experienced ERT during the pandemic benefits researchers and policymakers alike. Research in ERT has become more prevalent since the pandemic has affected education systems worldwide. In addition, policymakers in government and private enterprises now face making decisions as the world slowly returns to normal operations. This study provides more detailed information into how individuals, in this case, teachers, experienced ERT and how to make policy decisions best to benefit the new state of normalcy with remains moving forward.

Qualitative Research Approach

Qualitative approaches capture and understand experiences during pandemics. Furthermore, qualitative methods provide a glimpse of situations as they occur and provide lessons about future occurrences of those situations (Teti et al., 2020). Given these characteristics, this study uses a qualitative research approach.

Phenomenology

Husserl described the founding principle of phenomenological inquiry as examining the experience as it happened (Smith, et. al, 2022). The appearance of anything is a phenomenon, and any phenomenon is suitable for phenomenological reflection (Moustakas, 1994). A phenomenological study aims to determine what experiencing the phenomenon means for the participant. By further understanding teachers' experiences during ERT, a phenomenological design best suits this study. This qualitative study aims to understand further the lived experiences of high school mathematics teachers who underwent a sudden transformation into ERT due to the COVID-19 pandemic. As such, phenomenology is best for examining educators' experiences.

Phenomenology relies on the interpretation of the researcher (Bednall, 2006). Furthermore, the significance of the data can be affected by the researcher's experiences if the researcher has experienced the examined phenomenon. Thus, the design and implementation of the study require the concepts of epoche (Bednall, 2006). The researcher aimed to stay true to Husserl's view that phenomenology involves the examination of human experience (Smith et. al, 2022).

Epoch

Epoche is originally a Greek word to stay away or pass judgment (Moustakas, 1994). In the epoche, the researcher sets aside all preconceived notions or judgments. Husserl described separating or putting aside notions or judgments as bracketing (Smith et al., 2022). The participant's experiences are viewed with naïve glasses, allowing unbiased, open-minded interpretations. However, epoche does not remove all knowledge or create doubt about everything (Moustakas, 1994). Instead, it removes the knowing in advance or predetermined. The researcher of this study has shared the examined phenomenon of the study. Thus, the researcher used reflective bracketing and guidelines to ensure proper epoche throughout the study (Ashworth & Lucas, 2000; Gearing, 2004).

Bracketing and epoche are interchangeable (Gearing, 2004; Bednall, 2006).

Bracketing refers to setting aside presuppositions that surround a phenomenon (Ashworth & Lucas, 2000; Gearing, 2004). Reflective bracketing focuses on making the researcher's background and suppositions transparent. The researcher must identify all preconceptions or ideas about the investigated phenomenon. Identifying all preconceptions allows the researcher to bracket out those ideas better and minimize the study's impact (Gearing, 2004; Tufford & Newman, 2010).

A complete bracketing of all the researcher's ideas and suppositions is impossible (Ashworth & Lucas, 2000, Chan et al., 2013). Moustakas (1994) explains that while epoche requires the tabling of knowledge, it does not eliminate the conscious person. In reflective bracketing, the researcher attempts to understand the impact of their experiences rather than attempt to eliminate them (Bednall, 2006). Bracketing can also allow the researcher to reach a deeper level of reflection on the phenomenon (Tufford & Newman, 2010).

Bracketing

There are three phases of reflective bracketing (Gearing, 2004). The first phase is the identification of possible preconceived ideas by the researcher. The second phase is the application of bracketing, usually done in the design phases of the study. However, reflective bracketing should also occur during the analysis stage of the study. The final phase of reflective bracketing is the unbracketing or reintegration during data analysis. The goal of the unbracketing is to ensure the researcher's suppositions did not affect the study (Gearing, 2004). Chan et al. (2013) suggest that bracketing occur throughout the entire process rather than only during data collection and analysis.

Ashworth and Lucas (2000) established practice guidelines to support researchers in addressing proper bracketing. The guidelines consider bracketing presuppositions and developing an empathic understanding of the participants' experiences. The following are the nine guidelines and their application in this study (Ashworth & Lucas, 2000).

1. The researcher identifies the study's objectives and the phenomenon under examination.
2. Participants should be free to describe their experiences and the most appropriate means implemented to obtain the participant's experiences.
3. Participants should be allowed to reflect, and the researcher's suppositions should not be the basis for the questions.
4. The researcher's interview skills should be reviewed and adjusted when necessary.
5. Transcripts should be accurate in the descriptions of the participant's experiences.

6. The analysis should consider presuppositions and use empathic understanding.
7. Analysis should avoid premature closure to produce logical categories.
8. A clear description of the analysis should allow the reader to evaluate the attempt at bracketing and trace the process which produces the findings.

The concepts of bracketing were implemented throughout the entire study as suggested by Chan et al. (2013). This study included reflective bracketing (Gearing, 2004) and Ashworth and Lucas' (2000) guidelines to ensure proper epoche throughout this study. It also incorporated bracketing concepts from Tufford and Newman (2010).

Interpretative Phenomenological Analysis

The IPA was developed by Jonathan Smith (1996) and has its roots in psychology (Noon et al., 2017). An IPA examines how people make sense of their experiences as events occur (Smith et al., 2022). Smith is credited with the origins of the IPA in a 1996 publication calling for a different approach to capturing experiential and qualitative data. (Miller et al., 2018; Smith et al., 2022). The COVID-19 pandemic is a social event, and qualitative methods play a part in understanding and finding solutions to the challenges of the pandemic (Teti et al., 2020).

The IPA foundation is in three major theories: (a) phenomenology, (b) hermeneutics, and (c) idiography. IPA is used to examine and interpret the experiences of individuals as they experience and make meaning of their relationship with the world around them (Smith et al., 2022). This study used the phenomenological approach to examine ERT usage during the COVID-19 pandemic.

The second foundational theory of IPA is hermeneutics, the theory of interpretations (Smith et al., 2022). Hermeneutics as a research approach allows empirical

understanding by connecting the investigated phenomenon with a given set of pre-understanding (Vauterin & Virkki-Hatakka, 2021). The connection allows a subjective interpretation of the phenomenon investigated by including the individual and community's beliefs, history, and prejudices. An IPA's main objective is to interpret the studied phenomenon through participants' lived experiences. During data interpretation, an IPA allows for the movement back and forth (Smith et al., 2022). The flexibility allowed by the IPA benefited this study during the data interpretation of participants' responses.

The final foundation theory of IPA is idiography. According to Smith et al. (2022), idiography relates to or deals with something concrete, individual, or unique. For example, a group of selected participants may have experienced the same phenomenon. However, individuals within the group may have a very different sense of their lived experiences (Miller et al., 2018). IPA's use of idiography provides the ability for a detailed description and analysis of the experiences of individuals. Therefore, a small number of participants rich in lived experiences is desirable for the IPA. This study selected participants from a pool of high school mathematics teachers who experienced the same phenomenon.

An IPA approach is appropriate for this study since it examines the lived experiences of high school mathematics teachers using ERT during the COVID-19 pandemic. The selected site provides participants with the rich experiences necessary for conducting an IPA. An IPA also provides appropriate flexibility during interviews and the interpretation of responses. Flexibility or the ability to move away from a rigid format is an advantage of an IPA approach (Smith et al., 2022). While the participants each have

their own experiences and make sense of those experiences individually, all participants shared the central experience of using ERT during the COVID-19 pandemic.

Participants

This study used purposive selection sampling of participants since they can offer the best insight into the examined phenomenon in this study. Smith et al. (2022) describe purposive selection as beneficial to an IPA since researchers aim for a homogeneous sample. Creswell and Guetterman (2019) also identify purposeful sampling when a study requires the participants to have a similar trait or characteristic.

The number of study participants can vary based on the needs of the study. Creswell and Guetterman (2019) and Smith et al. (2022) recommend that qualitative studies use a few individuals. Smith et al. recommend that doctoral-level studies have between four and ten participants. Maintaining a relatively low number of participants is due to the nature of qualitative method research. Qualitative research methods, including IPAs, require that researchers provide an in-depth analysis of the participants and their experiences. Having a manageable number of participants allows the researcher to dedicate more resources to each participant. An appropriate number of participants enables a researcher sufficient case to show similarities and differences in the experiences while at the same time not overwhelming the researcher or study with too much information (Smith et al., 2022).

Participants were selected from a group of high school mathematics teachers. The selection of these mathematics teachers provides the study with a data-rich participant with unique knowledge based on the problem statement. In addition, teachers selected as participants all have lived through the experience of using ERT during the COVID-19

pandemic. Each pool member is a high school mathematics teacher and experienced using ERT during the COVID-19 pandemic. However, the experiences and backgrounds of each potential participant are different.

Data Collection Instruments

This study used two methods for data collection. The first method used was the General Participant Demographic Information Survey (GPDIS), a demographic tool collection instrument created by the researcher. The second method for data collection included responses from a one-on-one interview with the participants that I conducted. This section describes each method.

General Participant Demographic Information Survey

The GPDIS (Appendix A) was sent to participants once a member of the participant pool had agreed to the study. The GPDIS has a total of 7 general demographic questions. Each participant was sent the GPDIS online via email. I created the GPDIS for use in this study based on the following rationale:

Question 1: Name. The name connects the GDPIS responses with each participant.

Question 2: Email address. The email address allows the researcher to contact the participant during the study.

Question 3: Courses taught during ERT. This response provides a better understanding of the type of courses each participant experienced during ERT.

Question 4: Years of teaching experience. This response provides a more detailed understanding of each participants' level of teaching experience.

Question 5: Preferred method of contact. This response allows the participant to select email or phone as the preferred method of future contact by researcher.

Question 6: Level of comfort with technology use before ERT. This Likert scale question provides information on each participant's comfort level with technology use prior to using ERT.

Question 7: Level of comfort with technology use after ERT. This Likert scale question provides information on each participant's comfort level with technology use after using ERT.

Technology, specifically online collaboration, is how ERT is made available to students and teachers. Therefore, questions 6 and 7 provided a data point for how comfortable participants felt using technology before and after ERT. Completed GPDIS responses are kept confidential and stored in a secure location.

Semi-Structured Interview

An IPA is best suited when participants can offer detailed descriptions of their lived experiences (Smith et al., 2022). Thorough interviews collect a person's intimate lived experience and are optimal for an IPA. Smith argues that these interviews should not be highly structured or constrain participants from describing their experiences. On the contrary, a semi-structured interview that is more of a conversation, albeit with purpose and guided by the research questions, is recommended (Brinkmann & Kvale, 2015; Smith et al., 2022).

This study collected data using a semi-structured interview of participants, and each interview was between 40 to 60 minutes. Interviews used the Semi-Structured Interview Guiding Questions to maintain consistency. The themes used in the guiding

questions were developed from a synthesis of the literature on ERT studies and aligned with the central and research questions. Chapter 2 provides a description and rationale of the question themes.

Before any interview, I conducted three pilot interviews using experienced educators who had also experienced ERT. Pilot interviews are a way of providing information for the creation of a follow-up study (Oerther, 2019). The pilot interviews occurred via Zoom. The purpose of the pilot interviews was for the pilot participant to provide feedback which I used to improve the interview questions and overall process. Upon completing the pilot interviews and receiving feedback, I adjusted the interview process as necessary to ensure validity and reliability.

In addition to the pilot interviews, the researcher sent three experts the completed proposal. These experts included two doctorate-level education professionals and one educational professional with over 20 years of education experience. The purpose of sending the proposal to these experts was for them to review the study and provide suggestions for improvement. The experts received the proposals via email and provided feedback electronically and in person. These experts provided feedback to make adjustments and improvements to the study.

Procedures

The following is a detailed description of the procedures used by the researcher to complete his study. Joyner et al. (2013) describe the procedures as step-by-step instructions for completing the dissertation. The procedures should be clear enough for another researcher to replicate the study. According to Creswell and Guetterman (2019),

the procedures section should include the research's characteristics, design, sampling, and data analysis.

The study implemented the following steps after receiving approval from the University's Institutional Review Boards (IRB). A more in-depth discussion of the participants, interviews, and data analysis follows the steps.

1. Sent all potential participants an invitation email.
2. Created a list of respondents and non-respondents.
3. Three days after sending the initial email, I sent a follow-up email to those who have yet to respond.
4. Created a final list of participants five days after the initial email.
5. Sent all participants the informed consent form via email. Participants were issued pseudonym for confidentiality.
6. Upon return of all informed consent forms, participants were sent the GPDIS via email, within two days of receiving consent forms.
7. Received all GPDIS forms and recorded their data.
8. The researcher selected and scheduled three pilot interviews with experienced educators. The pilot interview improved the questioning and process before the remaining interviews.
9. Adjusted the interview questions and process based on feedback from the pilot interview.
10. Scheduled interviews with participants.
11. Conducted interviews as scheduled within fifteen days. All interviews had audio recordings and the researcher took notes during the sessions.

12. After each interview, the researcher transcribed the session.
13. Upon completion of all interview transcripts, the researcher sent, via email, each participant a session transcript and allowed them to verify, add, or adjust their descriptions.
14. All transcripts and notes were organized, and the data was analyzed. The information gathered during the data analysis is part of the dissertation's results and discussion sections.
15. A thank you letter was sent, via email, to all participants to show the researcher's appreciation for their assistance in this study.

Recruitment of Participants

Recruitment of participants began after the university's IRB approval. All potential participants were sent an invitation to participate via email, which served as the recruitment tool. I created a list of individuals who have agreed to be participants. A follow-up email was sent three days after the initial invitation email to those members of the pool who had not responded.

After the follow-up email, I created a final list of participants. Then, I sent the informed consent form, via email, to all participants. Participants returned signed informed consent forms. Once participants returned the informed consent forms, participants were sent the GPDIS via email. After five days, I sent follow-up emails to participants who had yet to return their GPDIS. All returned informed consent forms, and GPDIS were secured.

Scheduling the Interviews

Before conducting interviews with participants, I conducted three pilot interviews. The data gathered from the pilot interviews were not used as part of the data set for this study. Instead, the pilot interviews provided feedback and allowed for adjustments to the interview questions or process. Upon completion of the pilot interviews and making necessary adjustments, participant interviews were scheduled.

All participants were identified by a pseudonym assigned and used throughout the study to comply with confidentiality. All data was received and reported by using the individual's pseudonym. Individual interviews were planned to last for 40 to 60 minutes. All interviews took place via Zoom. The schedule of interviews was based on the needs of each participant. The goal of the scheduling process was to schedule them in the least intrusive manner to the participant while attempting to complete all interviews within fifteen days. I was available before and after work hours and weekends should participants wish to conduct the interviews.

Conducting the Interviews

All online interviews took place via Zoom software. Participants were not required to activate their cameras during interviews. Only audio communications were necessary for the session. I also take handwritten notes during all interviews. All interviews were recorded as audio files, and all files were saved and secured to ensure confidentiality. All interviews followed the questions included in the Semi-Structured Interview Guiding Questions (Appendix B).

After each interview session, I saved the audio recordings and handwritten notes and secured the file. In addition, I created and verified transcripts of each interview for

accuracy. The transcripts file was also saved and secured. Once each transcript was complete, each participant was emailed a copy of their session transcript. Participants had the opportunity to ensure the accuracy of their transcripts and make clarification or amendments to their responses as necessary. The anonymity of the participants and their data is maintained.

Data Analysis

This study used coding to analyze the data collected from semi-structured interviews. Smith et al. (2022) describes the analytical process in an IPA using the encouragement of reflective engagement of the participant's account and the hermeneutic nature of an IPA analysis. The final analysis of an IPA is a joint product of the participant, the analyst, and how the analyst interprets the participant's responses (Smith et al., 2022). Smith et al. (2022) describe the following six steps for the analysis of an IPA and followed in this study.

Step 1. Reading and re-reading. I immerse myself in the transcripts and audio recordings of each interview. All transcripts were read, and audio files were listened to. Additional summaries were made for any relevant information that stands out. It was necessary to repeat the reading of the transcripts or listen to the audio files several times to gain a better analysis of the narratives.

Step 2. Initial noting. This step eventually merges with Step 1. This step involves writing notes of anything interesting from transcripts and audio files. Exploratory comments were made on the original transcripts. Types of comments that were noted include descriptive comments, linguistic comments, and conceptual comments.

Step 3. Developing emergent themes. This step used the growing amount of data from steps 1 and 2 and began to develop emerging themes. Emergent themes should reduce the volume of data while maintaining the complexity and connections of the transcripts and audio files. The emergent theme combined the participant's responses and my analysis.

Step 4. Searching for connections across emergent themes. This step involved developing, charting or mapping how the themes fit together. Some themes may not fit with others. The key to this step is to connect the various themes to structure essential aspects of a participant's responses.

Step 5. Move to the next case. This step requires that I begin at step 1 with the next participant. This constant flow of repetition continued until I had completed the analysis of each of the participants.

Step 6. Looking for patterns across cases. This final step brought all cases together and looked for patterns. I laid out all themes found in each case's following steps to identify the main themes found during the analysis. Various topics were found across the cases, such as how one relates to the others or how a theme was present in some and not other cases.

Ethical Considerations

The interviewing process contains issues of morality and ethics (Brinkmann & Kvale, 2015; Husband, 2020; McGrath et al., 2019). The study's goal was to gain the most profound data from the participants to best meet the study's needs. Such a deep level of information from a participant can be invasive. IPA studies aim to gather the lived experiences of participants. These experiences are personal and unique to the

individual. Participants discuss their lived experiences and describe their inner thoughts and feelings, which can be an emotional and personal process.

My responsibility was to perform the interviews and ensure the participant's utmost respect. This responsibility extended to the gathering and handling of information. The researcher assured participants of confidentiality and ethical standards described in the informed consent form. In addition, to ensure confidentiality and the inability to match data to any participant, the researcher took a series of actions. Actions to ensure confidentiality include participant pseudonyms, appropriate data collection methods, storing data in password-protected devices, ethical data reporting, and explaining to participants the process of storing and disposing of data after 36 months.

The ethical considerations of performing qualitative studies permeate the entire study from conception to the end and involve the protection of the participant (Arifin, 2018). Several checking mechanisms ensured that this study was conducted with the highest ethical standard. First, the university's IRB evaluated the proposal and only approved the study after meeting all guidelines. An expedited level of review is available for studies with no more than minimal risk to human subjects. Second, federal guidelines determine the level of review for submitted studies. This proposed study obtained an expedited level of review by the university's IRB. All activities relating to the study, including the recruitment of participants, began after IRB approval.

I conducted this study per the established guidelines required by the university's IRB. At no time did any activity relating to this study impact students or the ability of faculty to perform their duties. I used the following standards to ensure the highest ethical standard (Arifin, 2018; Brinkmann & Kvale, 2015; McGrath et al., 2019).

1. This study aimed to improve the situation and not hinder the participants or the affected areas of study.
2. Participants were treated with the utmost respect. Participants were properly informed through informed consent, and the information was confidential.
3. The interview process considered the possible emotional stress that participants might experience, and care taken to ensure participants understood the process and were comfortable sharing their experiences.
4. Transcriptions of the interviews were made with the highest accuracy and were always confidential.
5. Analysis of the interviews and statements considered participants' ability to have a say in how their responses are interpreted.
6. The final report of this study only used verifiable and secure knowledge obtained from the participants.
7. The final report maintains confidentiality and considers the consequences of reporting findings for the participants selected for this study.

Trustworthiness

Accurate findings and interpretations were maintained throughout the data collection and analysis process (Creswell & Guetterman, 2019). To ensure trustworthiness, the researcher assigned participant pseudonyms which provided anonymity to participants and made data unable to be matched to the participant. Using pseudonyms afforded participants protection that built trustworthiness, security, and honesty. I validated the findings by using appropriate strategies to ensure accuracy and

credibility. The accuracy and credibility of the findings are critical to any study and provide trustworthiness in the results.

The member-checking process was used to maintain the accuracy of the findings in this study. Member checking is a process in which researchers ask one or more study participants to verify the data's accuracy (Creswell & Guetterman, 2019). This method can be achieved using a secondary interview or other communication methods. The purpose of the member checking is to receive confirmation from the participants that the descriptions are complete and accurate (Creswell & Guetterman, 2019). In addition, the participant confirms the themes and whether the interpretations are a fair representation of what the participant described during the data collection process.

Potential Research Bias

Rather than using the word *bias*, qualitative researchers should reflect on their role and interpretations while understanding that factors such as personal history may play a part in their interpretation of the data (Creswell & Guetterman, 2019). Smith (2022) discusses a researcher's preconceptions which should be bracketed or acknowledged. Smith describes the researcher as part of the process since the researcher is engaging the participants and interpreting the data collected from the participants.

I acknowledge the potential factors that may influence the research. I am a current coworker of the potential participants and experienced the same phenomenon that this study examined. Moreover, I have my own lived experience, which relates to the experience described by the participants. I adhered to proper reflective bracketing (Gearing, 2004) and Ashworth and Lucas' (2000) guidelines to ensure appropriate epoche during the study. I attempted to divorce myself from the personal history regarding the

phenomenon and made all interpretations grounded on the data collected from the interviewed participants.

Limitations

Limitations for qualitative studies could include weaknesses or recommendations for future research (Creswell & Guetterman, 2019). For example, one recommendation for this study is to expand the participation pool to a larger geographical area. This study was limited to one subject matter. Future research could expand the participant pool to include other subject matters and stakeholders.

Summary

This chapter presents the methodology of this study. It describes, in a logical order, the components needed to conduct the study. The format and writing of the methodology chapter are such that it allows any reader to replicate the study given the same circumstances. Within the sections of this chapter, the researcher described the aim of the study, the design approach and relevant topics, participants, data collection methods, detailed procedures, and data analysis. Finally, the chapters include ethical considerations, trustworthiness, potential biases, and limitations of this study.

Chapter 4: Results

Introduction

This qualitative study aims to understand further the lived experiences of high school mathematics teachers who underwent a sudden transformation into ERT due to the COVID-19 pandemic. During the early part of the 2023 school year, 13 participants were part of this research study and completed all its data collection activities.

All participants received the same documentation, and each interview involved the same general questions, guided by the interview guide in the appendix. Moreover, the basis of this study required that each participant experience the same phenomenon of using ERT during the COVID-19 pandemic. However, the experiences told by each participant were different. Different because each participant had their own experience and thus incorporated their experience individually. This study aims to explore these individualized experiences to provide a better understanding of how high school mathematics teachers experienced ERT during the COVID-19 pandemic. To create structure to this study and the interview process, the following central question and additional research questions were used:

Central Question: What are mathematics teachers' perceptions regarding their ERT experience during the COVID-19 pandemic at a high school in Southeast Florida?

RQ1. How do mathematics teachers describe their ERT preparedness during the COVID-19 pandemic at a high school in Southeast Florida?

RQ2. How and in what ways do mathematics teachers describe their ERT experience providing education to their students during the COVID-19 pandemic at a high school in Southeast Florida?

RQ3. How and in what ways do mathematics teachers describe their ERT experience providing services to students, including students with disabilities, during the COVID-19 pandemic at a high school in Southeast Florida?

RQ4. In what ways do mathematics teachers think that their ERT experience during the COVID-19 pandemic will influence their teaching techniques at a high school in Southeast Florida?

Data Collection and Analysis

Before any data collection activities, the researcher obtained the necessary approvals from the university's IRB. Then, procedures were followed as described in the Methodology chapter of this report. The researcher sent the recruitment information to 14 initial pool members, of which 13 members agreed to participate in this study. Each of the 13 participants received the Informed Consent Form, and the data collection process proceeded after the researcher obtained the signed Informed Consent Form.

This study used two methods for data collection. The first method involved the GPDIS (Appendix A). The researcher sent the GPDIS to participants and received the responses online. All participants were able to complete the GPDIS and provide the appropriate information. Using the GPDIS was very efficient and did not cause any undue burden to the participants or the researcher. The final data set of this study included all 13 GPDIS responses.

The second method of data collection was the semi-structured interviews. The researcher was able to schedule interviews with participants based on the participant's availability. All interviews were scheduled for 45 to 60 minutes. The researcher set up an online Zoom meeting, and the link was sent to the participant via email once an interview

was scheduled. Some interviews took longer than others. The shortest interview was 35 minutes, and the longest was 56 minutes. The interview times had a mean of 46.6 minutes, a median of 45 minutes, and a mode of 45 minutes.

The researcher completed the interview process following the procedures described in the Methodology chapter of this report. There are no significant challenges to report during the interview process. However, one participant was late for their interview time. The researcher had to message (via text) one participant to remind them of the interview. The participant confirmed her availability and was able to start the interview within 15 minutes of the initially scheduled time. One participant had to pause the interview for about five minutes due to a situation at home but could complete the interview with no complications. All other participants attended their interviews as scheduled and could complete the process without challenges.

After completing the interviews, transcripts were sent to the participants as described in the Methodology chapter. Of the 13 participants, ten responded that the transcripts were accurate and did not wish to make any adjustments. Two participants responded that they had questions regarding the grammar or text of the transcript. The researcher was able to answer these two participants' questions, after which the two participants were comfortable with the accuracy of their transcripts. One participant requested to clarify a response. The researcher took her clarification and adjusted the transcript for data analysis. The final data set of this study included all 13 interviews.

The researcher began the data analysis process after collecting all the data from both methods. The researcher completed the data analysis following the procedures described in the Methodology chapter of this report. In summary, the researcher used

Gearing's (2004) phases of reflective bracketing and the guidelines established by Ashworth and Lucas (2000) to ensure proper epoche throughout the data analysis process.

The researcher spent significant time reviewing the interview transcripts, notes, and audio files. A coding system was used, which eventually developed into emergent themes. The researcher used Smith et al. (2022) six steps to analyze the data for this study as described in the Methodology chapter of this report. This process was very laborious as the researcher had to go through 13 data sets and develop emergent themes representing the entire study.

Overall, the data collection process for this study went as planned in the Methodology chapter of this report. All 13 participants who agreed to be part of this study did complete all portions of the data collection process, and all participant interviews are part of this study's data set. The data analysis took the researcher longer than expected, but that was because of the volume of data produced from 13 interviews. However, upon completing the data analysis, the researcher could report on the findings.

Participant Descriptions

The target population of this study consisted of high school mathematics teachers that experienced teaching using ERT during the COVID-19 pandemic. A total of 14 potential participants were identified by the researcher using a purposive selection. Purposive selection is beneficial to phenomenological analysis and applicable when participants have similar characteristics, in this case, using ERT (Creswell & Guetterman, 2019; Smith et al., 2022). Of the 14 potential participants sent the recruitment email, 13 responded and agreed to be part of this study. Unfortunately, one potential participant did

not respond to any recruitment material.

Each participant was assigned a pseudonym to protect the confidentiality of the participants. The pseudonyms were selected from the National Weather Service's list of hurricane names and assigned to participants, gender appropriate, in random order. The names match the list of Participant Numbers (PN) shown below, and the PN numbers will be used in this report moving forward. In addition, the researcher received demographic information from the GPDIS (Appendix A). The following is a breakdown of each of the participants' assigned PN, gender, years of teaching experience, and courses taught during ERT:

Participant Numbers

Participant Number 1 (PN1) is a female teacher with 10 to 15 years of teaching experience. PN1 taught Geometry during the ERT.

Participant Number 2 (PN2) is a male teacher with over 26 years of teaching experience. PN2 taught Financial Algebra and Math for College Readiness during ERT.

Participant Number 3 (PN3) is a male teacher with 16 to 20 years of teaching experience. PN3 taught Algebra 2 and Pre-Calculus during ERT.

Participant Number 4 (PN4) is a female teacher with 10 to 15 years of teaching experience. PN4 taught Algebra 1 and Geometry during ERT.

Participant Number 5 (PN5) is a male teacher with 6 to 9 years of teaching experience. PN5 taught Algebra 1, Financial Algebra, and Math for College Readiness during ERT.

Participant Number 6 (PN6) is a male teacher with 16 to 20 years of teaching experience. PN6 taught Geometry and Math for College Readiness during ERT.

Participant Number 7 (PN7) is a female teacher with 16 to 20 years of teaching experience. PN7 taught Pre-Calculus and Calculus during ERT.

Participant Number 8 (PN8) is a female teacher with over 26 years of teaching experience. PN8 taught Algebra 2 during ERT.

Participant Number 9 (PN9) is a female teacher with 16 to 20 years of teaching experience. PN9 taught Algebra 1 during ERT.

Participant Number 10 (PN10) is a female teacher with over 26 years of teaching experience. PN10 taught Geometry during ERT.

Participant Number 11 (PN11) is a female teacher with 16 to 20 years of teaching experience. PN11 taught Algebra 1 during ERT.

Participant Number 12 (PN12) is a male teacher with 6 to 9 years of teaching experience. PN12 taught Geometry during ERT.

Participant Number 13 (PN13) is a female teacher with 21 to 25 years of teaching experience. PN13 taught Algebra 1, Geometry, and Statistics during ERT.

Interview Data

The Semi-Structured Interview Guiding Questions (Appendix B) were used to structure the interview process. The interview guide had seven main topic areas. Each main topic contained questions to provide depth to each participant's response. The main topics addressed one or more of the study's research questions. These areas were:

Topic 1: Training (addressing research question 1)

Topic 2: Engagement (addressing research question 2)

Topic 3: Technology (addressing research question 2)

Topic 4: Providing Services (addressing research question 2 and 3)

Topic 5: Emotional Support (addressing research question 2 and 3)

Topic 6: Learning (addressing research question 2)

Topic 7: Transition (addressing research question 4)

The data collected through these interviews were analyzed and synthesized as described in the methodology chapter of this study. Several themes emerged as the researcher synthesized the data, individually and in its entirety. The following is a report on each interview topic and the themes that emerged from the data analysis.

Topic 1: Training and Preparedness

For topic 1, participants were asked to describe how prepared they felt for ERT. In addition, participants were also asked to describe their perceptions as teachers of how they felt their students were prepared for ERT. The data analysis for topic 1 showed two divergent descriptions of preparedness. The following is a description of the experiences.

PN11, PN13, PN1, and PN9 were prepared best during the interviews. They each described their experience as being well-prepared for the activities and tools involved in ERT.

PN11 responded:

“So, myself I felt pretty prepared as the department head and as a teacher personally, I did feel ready. I was not prepared for the amount of like, you know, information that I had to be ready to disperse and like help, people on the fly. But, as a teacher myself, personally, I did feel ready.”

PN13 responded:

“Well, I was prepared because I already had experience with online education. I was a teacher’s assistant at FAU when I was doing my graduate studies. So, I was prepared specially to do it through Canvas and Teams. It was an easy transition for me.”

PN1 responded:

“I felt as though I was 100% prepared because I have taken a lot of prior training in technology. It was my focus to get better at and to integrate that into my lessons. So, when ERT happened, I was prepared and even my students were prepared because we were already submitting thinks online and using online platforms. “

PN9 responded:

“I felt very prepared, but it’s only because I had taught at Broward Virtual School. So, I already taught virtually, and so I knew some of the programs that we were going to be using, and I had used them before.”

The remaining nine participants described an experience that showed a much lower level of preparedness. While some participants had varying levels of preparedness and training, their experiences differed from the experiences described by PN11, PN13, PN1, and PN9. For example:

PN7 responded:

“I was totally unprepared to start ERT. So, I was not prepared at all. I mean, of course I knew some things. I know computers and I know how to use basic stuff, but to teach on like distance education. I was not prepared for that, and I was very scared to start.”

PN5 responded:

“Training was there? There was very little directive as to what we were supposed to do. It didn’t seem like we had an emergency plan in case of something. So, it’s kind of just saw people making decisions like flying by the seats of their pants.”

PN10 responded:

“I pretty much knew nothing. I had no idea how to do it. I didn’t even know what it was conceptually. I didn’t understand what it was. Absolutely didn’t even know what they were talking about. I didn’t know. What do you mean the kid is home, and I’m here to do what? I could not conceive of how to communicate with the kid.”

PN3 responded:

“Being, you know an old teacher. Technology was not really used in my previous

years. So, when COVID hit it was, you know, hard for me to cope with the situation beginning so, and I had to learn everything within a week. So, at the beginning it was a challenge.”

PN6 responded:

“Oh, I would say, on a scale of 1 to 10, maybe a 2. I felt very unprepared. I’ve never been really big into technology to be totally honest, and it’s never been my thing. I am more of a whiteboard and markers kind of guy. I had never even really used Canvas. I mean, anytime we were to do Canvas training or whatever, I just kind of zoned out. It was never my thing. So, going into ERT, just having it sprung on us. I was incredibly uncomfortable.”

When asked about students' preparedness for the activities and tools required for ERT, again, there were two different levels of preparedness. Three participants felt students were better prepared than teachers for ERT. Conversely, eight participants reported that they perceived students as unprepared for ERT.

PN6 responded:

“Well, the thing is that students are definitely more tech savvy. You know. They know their way around computers and Canvas pages and all sort of thing. So, I thought the kids were going to be fine with it. I thought they would be comfortable with it because they are so comfortable with technology and things like that. And, yea, I just thought they would be prepared. They’d be okay.”

PN11 responded:

“They were really confused about scheduling and stuff like that. But as far as getting on the technology piece of it, my students never really displayed a difficulty in finding or getting on to Teams to log-in. I think on the first day that we got thrown into ERT, my kids were already, like all logged in and ready to go. I didn’t have a lot of hiccups or anything. They were teaching me things.”

PN10 responded:

“From what I saw. Good. They were maybe halfway. There was a lot of direction given to them from the school, so they were a little better prepared when it started.”

Other participants felt that students were not as prepared for ERT and responded as follows:

PN9 responded:

“My perception was that they were not prepared at all for this. Well, they were required to do a lot online which they hadn’t been required to do in the past. I don’t remember when Canvas came out, but some teachers weren’t really using Canvas until the pandemic. And then all of a sudden, every teacher was using Canvas and the kids had to do everything online. I just think they were not prepared to do everything online and in addition to that they had to teach themselves the material in a way.”

PN13 responded:

“Students were not prepared and that surprised me. Given that this is the generation that practically were born with technology, they were not prepared at all. No, and even the parents were not prepared to manage the situation.”

PN3 responded:

“I don’t think they were prepared. Because remember the parents had to go to work and left the kid behind, you know. And I don’t think they were prepared for it and myself, as a teacher, this was new to me. And being home, you don’t even know if the kids are getting the information.”

PN5 responded:

“I found the students, socially they not online withdrew but many of them turn to destructive habits because they were unsupervised, because many parents use school as supervision. And because the students were unsupervised and weren’t required to turn on their cameras many of them were just not showing up to class. I personally had a student that had a party. I looked at him and his friends partying in the background. So, you know, socially, it brought out the worst in many of the students because it kind of made them see school seem as optional.”

PN1 responded:

“I believe that for the students, they were excited to not be in school and I don’t think they were honestly really prepared for how lonely it would be since nobody could be around. At the beginning they were happy to not be on campus, but I don’t know how they felt being secluded and isolated from everyone. So, I don’t know if they were prepared for that.”

The results revealed an emerging theme. Front-loading technology training or providing prior exposure to ERT-related technologies does a lot to make teachers and students feel better prepared for ERT. The participants, such as PN11, PN13, PN1, and

PN9, reported feeling better prepared for ERT. Participants said they felt better prepared because they had participated in some prior distance education activity or training.

Likewise, participants also reported that students accustomed to the tools required of ERT were better prepared once the entire system switched over.

Topic 2: Engagement

For topic 2, participants were asked questions relating to the level of engagement they experienced with students. When discussing student engagement experiences, 12 of the 13 participants described a similar experience of low student engagement levels.

Below are a few examples of the participants' responses to topic 2.

PN6 responded:

“That was pretty, non-existent. I mean, it was basically teaching a bunch of blank screens. I mean, probably less than 5 students a day would actually ask me a question about any of the material being covered.”

PN5 responded:

“I'd have maybe one or two students out of 28 that would pay attention. They would turn their cameras on but the other 26, they had their cameras off. There were very, very little back and forth conversations. Many students just didn't even try. They wouldn't even show up. So, there wasn't much engagement.”

PN3 responded:

“Well, you know, it's hard. It was really hard to keep focus from home. Because, like I said, I have no control. You know, I was teaching and asking them questions making sure that they were. But, no, it was really hard to keep them engaged, from my point of view.”

PN2 responded:

“A lot of times you would take attendance and you could see them in their bed covered. They made sure they were in attendance and then you didn't hear from them anymore after that for an hour and a half. The percentage of engagement that I had with students was maybe 10%, the other 90% were disengaged.”

PN4 responded:

“Very disengaged, it wasn’t the same as it was in the classroom. I don’t know who I was talking to. It is just like I was talking to myself in my house. Some of them told me later on that it was like they would sign in and went to sleep. There was no engagement.”

PN9 responded:

“If there’s one thing the whole pandemic and online teaching taught anybody was that having a teacher in the classroom makes a huge difference. They were missing in action. They just, you know they didn’t want to respond. It was very difficult to get them to engage, to talk or answer.”

PN13 responded:

“They were not engaged. Who knows what they were doing but no engagement. No matter what I tried. Out of 25 students, maybe 5 were engaged in the regular classes. Now in Advance Placement classes, I had most of the students engaged. It was different.”

PN1 responded:

“There was very little engagement. I think it was a bad experience. They didn’t want their cameras on. But I just feel like the engagement was very low and the students, if participating would just do the work and kind of disappear into the background.”

The results of topic 2 present an emerging theme of low student engagement during ERT, as most participants reported significantly low levels of engagement on the students’ part during ERT.

Topic 3: Technology

Participants were asked questions regarding the availability of hardware and software technology that they experienced during ERT. Overall, 12 of 13 participants described a positive experience when discussing the availability level of technology for teachers and students. However, one participant had a different experience from the majority regarding technology availability. Below is a sample of participants’ responses to topic 3.

PN11 responded:

“I felt like I never needed something that we didn’t have. I would say that the vast majority of my students when we started had what they needed. They had computers already. They did the drive by stop by any school to get a computer kind of thing.”

PN12 responded:

“I believe most of them and the majority of them had their own laptops. They definitely had to sign out a laptop from the school so they would have technology. If they came to the school and got the resources and they signed up for the free internet service, I believe they have enough for the class.”

PN6 responded:

“Awesome. I mean, they did give us those poly-cams which I never used, because I remember watching the demonstration on it and just that they looked awful. But other than that, not a whole lot. I mean we did have laptops, and you just use the cameras on them.”

When asked if they felt they had all that was needed to teach effectively, PN6 expanded his response:

“At the start, when we were doing the pre-planning week, I felt like I was the most nervous and unprepared I have ever felt in my life. I was losing sleep over it but once I got there, I kind of got the hang of it really quick. I felt really good about the whole thing. So, I had everything that I needed.”

PN9 responded:

“I felt okay about it. I think I bought a dock cam. I’m still using it, actually. So, I believe that every student was allowed to pick up a computer from the district. So, every student should have had a computer. It seemed okay, once we got into the group.”

PN7 responded:

“We just got new laptops at school when it started but I never used the school laptop. I just used my laptop and I had to purchase a camera myself. I know students who didn’t have internet access or who didn’t have laptops. They could receive it though the school.”

PN1 responded:

“I think they were very prepared for this. Everything that the technology department or innovative department put together really prepared us for this. Now, that’s the software side or web-based side. But when it came down to the hardware, the laptops, the computers, and such. I know that everyone’s experience is very dependent on the schools that they were at and not all students had, you know, access to computers right away. So, it took them some time to get that part, but as far as internet and software, the district was definitely ready for this.”

One participant did have a divergent experience from the overall responses.

Margaret describes her experience with the availability of technology as not a positive experience.

Margaret responded:

“The district was slow to provide us with cameras. I mean, the only thing we had was the laptops from the district that were already in our possession. And the district was not slow, it was just completely absent from providing us with what we really needed to create. I’m talking about cameras, headphones, speakers. I borrowed that or I had it already. Thank goodness. My own supplies. I received nothing from the district, including, I used my own internet. I actually had to upgrade my internet because I was using my data usage. I had to upgrade, you know, and I had to pay for that.”

The descriptions of the experiences for topic 3, technology, showed an overall good experience with the level of technology that the district provided to teachers and students during ERT. However, as stated above, one participant did describe the experience as not positive. The emergent theme from topic 3 was the importance of the availability of technology for all users during ERT.

Topic 4: Providing Services

Participants were asked questions regarding their experiences on how teachers could provide services to students. Specifically, participants were asked about services provided to students requiring additional services, such as English language learners and special education students. Most participants, 12 out of 13, had similar responses

regarding the level of services they felt they provided during ERT.

PN10 responded:

“Well, the one thing that you could do for them, and it might be the only that you could do for them was give them extra time. That is the only thing I can remember being able to do for them.”

PN5 responded:

“I was able to give better instruction because I was able to use for the first time a translator. So, I mean, I could if I had multiple languages. But if I usually had someone with one language, I could use a translator. They could at least get what I was saying, translated and captions. So, that was a good part about using that.”

PN2 responded:

“It was tough. I advised them to use their dictionary and use an app to translate. I gave them additional time, time and a half. I remember one student always wanted to make sure I showed my face on the video screen because she wanted to read my lips.”

PN6 responded:

“Well, I did have one student who an accommodation where they had to have the close captioning on the entire time. I was giving an assessment and gave them time and half for that. So, really, I didn’t run into any issues with that as far as the English language learners go.”

PN11 responded:

“My route was to post a video, and then post someone else teaching it like from YouTube. Then have handwritten notes posted. If you don’t learn it this way, learn it this way, and then all my videos were recorded though.”

PN12 responded:

“Like all the notes that I wrote, I would scan it on my phone and upload it. So, if they missed something from the notes, they would have it. If they need more time, I’ll be able to give that to them.”

PN1 responded:

“I definitely tried my best to provide the best service I could, recording videos, having notes and being there to answer questions. I definitely provided as much as I could have and was available a lot more hours in the day than in the regular

setting.”

The responses for topic 4 showed that participants did provide services to students. The responses show that teachers were aware of their students requiring special services and made every attempt to accommodate them. However, the responses showed different approaches to how each teacher provided services. An emerging theme presents itself from topic 4. Students’ services can be provided by teachers during ERT, as shown in this study, but there seem to be varying approaches to how to provide these services.

Topic 5: Emotional Support

Participants were asked questions regarding their experiences on the emotional or social support level they and students were provided during ERT. When describing their experience of the emotional or social support offered to them as teachers, a common response was that teachers received most of their support from their colleagues and very little support from any other source, including the school district. In addition, eight participants, stated they only sought or needed support from their colleagues.

PN13 responded:

“Well, I got it from my colleagues. That’s it. I know the principal was constantly communicating with us. Those teachers we support each other. That was fantastic. But that’s it. We had weekly meetings used for leadership but not for support, even though they kept saying, we support you. Whatever, I think it was not proactive. I may be wrong but that’s how I feel.”

PN10 responded:

“Enormously from my department. The folks in our department, we were very good to each other. We would meet up. If we had struggles, we’d ask each other. We would get on zoom and go back and forth. And it was wonderful. A lot of support that way.”

When inquired further into the specifics of support from the district.

PN10 responded:

“I felt that they were open to help. Not necessarily could help. But they did attempt to help. You know again as best as could be from everywhere else. But I think they might have been kind of banging into walls themselves, trying to figure out how to get things to work, too.”

PN12 responded:

“I don’t think I needed it. I think I supported other teachers more as a young teacher, and who was pretty good with this platform. I was able to help other teachers who are struggling with hosting assignments. So, I felt like I was more of a support for other people, because I don’t need the support.”

PN11 responded:

“Does it count that they were like, oh let’s breathe for the first minute of the day. I don’t know, like it was like not the best support. Then a lot of time because of the position I was in, I felt like I had to be the support. Yeah, we had group chats, and we were offline as well. But as far as admin went, no I felt like everyone had things to cover and they had stuff to do. “

PN9 responded:

“I think teachers were just expected to do what they were supposed to do. Given all this new material and information they either sank or swam and that was it. Maybe there was an email that got sent out, but saying, you know if you need support, call this number.”

When inquired further regarding her experience with support from the district or other educational personnel, PN9 expanded her response.

“Not that I remember, I mean maybe there was an email that got sent out, but saying, you know if you need support, call this number, but I don’t remember. So, support was better from the co-worker point of view.”

PN7 responded:

“Well, I did not feel any support from the district like in an emotional part of that. The only emotional support that I would be able to receive was from my co-workers. But it was not from administrators or from the district. So, no support from I mean no emotional support, I would say from administration or the district.”

PN6 responded:

“Yeah, everyone was in good spirits. Everyone was super friendly and yeah it

was. Yeah, everyone was great. No problem, everyone was supportive. I remember getting emails all the time about people who to reach out to and counselors, that this and that.”

Responses from participants had an emerging theme. The theme was that co-workers provided the most support for participants and described it as a positive experience. However, participants described district-level support as minimal to non-existent and not a positive experience.

When participants described their experiences of their perception of the amount of emotional or social support during ERT for students, the responses were very different from the support provided to them. PN12, PN10, and PN6 responded in line with most participants. However, a few, such as PN1 and PN2, could not properly respond to this topic.

PN12 responded:

“I believe there were a lot of resources there. I don’t know what they offered, but I felt like there was a lot for the kids to go through the guidance counselors and through what the district provided.”

PN10 responded:

“There was a lot of information and encouragement sent to the homes about how to get on Canvas, how to work Canvas, how to stay in touch with your teacher. A lot of what do they call that? Maybe cuddling, I guess, would be a good word.”

PN6 responded:

“I remember getting emails all the time about people who to reach out to and counselors and this and that. And so, I feel like there is a ton of that available, a ton of resources, a ton of programs, all that sort of stuff, so I think they did a really good job with that as well.”

Two participants were unsure how to respond to questions regarding emotional or social support provided to students. They felt they did not have much experience with this topic, so they could not respond confidently.

PN1 responded:

“I honestly, I don’t think I have any experience with that. I don’t think I had any instances.”

PN2 responded:

“They were offered it. I know that. I don’t know how much or who went for it.”

Topic 6: Learning

Participants were asked to describe their experience on how they felt was the level of student learning (academically). Then, within the context of student learning during ERT, participants were asked to describe their perception of students' student achievement level in their classroom now that education has returned to face-to-face. Twelve participants described significantly low levels of student achievement during ERT.

PN2 responded:

“About 10 percent were doing honest work and the other 90 percent were taking advantage of the situation and cheating. Cheating a lot. There was a lot of cheating going on.”

PN6 responded:

“I mean, I was giving them the same lessons that I would give if I were in person. What they chose to do with that was up to them and a lot of them were not taking advantage of it. So, I feel like if they wanted to learn they could have because I wasn’t cutting the lesson. I was teaching the same things that I would have been doing. But I feel like most of them didn’t take advantage. They were cheating most of the time, not paying attention, you know, just checking in for attendance, then turning their microphones off and pointing their cameras at the ceiling. I thought, as far as the actual education was kind of a disaster, as far as learning goes.”

PN11 responded:

“They cheat, they cheat. Oh, they were all using Photo Math, or they are all doing this, and I would be like, Listen! Turn on your cameras if you don’t have a camera, I don’t care if you get a one or a hundred. You are getting a zero in

Pinnacle. How much I tried to beat cheating, but it was nothing I could do right?”

PN1 responded:

“My experience is that except for a limited few, I don’t believe that there was much learning going on. I don’t believe that they were learning. That is how I felt the entire time.”

PN9 responded:

“I had no idea if the students were learning or not. The only thing I could base it on was if they did well on a test and even so, they could have cheated on that. So, I have no idea if kids learned or not during COVID-19. They were worse than usual, because the attendance was terrible, and kids were not turning in their work.”

PN10 responded:

“Oh, yeah, I don’t think the learning was really there. Not at all. Perhaps we could give them a skeleton kind of a class. They would learn the outline, the basic idea of the class. But word problems were put to the side. A lot of depth, in Geometry, for instance, the proofs. Constructions absolutely couldn’t even really happen because how do you teach the child the construction. You have to be able to see how they’re holding the pencil. How are they holding the compass. How are they laying their paper on that that? And all that has to be observed and it cannot be observed on Teams. So, I think their learning wasn’t just watered down. It was less than and it had to move slower.”

PN4 responded:

“I don’t think they learn much. I think it was bad because from what I heard from other teachers, some of them didn’t really care. They didn’t really post up. They didn’t offer help. They kind of just put the assignments up and that was it. They didn’t even do the kind of what some of my team members are doing. We came on for an hour for any homework help.”

PN7 responded:

“But well, of course, learning was much worse compared to in class instruction. Because, like every time when you would give like a test or quiz you can like the results are so much worse than it used to be when you had face to face instruction.”

Participants were further asked to describe their experience with how they perceived the difference between pre-pandemic students and post-pandemic students who

are currently in their classroom face to face.

PN9 responded:

“It is a different world. They cannot accomplish much. You cannot give as long a test and expect that they’re going to finish it. It is just a different world of what they are willing and their effort of what they think they should have to do.”

PN5 responded:

“Especially now as we are getting a few years out. So now we are getting to see some students that were maybe in the middle school ages, sixth and seventh grades, come into the higher grades. You’re now seeing, not just foundational issues in their education but foundational behavioral issues. They are missing some social skills. They are missing, along with achievement and academic foundational skills, they are missing simple things like adding and subtracting fractions. But then also not knowing how to de-escalate certain situations. The number of fights and the increase in the number of security guards every year since then and the unwanted attention on the news. Things like that, you know it’s been a lot of. Then you can tell the student just not being able to sometimes socially, just deal with each other anymore because they are so deficient just in some of their basic skills that they need to be able to just survive.”

PN1 responded:

“I just feel like the ERT students didn’t learn much. It was kind of more passive, so they got the information they copied and pasted. They used technology to help solve things and I don’t think that they held on to the knowledge of what I was presenting.”

PN10 responded:

“So academically, they are struggling with everything. Then, after it, right down to this is in high school. They are struggling all the way back to their arithmetic, simply because when they were going through ERT they were in middle school, where they are still taking the arithmetic. They learned to apply it, use it, and practice it. And so now they are coming to us with arithmetic difficulties, reasoning difficulties, judgement difficulties and inability to write. They no longer, in my opinion, can conceive of writing their own notes. They don’t know how to write notes anymore. They don’t know how to use a book anymore. They don’t know how to use a glossary anymore. A lot of them are having a struggle of writing the steps of a problem. They don’t know how to draw. It’s just so pervasive. The kinds of things, the difference in the kid of 5 years ago compared to the kid now. Their ability to speak and keep attention. Their ability to understand that the person in front of them with the role of the teacher is versus their role in the class. What responsibilities do they have? This is all brand new to

them and they fight it.”

The responses from topic 6 show a clear issue with students’ academic achievement levels during and after ERT. Participants were asked to describe their ERT experiences and compare the students after ERT. As described above, participants reported significant achievement level deficiencies in both situations. The emergent theme from the responses to topic 6 is the low student academic achievement levels reported by teachers during ERT.

Topic 7: Transition

As a final topic, participants were asked to describe their experience regarding the transition from ERT to the return to face-to-face instruction. Participants were also asked to describe what skills or techniques they have carried over into their teaching methods from ERT to their return to face-to-face teaching. Finally, participants were asked to advise other teachers, now that they have experienced ERT, to best prepare for the possibility of doing ERT in the future. When describing their experiences during the transition, the following were some responses.

PN1 responded:

“It was exciting to get the kids back into the classroom. I personally always enjoy like having interactions with the students. After like a year and a quarter without having those one-on-one interactions. I was happy to get that back. However, it did take, you know, a considerable amount of time for them to open up and have open discussion. You know, even have math discussions. So, asking questions, it took a little bit more than usual. So, I think the transition was a little rocky the first year we were back. But one of the things I notice is that because of use learning remotely for that long the students feel as if they don’t need to be in the classroom in order to learn. So, the rate of absences has definitely skyrocketed from pre-pandemic to now.”

PN4 responded:

“I think, when they were like implementing kids wearing masks during a time and

that was like a huge issue. And then when they're talking about vaccinations. And you know, kids were more concerned about what was happening in the world. They were now becoming more concerned about what's happening in the world more so than prior years. Sometimes they'll see certain things in the world but this time they were just more adamant about, you know, their lives. They started thinking about and wanting to come back to school. Some kids were afraid to come back to school. I think even some teachers were afraid to come back to school. I had one teacher that she had lupus and so she's like very scared. She was scared of, you know, trying to not get infected and then something would happen."

PN12 responded:

"I'm making sure I don't get sick myself. Putting my life in jeopardy without any reassurances that I may be taken care of."

When asked further regarding challenges faced during the transition.

PN12 expanded his response:

"When we had mixed mode, being able to maintain a classroom and an online classroom at the same time. So, having two classes at once. Basically, maybe seven students in the class and then everybody else was at home. Because, if I'm helping a student in person and then I miss a raised hand or if I leave my desk, it just seemed like it was double the classroom management."

PN9 responded:

"Attendance, that's a big one. Yeah, because kids still wouldn't show up and then motivation, they just have a lack of motivation.

When asked further regarding challenges faced during the transition.

PN9 expanded her response:

"Yeah, having to provide for the kids who were not coming back yet and for the kids who were coming back was difficult. Because you had to make sure that you had something for all those kids."

Participants also described what skills or techniques they have carried over into their teaching methods from ERT to their return to face-to-face teaching. In addition, participants were asked to advise other teachers, now that they have experienced ERT, to best prepare for the possibility of doing ERT in the future.

PN5 responded:

“Well, one thing that I would tell them now to any new teacher, it would be to have them use the learning management system. To set up kind of a skeleton of what you’re doing as you go along, even if you are on pencil and paper. If you have the lessons kind of marked out on your learning management system, it kind of makes it well, it makes it one easy to say organized. It makes your plans easier to stay organized. But then also were anything to every happen, then you’d be able to switch over and that’s kind of the reason I kind of also continue to use a learning management system is that it will give students a familiarity with the system.”

PN10 responded:

“You gather your little network of people. You gather someone who understands how to do Canvas, someone who understands how to write tests and grade them online. You get your group of people that are good at how to do this. You gather them and then you stay in touch with each other. You get meetings together, you know, just to check on each other and be prepared in the beginning of it to spend a good bit of time getting organized. Start out in an organized fashion. Think it all through before you start.”

PN13 responded:

“Okay, don’t be afraid to ask. Get in contact with your colleague immediately. If you don’t know how to do something, ask somebody. Don’t be alone. Send an email to ask for steps on how to use this technology or get a Zoom meeting. Hey guys, how do we do this? Never do this alone and don’t expect the district to come up with something immediately. Communicate with your colleagues.”

PN2 responded:

“Let me see. Yeah, try not to learn it all at once. Just the basics. Get the basics and learn from others that know more. You just want to know at least the basics. So, you have got to be patient and look for it. You have got to do your research. It’s not that easy either, you know. But technology wise, you can watch webinars. But there is nothing like just trial and error. And you know you are going to make mistakes and it’s not going to come easy. But, you know, you just keep on working at it and eventually within a month you’re a lot better and you know what’s up. Just take notes and you got to practice. You got to study.”

PN7 responded:

“Well, I still can upload my, you know material on Canvas for the students who miss class like notes and videos. I ask them to submit assignments online on Canvas. So, I think I did not do it before. I would not upload like videos for the

students who miss the class.”

When PN7 was asked further regarding advice for any future ERT occurrences, PN7 expanded her response:

“Well definitely, you have a mic and camera. They should be on for the teacher and student. We should be visible to each other. Of course, like a computer. Wi-Fi it’s definitely. I would say be prepared to post all your notes like in electronic form. So be ready to upload at least for the students in an emergency. So once again, like maybe some videos should be ready.”

PN9 responded:

“You have something so you can share your screen so they can see you. I feel like in math kids when you post overheads and the notes already there, the kids don’t learn from that. They need to see it step by step. They need to hear you talk about it and write every step, and why you’re doing it. So, in teaching math, it’s important for you to be able to somehow project what you’re writing so they can see it and watch you do it like when they are in the classroom.”

PN9 expanded her responses regarding advice for future ERT incidents:

“You need to have whatever you’re teaching, whatever you’re doing, probably have whatever work you want them to do. If they are working out of some book, they should have that and everything they need. And that needs to be all set up. And then you just want to pray that technology is going to work and that it’s going to go. Well, I mean, you know that’s the thing you can’t control. And I think that you just have to be okay with that. Sometimes things are going to go wrong in a way that you know there’s nothing you can do about it.”

The responses from topic 7 showed a turbulent transition from ERT to the return to face-to-face instruction. Participants reported student difficulties with getting back into school mode and difficulties with teachers managing multiple instruction modes simultaneously, online and in-person. When asked to provide advice in case of future ERT instances, the emergent theme of becoming familiar with the technological aspect and organization was the best way to prepare for any future ERT occurrences.

Technology Comfort Levels

In line with topic 7, transition, the GPDIS contained a section that asked

participants to rate their “level of comfort with using technology” on a Likert scale from one to five. One is not uncomfortable at all, and five is very comfortable. Two similar questions were asked. The first was for participants to rate their comfort level using technology before ERT (pre-pandemic). The second was for participants to rate themselves using the same parameters after ERT (post-pandemic). The results for the first question, before ERT, showed two participants reported level two, three participants reported level three, four participants reported level four, and two participants reported level five comfort with technology before ERT. After ERT, the results of the second question showed that most participants increased their comfort level with technology. Three participants went up two levels (PN10 from two to four, PN6 from two to four, and PN9 from three to five). Six participants went up one level (PN1 from four to five, PN2 from three to four, PN3 from three to four, PN4 from three to four, PN7 from four to five, and PN12 from three to four). Four participants remained at the same level of comfort with technology (PN9 and PN11 stayed at level four, and PN5 and PN13 remained at level five). The results from the GDPIS technology questions go hand in hand with the participant responses from topic 7.

Summary of Emergent Themes

In this IPA, the responses from the semi-structured interview process provided insight into the emergent themes. Seven themes emerged based on the data analysis. These include technology training, low student engagement levels, availability of technology, providing services, co-worker support, low student achievement levels, and preparation for future ERT.

Technology Training

The finding revealed that technology training before ERT implementation significantly reduces stress and increases the level of preparedness of teachers and students. PN11, PN13, PN1, and PN9 all reported positive experiences in their preparedness for ERT because they each had some technology training before ERT. For example, PN13 responded, “I was prepared because I already had experience with online education.” In contrast, the remaining participants who did not report technology training before ERT described their preparedness as inadequate. For example, PN6 responded, “Oh, I would say, on a scale of 1 to 10, maybe a 2. I felt very unprepared.”

The theme of technology training has been reported in previous ERT studies and is essential to a teacher’s self-efficacy for teaching online. Bhamani et al. (2020) and Walsh et al. (2021) found that faculty experience, training, and experience contributed to ERT implementation. Horvitz et al. (2015) found that a significant predictor of the self-efficacy of online teachers was the amount of experience they had teaching online. This means that as teachers were more trained or experienced in teaching online, their belief in their ability to teach online increased.

Low Student Engagement

Twelve out of 13 participants reported experiences consistently identifying low student engagement levels during ERT. It was clear from the data that student engagement was low during ERT. For example, PN6 responded, “That was pretty, non-existent. I mean, it was basically teaching to a bunch of blank screens.” In addition, participants reported a feeling of no control over who was engaged in the class. PN3 responded, “It was really hard to keep focus from home, because like I said, I had no control.”

The theme of low student engagement is a common theme of ERT studies. Petillion and McNeil (2020) reported diminished engagement of students during ERT. However, another study did find that it is possible to have high levels of student engagement during ERT (Ganiyu, 2021). Student engagement can be affected by changes in pedagogical practices from face-to-face to ERT (Yundayani et al., 2021).

Availability of Technology

The findings showed that an organization could proactively prepare for ERT by providing adequate technology to teachers and students. All but one participant described a positive experience with the technology available to them and their students for use during ERT. For example, PN11 responded, “I felt like I never needed something that we didn’t have.”

The availability of technology is part of Rush et al. (2016) five stages plan for implementing ERT. Stage three of the plan addresses the need to gather the resources, including technology, to implement ERT. Technological issues have also been reported as challenges during ERT use (Al-Freih, 2021; Alvarez, 2020). The theme of the availability of technology is in line with the literature, albeit from a different perspective, as this study showed an organization that was proactive in providing availability.

Providing Services

All 13 participants reported some experience providing services. The data analysis showed that teachers are willing and make an effort to provide to those students who require additional services, such as English Language Learners and Special Education students. Participants reported doing their best to provide services to students, including those requiring other services. All participants reported providing some type of

service, such as additional time. For example, PN10 responded, “Well, the one thing that you could do for them, and it might be the only thing you could do for them was given extra time.” This type of response shows how teachers attempted to provide what they felt they could.

The theme of providing services has been reported in other ERT studies. However, in contrast to this study, Van Heuvelen et al. (2020) reported teachers' inability to provide services to students at a higher education level. Moreover, several districts also reported difficulties providing services (Jameson et al., 2020; Mantzikos & Lappa, 2020).

Co-Worker Support

Eight out of the 13 participants reported an overwhelming feeling that participants received emotional or social support from co-workers, not from other sources such as the district. Participants reported receiving most of their emotional or social support from co-workers. The reported experiences showed a sense of camaraderie among the teaching group members. For example, PN13 responded, “Well, I got it from my colleagues. That’s it.”

As a crisis mode of operation, groups experiencing the same situation tend to build a sense of camaraderie (Mitschke et al., 2021). Van Heuvelen et al. (2020) also reported that instructors assist each other to alleviate some of the stresses and challenges of ERT. The theme of co-worker support is in line with previous ERT literature.

Low Student Achievement Levels

Twelve of the 13 participants strongly agreed that student achievement levels were significantly low during and after ERT. During ERT, participants reported much cheating going on in the classes. The cheating was something participants identified from

the exam scores and testimony from their own students. For example, PN11 responded, “They cheat, they cheat. Oh, they were all using Photo Math.” Low student achievement levels were also reported when participants were asked to describe their perspective of students’ post-pandemic. For example, PN9 responded, “It is a different world. They cannot accomplish much. You cannot give as long as a test and expect that they’re going to finish it.”

Bhamani (2020) and Petillion and McNeil (2020) also reported challenges regarding student achievement levels during ERT. In addition, studies on ERT in other areas relating to student achievement have also reported challenges such as assessment evaluation and overall academic grade point average (Deli et al., 2022; Nazempour et al., 2022).

Preparation for ERT

Nine participants reported two main topics regarding the best preparation for future ERT uses. The responses showed a two-prong approach to preparing for future implementation of ERT. The first topic was technology training. For example, PN5 responded, “Well, one thing that I would tell them now to any new teacher, it would be to have them use the learning management system.” The second topic was organization. For example, PN10 responded, “Be prepared in the beginning of it to spend a good bit of time getting organized. Start out in an organized fashion.” The topic of technology training for preparation for future ERT use is in line with the first theme presented in this study. Participants reported training in technology as a significant factor in their preparedness level.

Kearns (2016) also reported teacher reflection after ERT. In line with the theme of

preparation for future ERT, it reported improved teacher use of technologies to present online content and organization of classes. Marshall et al. (2020) and Petillion and McNeil (2020) also recommended technology training as a preparation step for future ERT use.

Summary

This chapter presents the results from the data collection process of this study. First is a summary of the researcher's activities to obtain the data collection and analysis. Next is a description of each participant and their respective pseudonyms. The data results from the interviews follow this. Within the interview results is a breakdown of the emerging themes and quotations from interview responses. Finally, information on the results of the GPDIS is also presented, along with a summary of the emergent themes. The themes are technology training, low student engagement levels, availability of technology, providing services, co-worker support, low student achievement levels, and preparation for future ERT. The themes provide a better understanding of how teachers experienced ERT during the COVID-19 pandemic and are at the core of what this research study aims to obtain.

Chapter 5: Discussion

Introduction

Implementing ERT during the COVID-19 pandemic caused the educational system to shift to distance education with little warning. As a result, teachers and students continued the education process using a method that most had never experienced before. This study aimed to provide a voice to the mathematics teachers at a local high school in Southeast Florida. The findings of this study will add to the growing literature on how education was affected during and after the COVID-19 pandemic.

This chapter will present the interpretations of the results of this study. First is the researcher's description and interpretation of this study's research questions. Next, the chapter includes a discussion of the results in the context of Roger's Diffusion of Innovation, which serves as the theoretical framework of this study. This follows a discussion on the implications for the emergent themes found during the result of this study. This chapter's final sections will include recommendations for future research and a conclusion.

Interpretations of Results

Research Question 1

How do mathematics teachers describe their ERT preparedness during the COVID-19 pandemic at a high school in Southeast Florida? The responses from participants showed two different experiences of preparedness for ERT. Participants described their experiences in how prepared they felt for ERT and how they perceived, as teachers, the preparedness of their students for ERT. Both types of preparedness showed the same result. The perception of being prepared for ERT was affected by how much

technology training the participant had before ERT. Participants such as PN1, PN9, PN11, and PN13, who had some prior technology training, reported being prepared for ERT. For example, PN 1 stated, “I felt as though I was 100% prepared because I have taken a lot of prior training in technology.” Likewise, participants who had previously used technology items used in ERT before the pandemic with students reported that their students were better prepared for ERT. For example, PN6 stated, “Well, the thing is that student are definitely more tech savvy.”

In contrast, teachers who reported feeling unprepared for ERT needed more prior technology training. Therefore, the response to research question 1 depended on the amount of training a participant had before ERT. The more training the participants had, the more prepared they felt for ERT. For example, PN6 stated, “Oh, I would say, on a scale from 1 to 10, maybe a 2. I felt very unprepared. I’ve never been really big on technology.”

The interpretation of research question 1 is that it is possible to prepare for ERT. Teachers reported a much better feeling of preparedness when they had previous experience with the technology tools used in ERT. The same occurred when teachers described their experience with student preparedness. Therefore, research question 1 showed significant self-efficacy when teachers or students are adequately trained before ERT (Horvitz, 2015).

The findings from this research question align with studies by Bhamani et al. (2020) and Durak and Cankaya (2020). Both studies found common challenges due to the need for more training teachers and students received before ERT. In addition, a study by Marshall et al. (2020) reported a similar finding, with 92.4% of 328 teachers surveyed

stating no online teaching experience. Also, in line with the results of this study, a study from Poland found that the predictors of the effectiveness of ERT were self-efficacy and digital competencies (Knopik & Domagata-Zysk, 2022).

Research Question 2

How do mathematics teachers describe their ERT experience providing education to their students during the COVID-19 pandemic at a high school in Southeast Florida? Teachers reported challenges when providing education to their students during the COVID-19 pandemic. Overall, the district offered adequate technology to teachers and students. However, teachers reported a lack of control and an inability to reach the students during ERT. Thus, teachers reported low student engagement and achievement levels. For example, PN5 stated, “I’d have maybe one or two students out of 28 that would pay attention.”

Moreover, some teachers reported being unable to control what their students were doing during class and assessments. The lack of control led to reports of students sleeping and cheating during exams. For example, PN2 stated, “About 10 percent were doing honest work and the other 90 percent were taking advantage of the situation and cheating.”

The interpretation of research question 2 shows that providing effective education to students during ERT was a challenge. Teachers reported trying many techniques to engage students in class and improve student achievement levels. However, teacher attempts faced barriers that were out of the control of the teachers. For example, students sleep during lessons, not turning on their cameras, not participating in discussions, or simply not attending class. In addition, there was a sense of lack of accountability among

the students because education was occurring through ERT. This lack of accountability has now transferred into the year after ERT, as teachers reported a significant drop in current students' knowledge. For example, when discussing post-pandemic students, PN9 stated, "It is a different world. They cannot accomplish much. You cannot give as long a test and expect they are going to finish it." Therefore, it is clear that ERT harmed student education during and after ERT use.

The findings are consistent with other studies on the pandemic's effect on student achievement. For example, a report by Kuhfeld and Taraswa (2020) discusses a COVID-19 slide as a representation of the learning losses experienced during the pandemic. The report's authors suggest students returned to school post-pandemic, with approximately 70% in the typical learning gains. Other studies found similar results showing a loss of achievement and teacher control during lockdowns, such as ERT (Mukhari & Sanders, 2023; Zhdanov et al., 2022).

Research Question 3

How and in what ways do mathematics teachers describe their ERT experience providing services, including students with disabilities, during the COVID-19 pandemic at a high school in Southeast Florida? Results from research question 3 showed that teachers were willing and able to provide services to their students. All teachers reported that they provided services to all students and provided additional services to students with disabilities and English Language Learners. For example, PN1 stated, "I definitely tried my best to provide the best service I could, recording videos, having notes, and being there to answer questions." However, there was a difference in the type and amount of service provided.

The interpretation of research question 3 is that all students can be provided services during ERT, but this area requires greater attention from policymakers and educational decision-makers. The teachers in this study showed that they are willing and desire to provide the best educational service to their students. However, it was clear from the responses that there needed to be more guidance. Teachers were doing their best given their knowledge, previous applications of rules and policies, and the circumstances of ERT. The lack of direction created an uneven application of what individual teachers provided students. Moreover, special education personnel were also unable, for an unknown reason, to provide guidance or collaboration with teachers. This area will require much more research and planning based on the results of this study.

The findings of this study are consistent with other studies describing the experiences of teachers of special education students during ERT. For example, one study describes a teacher's experience as having a wall between teachers and students when teaching special education students (Lambert & Schuck, 2021). In line with the results of this study, teachers described various challenges when teaching using ERT and attempting to address all that is required to be effective with students with disabilities. Reported challenges included physical separation, emotional issues, resources, and changes in teachers' teaching approaches. One teacher summed it up by asking, "Am I doing enough?" (Schuck & Lambert, 2020), which the teachers in this study would also find themselves trying to figure out.

Research Question 4

In what ways do mathematics teachers think their ERT experience during the COVID-19 pandemic will influence their teaching techniques at a high school in

Southeast Florida? ERT, by its nature, only provides a little time for preparation. Results from research question 4 showed teachers were forced into ERT whether they were ready or not. Some teachers reported that they were better prepared than others. However, most reported that they either improved or learned in several areas for the first time while using ERT. In a way, ERT forced many teachers out of their comfort zone to learn tools or techniques they would have never used. For example, some teachers reported using cameras or posting notes for the first time during ERT. However, moving forward, the results of the GPDIS showed that most participants increased their technological comfort level after ERT.

As education shifted back to face-to-face education, many teachers reported continuing to use techniques or tools they learned during ERT. For example, most teachers reported continuing to post notes and assignments on Canvas for all students to have available. In addition, some teachers reported that posting videos for students is a way to supplement their in-classroom instruction. For example, PN7 stated, “Well, I still can upload my, you know material on Canvas for students who miss class like notes and videos.”

Overall, teachers reported positive experiences when learning tools or techniques during ERT and feel more confident in applying them as they have moved back into face-to-face instruction. In addition, participants were able to provide best practices when asked to advise teachers should the use of ERT be needed again. For example, PN 2 stated, “Get the basics and learn from others that know more,” PN9 stated, “If you are working out of some book, they should have that and everything they need and all that needs to be set up” and PN13 stated, “Don’t be afraid to ask. Get in contact with your

colleagues immediately”.

The interpretation of research question 4 results is that many teachers had to learn new techniques and tools during ERT. Teachers having to learn new skills brought them out of their usual comfort zone. While many teachers reported being unprepared initially, most teachers began to feel comfortable after using ERT. As shown, teachers continue to use those same new skills and integrate them into their teaching processes as they continue their careers. The teachers that went through ERT are now more confident in their understanding of what ERT is, how to use the tools needed for ERT, and how to better prepare for ERT should the need arise. Based on the results, it is clear to the researcher that the teachers who experienced ERT are now better, more confident, and better-skilled educators.

The literature on the topic of the influences and impact of ERT on the future of teaching is rapidly increasing (Atweh et al., 2022). For example, some researchers have found that the future of education could include blended or hybrid modes where teachers and students would experience both distance education and face-to-face (Fornasari & Conte, 2023). In addition, researchers have found concerns among teachers regarding post-pandemic issues such as curriculum, assessments, and equity (Atweh et al., 2022), while other researchers have found some positive changes that have come out of ERT use (Robson et al., 2022). The result of this study will add to the literature on the topic of post-pandemic education.

Diffusion of Innovation

Viewing the results through the theoretical framework of Roger's (2003) Diffusion of Innovation showed how the lack of appropriate time affected the use of the

innovation, ERT. Most diffusion of innovations allows for adequate time for passing information and making decisions. However, the rapid shift to ERT prevented that sufficient time. The following is an interpretation of how ERT, through the five stages of Roger's (2003) Innovation Decision Process based on the results of this study.

Stage one is the knowledge stage. This study showed that while some participants had some training in ERT, most did not have any knowledge or specific training for ERT. The nature of ERT only allows a little time for preparation. This lack of time disrupted the innovation process. The results showed that while participants had some knowledge of distance education, none knew all that is involved in ERT.

Stages two and three are the persuasion and decision stages, respectively. Rogers (2003) states that innovation can be a preventive innovation to prevent an adverse event. ERT is a preventive innovation that does not require more persuasion from teachers. For example, the world faced the COVID-19 pandemic, and ERT was the solution presented to allow for continuing education during social distancing policies. The results of this study showed that participants accepted the innovation introduced, ERT. All participants reported facing the challenges of ERT as best they could, given the tools, skills, and personal tenacity they had at the time.

Stage four is the implementation stage. The results of this study showed that a district could successfully implement ERT. The results showed that the district in this study adequately provided technology to their teachers and students. However, the results of this study do show other challenges during the implementation of ERT. Participants reported difficulties in student engagement, support, achievement levels, and providing services. Rogers (2003) describes implementation stages as a lengthy process. This study

showed that it is possible to implement ERT even if time was cut short by the pandemic.

The final stage is the confirmation stage. The results of this study showed that the district did not adopt ERT for permanent use. However, this is normal within the context of ERT. ERT is not a permanent method of instruction. Instead, schools use ERT when necessary and return to face-to-face instruction when possible. The results of this study showed that participants learned how to implement ERT and returned to face-to-face instruction gaining knowledge they can apply should ERT be needed again.

Discussion and Implications of Themes

The results and analysis of the data found seven emergent themes. These themes are technology training, low student engagement levels, availability of technology, providing services, co-worker support, low student achievement levels, and preparation for future ERT.

The study showed that the amount of technology training teachers and students directly affected how they felt prepared for ERT. ERT was something new to everyone, but some of the tools and techniques used during ERT were not. Therefore, the implication is that more schools should be proactive in their training and development towards technology for teachers and students. This proactive approach will improve readiness should a need occur for future ERT use.

The themes of low student engagement and low student achievement can be discussed together. Teachers overwhelmingly reported low levels of both during ERT, with impact reaching beyond ERT. Unfortunately, students were not held accountable at the same level as before the pandemic. In addition, the district did not address situations faced by teachers, such as sleeping students, cheating, and truancy. In the future,

educational leaders, teachers, students, and parents should adequately address these two themes to ensure that any future use of ERT would maintain the same academic quality as face-to-face education.

The themes of availability of technology and preparation for future ERT use can be discussed together. The results of this study showed that it is possible to be proactive in preparing for ERT by having adequate technology available to teachers and students. The district from this study was proactive in having a system to effectively and quickly provide the technology needed for ERT to all teachers and students. In addition, the district had already offered a learning management system and a real-time course system. As such, participants reported having everything they needed for ERT. Moving forward, teachers report being more comfortable using this technology and being better prepared should ERT arise.

The theme of providing services was a challenge for teachers. Given the circumstances, all teachers reported doing their best to provide their students with all the services they require. However, there needed to be more direction and guidance from educational leaders. Teachers reported feeling uncertain about how to provide services best. Educational leaders and support personnel must be proactive in how teachers will provide student services. This direction and guidance will be beneficial in assisting teachers in providing adequate education for students during ERT.

Finally, teachers reached out to their departments during ERT. The theme of co-worker support showed that teachers could provide themselves with the needed social or professional assistance during a crisis. The teachers reported the district attempting to provide outside services, but teachers felt close enough to their co-workers to meet their

needs. School districts should address the support provided to teachers and students for future ERT. The support should emphasize local support rather than having people reach out over the phone or online. This study showed that support at the local level was more effective during ERT.

Recommendations for Further Research

This study's purpose was to understand further the lived experiences of high school mathematics teachers who underwent a sudden transformation into ERT due to the COVID-19 pandemic. In addition, the study contributed to current research on the impact of COVID-19 on education. This study limited the participants to one subject matter and academic level, high school mathematics. Recommendations for further research are possible for other subject matters and academic levels. In addition, a different geographic area, such as a different state, could also be beneficial to compare the findings of this study.

Conclusion

This study aimed better to understand teachers' experiences during the COVID-19 pandemic. The pandemic caused a worldwide disruption in everyday lives, including education. This study aimed to provide some insight into how people experienced that disruption. In addition, this study provided a voice to the teachers who educate students daily and were thrust into teaching using ERT, a method that was new to most.

The results showed that teachers continued to provide the best education they could, given the circumstances. In addition, based on the data analysis, several themes emerged that showed areas of consensus among the participants. Overall, this study shows that education is possible using ERT immediately should the need arise again.

However, this study also provides some behind-the-scenes insight into what worked well and what did not during the COVID-19 pandemic's use of ERT. Therefore, based on the results of this study, educational leaders and stakeholders can better understand how ERT affects education and how to best prepare for a future need.

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Appendix A

General Participant Demographic Information Survey

General Participant Demographic Information Survey

1. Name:
2. Email Address:
3. Courses Taught during ERT:
4. Years Teaching Experience:
5. Level of comfort with technology use before ERT (rate 1 through 5)
(1 being not comfortable at all and 5 being very comfortable with
technology use).
6. Level of comfort with technology use after ERT (rate 1 through 5)
(1 being not comfortable at all and 5 being very comfortable with
technology use).
7. Preferred method of contact? (Email or phone, if phone, please
provide number).

Appendix B

Semi-Structured Interview Guiding Questions

Semi-Structured Interview Guiding Questions

Topic: Training (Research question # 1)

1. Describe your preparedness when faced with teaching using ERT during the COVID-19 pandemic.
 - a. Describe your preparedness in terms of technology.
 - b. Describe your preparedness from a social or emotional perspective.
 - c. Describe the perception of the preparedness of your students, parents, and administrators.

Topic: Engagement (Research question # 2)

2. Describe your engagement when teaching using ERT during the COVID-19 pandemic.
 - a. Describe your engagement with other stakeholders such as students and parents.
 - b. Describe your engagement with other educational professionals.

Topic: Technology (Research question # 2)

3. Describe the status of the technology you used during ERT.
 - a. How was the level of technology provided by the school district?
 - b. Describe your perception of the status of technology that students had available to them during ERT.
 - c. Describe challenges presented by technology issues that you experienced during ERT.

Topic: Providing Services (Research question # 2 and # 3)

4. Explain how you felt you were providing services to your students
 - a. How did you feel about the level of services you were providing to students via ERT?

Topic: Emotional Support (Research question # 2 and # 3)

5. How would you describe the emotional or social support you received during ERT use?
 - a. What is your perception of the emotional support provided to your students?
 - b. Describe the level of emotional or social support that was available to you.
 - c. Describe your perception of challenges involving emotional or social support for students, teachers, or parents.

Topic: Learning (Research question # 2)

6. What was your experience with the level of learning that was occurring during ERT use?
 - a. Describe how you felt you were learning during ERT?
 - b. Describe your perception of ERT learning of your students and parents?
 - c. How would you describe the academic achievement levels of students learning through ERT compared with your experience of students learning via face-to-face?

Topic: Transition (Research question # 4)

7. Describe your transition from ERT back to face-to-face teaching?
 - a. Explain challenges that you have experienced during the transition.
 - b. Describe best practices you are now incorporating since moving back to

face-to-face learning.

- c. How would you prepare to move back to ERT should the need arise in the future?