ELEMENTARY SCHOOL TEACHERS' PEDAGOGICAL DIGITAL COMPETENCY AND SELF-EFFICACY DURING THE COVID-19 PANDEMIC: A MULTIPLE CASE STUDY

by

Teerath Kaur Grewal

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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Abstract

The purpose of this multiple case study was to understand the pedagogical digital competence and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during emergency remote teaching of the 2020-2021 school year caused by the Covid-19 crisis. Previous research has shown that factors such as competency and self-efficacy as primary elements that immensely influence the educator's ability to integrate technology in a classroom. The theory guiding this study was Bandura's self-efficacy theory, which explains the educator's ability to integrate educational technology within instructional practices successfully. Qualitative multiple case study was used to explore the challenges and successes that educators experienced with educational technology. Six teachers from first through sixth grade from each school site were selected to participate in this study and shared their experiences regarding their pedagogical digital competence and self-efficacy. Data were collected through a timeline template, interviews, and artifacts/documents. The data were analyzed through thematic analysis. The themes were resilience for online teaching, insufficient professional development, anticipated and unanticipated challenges, in-person education preferred, and advanced hardware technology. The sub-themes were learning online teaching, increase in digital competence, teacher collaboration, self-taught, and site-specific challenges. The study found significantly low self-efficacy with participants from both school sites in regard to using educational technology at the initial stage of emergency remote teaching. Future research recommendations include studying the perspectives of other stakeholders, such as administrators, parents, and students, to learn from their experiences.

Keywords: Emergency remote teaching, self-efficacy, pedagogical digital competency, Covid-19 pandemic, and educational technology.

Dedication

I would like to dedicate this dissertation to my family. The doctorate journey required a significant amount of time and it resulted in sacrificing quality time with my family. For the past few years, countless weekdays and weekends were spent working on my courses and dissertation, and each time I had to deny spending time with my family. I appreciate all the support I received from my family and friends during this journey. I am thankful to my parents and my in-laws' family for always checking in with me and praying for the successful completion of my doctorate. The continuous encouragement of my dear friends made me feel I could take on any challenge that came my way during this process. Their words uplifted me during times I felt wearied and low. I could not have completed this journey without their patience, love, and support. Also, I want to dedicate this dissertation to my dear husband, Amanvir Singh Grewal. He has been my backbone. I am so thankful for him being so understanding as I've had to be absent for a significant time during the first a year and half of our marriage. He always made sure that I had all the resources I needed to complete this journey. I will forever be grateful for his continuous encouragement.

Also, I will forever be grateful for the blessings of God because, with God's grace, I had the support I needed to accomplish this achievement. There were times when the only thing helping me get through this process, which was so isolating at times, was my prayers. I am beyond thankful for this opportunity that God presented to me.

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List of Abbreviations

Emergency Remote Teaching (ERT)

International Society for Technology in Education (ISTE)

Learning Management System (LMS)

Pedagogical Digital Competence (PDC)

Technology Acceptance Model (TAM)

Technological Pedagogical Content Knowledge (TPACK)

CHAPTER ONE: INTRODUCTION

Overview

The Covid-19 pandemic that began in 2019 heightened the challenges for K-12 educators to implement educational technologies in a virtual classroom with students (Gerber, 2020). Because students and educators were expected to follow the stay-at-home orders to prevent the spread of the corona virus, educators were expected to design and implement instruction via online platforms and learning management systems (Shamil-Inbal & Blau, 2021). The abrupt shift from in-person instruction to completely virtual forced many teachers to learn new educational technology tools, and teachers described the process as "building the plane while flying it" (Trust & Whalen, 2020, p. 193). Since schools reopened, engaging in conversations with teachers is crucial to understand their various experiences, challenges, success, and recommendations for future digital instructional practices. This chapter includes a background with historical, social, and theoretical contexts. Furthermore, this chapter provides background, problem statement, purpose statement, significance of the study and research questions.

Background

Many societal changes have occurred due to social, economic, and cultural shifts; however, technology has significantly improved the quality of people's lives during these changes (Fernandez-Batanero et al., 2020). The potential and impact of technology in education are still developing and being studied, primarily due to the rapid expansion of online learning (Philipsen et al., 2019). Therefore, it has become a priority of many nations to evaluate the training needs of educators to be current with the new digital resources and pedagogical skills for student learning (Fernandez-Batanero et al., 2020). However, teachers' digital competence is a complex concept involving skills, knowledge, and attitudes to effectively incorporate

technologies in their pedagogy (Lucas et al., 2021). Additionally, to improve the quality of technology integration due to the increase in online learning, it is critical to analyze educators' experiences to identify factors that may impede their ability to address the learning demands of 21st-century students (Instefjord & Munthe, 2017).

Historical Context

Technology has intersected with education in different forms. Terzian (2019) stated that scholars have studied the evolution of educational technology that began with tools such as film, radio, and television. Initially, the focus of research was on using these tools and then shifting to how educators implemented these resources and how students interacted with them. After World War I, radio programs proliferated classroom instruction in many countries, including the United States. Terzian also stated that during the early 20th century, there were many attempts to continue incorporating radio broadcasts in the American classroom to supplement instruction; however, the economic crisis of the Great Depression forced many educational stations to close. After World War II, television gained popularity, and a series of initiatives aimed to create educational television programs that would create the potential to engage with remote learners. During this time, the emergence of a nonprofit educational corporation, the Public Broadcasting Service, was established. Terzian stated that during the years following World War II, many American universities created the first electronic computer mainframes, which led to the emergence of the microcomputer in the 1970s. Many scholars believed that computer programs would facilitate student learning, and this notion led to the use of microcomputers in American elementary and secondary schools by the 1980s (Terzian, 2019).

Following are the four main stages of the evolution of technology in education from the years 1976 - 2016: the advancement and growth of computer-based instruction (1976 -1986);

stand-alone multimedia learning (1987 – 1996); networked computers as tools for collaborative learning (1997 – 2006); and online learning in a digital age (2007 – 2016) (Zawacki-Richter & Latchem, 2018). During the first stage, the advancement and growth of computer-based instruction (1976 -1986), the "computer literacy" movement occurred, and the text-processing system Microsoft Word was released in 1983. The main focus during this stage was on the use and capability of computer systems in education. During the second stage, stand-alone multimedia learning (1987 – 1996), the World Wide Web was invented which resulted in schools creating web pages and launching the first learning management system (Virtual – U). The third stage, networked computers as tools for collaborative learning (1997 – 2006), experienced an expansion of the internet; search engines such as Google and Yahoo produced new methods of accessing information. The term e-learning was introduced, and new opportunities to learn and complete degrees online became available in higher education. Lastly, during the fourth stage, online learning in the digital age (2007 – 2016), social media and Wi-Fi increased, which led to new interactive, collaborative, and participative learning. E-learning became mainstream as higher education proliferated web-based learning platforms for students (Zawacki-Richter & Latchem, 2018).

Raja and Nagasubramani (2018) also discussed the evolution of modern technology and the impact of modern technology on education. Prior to the integration of technology in classrooms, educators experienced many restrictions and limitations for engagement, delivery of instruction, and connectivity with students. Terzian (2019) argued that advances in technology have reduced physical barriers to learning that included access to information. Raja and Nagasubramani (2018) also stated that modern technology has allowed educators to teach effectively and conveniently at a much higher rate than before. For instance, learning and

instruction has become much more interactive through integration of technology and the level of connectivity between educators and students has increased. Furthermore, modern educational technology has enhanced teaching and learning as globalization is taking place. Educators and students' pair with other students from various states and countries to engage in learning with no geographical limitations.

Social Contexts

During the Covid-19 pandemic and the emergency online teaching, digital platform was the sole instructional method. It created new challenges for educators with educational technologies and time needed for preparation, amount of content that could be taught, and difficulties with engaging students, and assessing students online (Kaden, 2020). Teachers stated that there were low levels of children's participation, limited social interaction and age-appropriate methods of engaging students in the remote learning environment, lack of knowledge and skills for virtual teaching, and limited technology support availability. Allen et al. (2020) argued that the abrupt shift to online teaching increased stress on teachers as they were expected to solely provide instruction online and quickly navigate a myriad of online platforms and software. There was a significant problem of communication with parents while using the online platforms (Dayal & Tiko, 2020). The level of these challenges also varied depending on the availability of resources (Andrew et al., 2020).

Additionally, during emergency remote teaching, many schools struggled to meet the basic needs of students due to lack of digital tools, internet access, and training for teachers. The students that were detrimentally affected the most were children from low-income families, ethnic minority backgrounds, children with disabilities or other health issues, and students from rural communities (Dorn et al., 2020). Disparities and inequity were discovered with the access

and engagement in virtual learning that was due to the level of socioeconomic status of parents (Andrew et al., 2020). For instance, high socioeconomic status parents were able to spend more time with students and provided additional academic support including help with homework and digital resources such as computers than parents of low socioeconomic status (Ford et al., 2021).

A critical social aspect that was impacted during emergency remote teaching was student engagement (Huck & Zhang, 2021). A survey conducted in April of 2020 reported teachers indicated that 74% of their student's current engagement level was much lower than prior to the pandemic and 25% of the students were truant (EdWeek, 2020). Also, teachers, students, and administrators throughout the country reported low morale during the early months of the pandemic (EdWeek, 2020). The impact of school closures on the social and emotional well-being of students is another severe concern because it affected their engagement during remote learning (Huck & Zhang, 2021). Schools are a place for students to connect with peers and adults which helps them develop meaningful relationships; however, the abrupt shift to digital learning made it difficult for students to maintain those relationships (Oosterhoff et al., 2020; YouthTruth, 2020). Additionally, students experienced learning disruptions during emergency remote teaching, resulting in falling behind their grade level progress (Dorn et al., 2020). Data indicate that students of color and low income experienced even greater learning loss (Kwakye & Kibort-Crocker, 2021).

Theoretical Contexts

It is essential to understand how the scientific theories of learning have explained the use of educational technology for teaching and learning (Terzian, 2019). For example, the concepts of psychologist Skinner were evident in the mid-20th century and focused on how media reinforced learners' behaviors. Later in the 1970s and 1980s, behaviorism was criticized by

cognitive psychologists because it characterized learners as passively absorbing information rather than engaging in active thinking. Cognitive theories of learning focused on using educational technology to understand how learners process and interpret what they learn and the most effective techniques for designing instruction. Subsequently, constructivism emerged as another learning theory in the late 20th and early 21st centuries. Two significant categories of constructivism are cognitive and social (Ahmad et al., 2020). Piaget (1967) defined cognitive constructivism as the process of learning in which new knowledge is assimilated and accommodated into existing knowledge. Vygotsky (1978) defined social constructivism as a learning process are facilitated by social interactions with others. In constructivism, a learner is an active agent in the process of knowledge. Constructivists emphasized student-centered instructional practices and encouraged emergent technologies such as educational games, interactive blogs, and problem-based learning (Terzian, 2019). Furthermore, constructivists viewed educational technology not only as a tool for distributing information but as a method of communication and collaboration that students can use to construct their understanding.

Borthwick and Hansen (2017) stated that the traditional approaches for guiding teachers to develop digital capabilities had focused on digital literacy, and this term emerged around 1997. This approach also refers to equipping teachers with the basic competencies they can learn to transfer in the classrooms but fails to consider the ability needed to create authenticity, foster independent learning, and create innovative digital learning experiences. However, due to constant changes in technology, Falloon (2020) suggests that teacher learning needs to emphasize “digital competency” rather than “digital literacy” so that educators’ digital learning involves focusing on how to implement digital resources to proliferate student learning effectively.

Joo et al. (2018) stated that technology-integrated learning and teaching are prevalent in K-12 using various platforms and digital resources. Therefore, improving positive perceptions of technology and intentions to use it is critical and can be addressed with the adoption of the technology acceptance model (TAM) (Joo et al. (2018). This theoretical framework developed by Fred Davis and Richard Bagozzi first appeared 30 years ago and has been accepted in education (Granic & Marangunic, 2019). TAM explains that two factors influence an individual's use of technology: (a) perceived usefulness, and (b) perceived ease of use. The TAM model emphasizes the adoption of new technology is influenced by the individual's attitudes.

Problem Statement

The problem is that K-12 educators experienced inadequacies due to a lack of pedagogical digital competency and self-efficacy when teaching online during the Covid– 19 pandemic (Gerber, 2020; Hodges et al., 2020; Oyedotun, 2020). Many challenges contributed to teachers' instructional ineffectiveness during the transition to virtual teaching, including lack of preparation by school districts, inadequate instructional technology training, and limited access to digital tools (Ogodo et al., 2021). Portillo et al. (2020) reported that teachers partially perceived themselves as competent for delivering emergency remote teaching and argued that there is an urgent need for teacher professional development for online and blended learning. Furthermore, limited digital competency corresponded with educators' low level of self-efficacy during emergency remote teaching (Ogodo et al., 2021).

Purpose Statement

The purpose of this multiple case study was to understand the pedagogical digital competence and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during emergency remote teaching of the 2020-2021 school year

caused by Covid-19 crisis. Pedagogical digital competence is defined as educators' ability to consistently apply the attitudes, knowledge, and skills required to design and implement to support student learning through technology (From, 2017). The theory guiding this study is Bandura's (1997) self-efficacy theory.

Significance of the Study

Although, in the United States, there has been an optimistic outlook for technology-supported instruction, there have been continuing challenges that hinder the seamless integration of technology in the classroom (Mao et al., 2019). The sudden shift of K-12 education to virtual instruction added to those current challenges (Ogodo et al., 2021). It is a crucial moment in education to investigate the disruptions that occurred due to the pandemic that caused frustration and inconsistency in the delivery of effective online instruction across the United States.

Empirical Significance

There was limited research on the impact of Covid-19 in the education sector, and currently, the majority of the research has been conducted beyond the United States (Karalis & Raikou, 2020; White & McCallum, 2021; Yan et al., 2021). Duraku and Hoxha (2020) presented evidence of remote learning and teaching challenges during the pandemic in southeast Europe. Shamir Inbal and Blau (2021) explored teacher experience conducting synchronous and asynchronous instruction during the pandemic from elementary and secondary school teachers in Israel. Oyedotun (2020) discussed the challenges that occurred due to the transition to online learning from the experiences of a university in the developing country of Guyana in South America. Diz-Otero et al. (2022) analyzed educators' digital competence during emergency remote teaching in the Northwest region of Spain.

Although a few studies have been conducted in the United States, there is still a need to

engage with educators from the United States to understand their unique experiences of emergency remote teaching (Huck & Zhang, 2021). Mourlam et al. (2021) explored teachers' knowledge to determine changes in their technology, pedagogy, and content knowledge (TPACK) before and during the pandemic in South Dakota. Akojie et al. (2022) conducted a narrative study of educators from K-12 grades from the Southeast region of the United States regarding adjusting instruction during the first two months of emergency remote teaching. An et al. (2021) examined K-12 teachers' feelings, experiences, and perspectives regarding emergency remote teaching during the early stage of the pandemic from 25 different states in the United States; however, the researchers did not indicate which states were selected to gather evidence for the study. There have been minimal studies related to the pedagogical digital competence of teachers in California during Covid-19. Consequently, this study was warranted and fills the gap in the literature.

Practical Significance

This study offers findings for administrators regarding the issues teachers had with pedagogical digital competency skills that were revealed during Covid-19. Diz-Otero et al. (2022) stated that in the 21st century teachers should be fully trained in digital issues; however, their study indicated a lack of competence in digital pedagogy as they analyzed teachers' knowledge and use digital competence. In order to achieve excellence in education and ensure equitable education is delivered to all students, it is critical to analyze the experience of educators and the impact of their digital training on their ability to provide instruction during emergency remote teaching. To avoid a higher workload that caused major distress to educators as they quickly aimed to learn and navigate new technologies to support their instruction during emergency remote teaching, it is critical to understand and highlight shortcomings in the training

of digital skills (Portillo et al., 2020).

The findings of this study also discovered the need for professional development sessions to include specific training with digital tools so teachers are prepared if a similar crisis were ever to occur again. Additionally, this study supports the use of the ISTE standards framework as essential in designing teachers' professional development for virtual learning. Schools that provided learning in blended or hybrid ways discovered that educators need to develop and enhance their instructional skills with technology (Rapanta et al., 2020). Akojie et al. (2022) gathered evidence from educators regarding their experience of providing virtual instruction during the first two months of the Covid-19 crisis. A common concern among all the teachers interviewed was the insufficiency of technology training provided by the schools.

Theoretical Significance

Bandura's (1977), self-efficacy theory refers to the level of confidence that individuals have in their ability to perform a task or achieve an objective. Dolighan and Owen (2021) stated that teachers' self-efficacy was impacted during the pandemic. The self-efficacy of K-12 educators needs to be explored, as to how it impacted their ability to use technology during the Covid-19 crisis (Perera et al., 2019). Pressley and Ha (2022; 2021) argued that when teachers returned to teaching in a virtual environment during the fall of 2020, they demonstrated lower self-efficacy than in studies completed before the Covid-19 pandemic. Not only in the United States, but researchers have also conducted studies on teacher self-efficacy in Canada and Europe at the initial stage of the pandemic and found associations between teacher burnout and low self-efficacy during the pandemic (Dolighan & Owen, 2021). Rabaglietti et al. (2021) surveyed 366 European teachers, and the results showed that their self-efficacy decreased as they came across more difficulties with emergency remote teaching.

The proposed research showed that self-efficacy theory is viable when exploring the pedagogical digital competence of teachers during Covid-19. Furthermore, the findings related to self-efficacy offer education leaders and school administrators to learn about the significance of providing resources and training that help educators develop high self-efficacy while thriving in the constantly evolving technological development. The study explained the significance of implementing ISTE standards to support educators' educational technology knowledge and skills.

Research Questions

The research questions helped identify the inadequacies, challenges, and hindrances that educators from two different school sites may have experienced as they had a sudden shift from face-to-face instruction to a virtual setting caused by the Covid-19 pandemic. Additionally, the research questions focused on how educators from both sites designed pedagogical practices through educational technology that allowed them to provide instruction during emergency remote teaching. Depending on the skills and self-efficacy, educators use educational technology differently, thus designing different pedagogical practices to support student learning remotely (Perera et al., 2019). The following research questions led to understanding the digital pedagogical competency and teacher self-efficacy during the Covid-19 emergency remote teaching of the school year 2020-2021.

Central Research Question

What were the K-6 elementary school teachers at Delta Technology Elementary School and MacArthur Elementary School pedagogical practices while integrating technological resources during Covid-19 emergency remote teaching of 2020 - 2021 school year?

Sub Question One

How did the K-6 elementary school teachers implement pedagogical digital practices learned from the professional development during the Covid-19 emergency remote teaching of the 2020 - 2021 school year?

Sub Question Two

What was the self-efficacy of elementary school teachers regarding their pedagogical digital competence during the Covid-19 emergency remote teaching of the 2020 - 2021 school year?

Sub Question three

How did K-6 elementary school teachers implement two of the seven (2.1 learner and 2.5 designer) ISTE standards for educators in their pedagogical practices during the Covid-19 emergency remote teaching of the 2020-2021 school year?

Definitions

The following terms are pertinent to the study.

1. *Blended Learning* – the thoughtful integration of classroom face-to-face learning experiences with online learning experiences (Garrison & Kanuka, 2004).
2. *Educational technology* – technology resources, processes, and procedures geared at improving teaching and learning in the classroom. Includes elements such as instructional, instructional resources, productivity tools, digital applications, assessment tools, and student management systems (Lakhana, 2014).
3. *International Society for Technology in Education* – An organization founded in 1979 that created the first essential conditions for education in 2003, and later the ISTE standards in 2009 and 2016 (ISTE, 2016)

4. *Pedagogical practices* – teaching strategies and ways of providing instruction (Cohen et al., 1976)
5. *Technology integration* – the process of facilitating and managing learning through purposeful integration of technology tools into the learning and pedagogical process (Januszewski & Molenda, 2013)
6. *Technology integration self-efficacy* – the level of confidence teachers have in their ability to integrate technology in their classrooms in a meaningful way (Hur et al., 2016).

Summary

The purpose of this multiple case study was to understand the pedagogical digital competence and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during the Covid-19 crisis of the 2020-2021 school year. Bandura's (1977) theory of self-efficacy was used as the theoretical framework for this study. It was critical to investigate and explore the various circumstances that educators experienced during Covid-19 to understand methods that can be employed by education leaders to help support educators in the future. Teachers' pedagogical digital competence had been part of the discussion by researchers, but the pandemic alarmed administrators as teachers expressed unpreparedness when they were expected to teach emergency remote teaching (Pressley & Ha, 2021). Self-efficacy became vital as teachers questioned their abilities to perform during emergency remote teaching.

CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this multiple case study was to understand the pedagogical digital competency and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during emergency remote teaching of the 2020-2021 school year. Although prior researchers have discussed digital competency, the immediate need for educators to teach using emergency remote teaching platforms revealed new concerns during the Covid-19 pandemic of 2020-2021(Kaden, 2020). This chapter discusses Bandura's (1977) self-efficacy theory as a framework for this study. Then a survey of the related literature is presented and includes studies on educators' pedagogical digital competency, challenges for integrating technology at a proficient level, professional learning, approaches for improving pedagogical digital competence, and insights into emergency remote teaching issues during Covid-19.

Theoretical Framework

Bandura (1977) defined self-efficacy as the belief in one's ability to perform necessary tasks to achieve goals. He claimed that these beliefs influence a person's decisions and actions when experiencing obstacles. Individuals with a strong sense of self-efficacy approach difficult tasks as a challenge to master rather than consider them a threat. Furthermore, they maintain a strong commitment to these tasks and attempt to acquire knowledge and skills that will allow them to achieve success. On the contrary, individuals with low self-efficacy doubt their abilities and make insufficient efforts toward difficult tasks.

Bandura (1977) identifies four sources of influence on self-efficacy development: mastery experiences, vicarious experiences, social persuasion, and physiological and affective states. The first source of influence, also considered the most effective way of creating a strong

sense of efficacy, is when individuals experience success because it helps elevate beliefs of one's capabilities. Persevering through difficulties helps individuals become convinced that they can remain tenacious and emerge stronger from adversities. As successful experiences build self-efficacy, failures can undermine them. The second source of developing self-efficacy is through vicarious experiences when individuals see others like themselves succeed. Through this modeled influence, they believe they can also master similar challenging activities. Bandura argues that people seek proficient models with the competencies they aspire to achieve, and through expressed behaviors and thinking, the knowledge is transmitted to the observer. It is also essential to consider that when the observer views others similar to themselves fail despite high efforts, it leads to a decrease in self-efficacy of the observer.

The third source of influence is through social persuasion, which involves others verbally persuading people about their capabilities of mastering tasks. Along with conveying positive and elevating appraisals, individuals also help create situations that bring success rather than failures for others. Realistic social persuasion that does not provide false encouragement is critical to instill high self-efficacy. Lastly, the physiological and affective states are essential to strengthening people's self-efficacy. This source involves physiological and affective arousal during difficult situations. Self-efficacy can be increased by reducing stress reactions and misinterpretations (Bandura, 1977).

Bandura (1977) argues that an individual's self-efficacy is the most significant cause of human behavior, especially during adversity. Self-efficacy helps individuals interpret their thoughts, actions, and emotions in various situations. The scope of perceived self-efficacy changes throughout life as individuals experience different types of adversities; they cause

individuals to obtain different levels of competencies required to remain perseverant. Ultimately, self-efficacy is people's belief in their ability to exert control over events that impact their lives.

In a study that used Bandura's (1977) self-efficacy theory, Zee and Koomen (2016) investigated human agency – the belief that individuals can exercise control over actions that affect their lives. They stated that although teachers understand that scaffolding increases student learning, they could be motivated to use the scaffolding strategy. However, teachers are unlikely to practice scaffolding strategies if they do not believe they have the skills and capabilities to select opportunities that support their students.

Perera et al. (2019) applied the self-efficacy theory to understand teachers' self-judgments related to their capabilities of organizing and executing instructional practices that yield success. Perera et al. found that self-efficacy theory can be used to explain the different levels of efficacy teachers may possess in certain teaching domains. Classroom management is one domain that involves a teacher's ability to establish and maintain order in the classroom. Another domain is student engagement, which is associated with teachers' abilities to create positive relationships with students to promote motivation. Lastly, the instructional strategies domain is the teachers' ability to use alternative teaching methods and assessments. Teachers could possess different levels of self-efficacy in these various teaching domains, and their abilities to perform these tasks will vary according to their level of self-efficacy. Furthermore, teachers' self-efficacy can be used to explain their effectiveness in job performance, job satisfaction, and retention. This analysis of self-efficacy can be used to predict the level of commitment teachers have for adapting to the changes that occur in educational settings and their satisfaction to enhance students learning along with professional learning opportunities (McLennan et al., 2017).

Bandura's (1977) self-efficacy theory provided the foundation for this study because it generates specific research questions to investigate factors that impacted the teacher's ability to teach during emergency remote teaching. Furthermore, the efficacious outlook of educators during challenging experiences was examined as to whether their self-efficacy remained at the same level or changed during the different stages of emergency remote teaching. During data collection, self-efficacy was the primary focus to inquire how the teacher's confidence and perceptions of their abilities influenced their instructional practices as they prepared and implemented learning activities using educational technology within remote teaching. When data was analyzed, the teacher's behaviors and competency level determined how these impacted their self-efficacy as they taught online during the pandemic.

Related Literature

This section contains fundamental concepts, current issues, and trends related to implementing educational technology in the classrooms. It is critical to understand different perspectives on how to approach educational technology and how the challenges have been addressed when educators attempt to integrate it within instructional practices. Furthermore, this section provides standards researchers have used to align instructional practices to critique the success of educators' abilities to reach proficient levels with educational technology.

Educational Technology Frameworks

Students in the current K-12 classrooms are often referred to as digital natives; they learn differently than the previous generations and prefer to learn through inquiry and working in teams. The immediate need for new pedagogies that adapt to changing technology, increase active learning, and provide authentic learning opportunities for digital natives is critical (Rice, 2018). Therefore, Rice suggests that theories such as connectivism that provide a new framework

for how students learn are essential to implement in current classrooms. Connectivism was developed to understand learning in the current digital age classrooms. According to the theory of connectivism, knowledge is not passively obtained but through generating meanings and networked learning. Thus, connectivism focuses on the student's ability to make connections between ideas, synthesize information, and distinguish essential and unimportant information as they engage in various learning networks, using technology and face-to-face interaction with peers (Homanova et al., 2018).

Four learning strategies are associated with connectivist networked environments that can be implemented in any classroom (Smidt et al., 2017). The strategies include (a) learner autonomy – students should be independent learners and given a choice regarding their learning resources, (b) resource openness – students should be given opportunities to use various technological networks to share knowledge, (c) network connectivity – students should be encouraged to build connections with technological and social networks, and (d) opinion diversity – students should be encouraged to use their networks to form different opinions and perspectives on topics. Hence, connectivism as a pedagogical approach promotes learning controlled by the learner as they gain knowledge from technology networks; the teacher provides direction to valuable resources and helps the learner navigate through the information (Hegedus et al., 2016).

International Society for Educational Technology

Another technology integration paradigm influencing pedagogical practices is the International Society for Technology in Education (ISTE) standards (Crompton, 2017). ISTE (2016) standards were developed to reference how technology should be implemented by various stakeholders, including educators, education leaders, and coaches, to support instructional

practices. The ISTE educator standards are derived from the following seven themes: learner, leader, citizen, collaborator, designer, facilitator, and analyst (Smith, 2017). The learner standard addresses activities for educators that involves professional learning networks and other opportunities that impact instructional practices. The leader standard encourages teachers to advocate for using technology that empowers students and promotes equity and access to technology. The citizen standard focuses on teachers becoming digital citizens and positively using technology. The collaborator standard encourages teachers to dedicate time to share ideas and resources that improve student learning. The designer standard encourages educators to design authentic and learner-driven activities that accommodate learner differences and needs. The facilitator standard helps teachers create learning opportunities with technology that fosters a culture of independent learning for students. Lastly, the analyst standard encourages teachers to use technology to understand data and create data-driven instruction (Smith, 2017).

Ayad and Ajrami (2017) found that ISTE implementation and understanding of standards were low among preservice teachers and concluded that additional research is needed to understand the perception of how ISTE standards are being implemented. Kimm et al. (2020) found that the teacher candidates perceived they have yet to reach the proficient level of technology competency according to ISTE standards for educators. Morgan (2020) suggested that schools consider aligning their goals and objectives to ISTE as it provides guidelines that ensure equity, transparent and clear communication, student-centered learning, and high-quality resources.

Technological Pedagogical Content Knowledge

A framework that can be used to understand pedagogical digital competence is the technological pedagogical content knowledge (TPACK) developed by Punya Mishra and

Matthew J. Koehler (Swallow & Olofson, 2017). Swallow and Olofson explained that this framework incorporates four knowledge domains - technological knowledge (TK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and technological pedagogical content knowledge (TPACK). Researchers have used this framework to determine how well educators integrate technology for instructional purposes and how educators interact with the multifaced and complex aspects of pedagogy, content, and technology effectively (Yildiz Durak, 2019; Wang et al., 2018). TPACK provides the potential to improve the quality of instruction from planning to implementing the learning activities and even evaluating the teaching process (Ozudogru, 2019).

It is essential for educators to not only have the technical skills for effective technology integration but also be able to blend the different domains, such as content and pedagogy. TPACK framework addresses how educators can synthesize technological, pedagogical, and content knowledge to bring pedagogical changes (Koh, 2019). TPACK framework embeds all the essential components involved in teaching and helps educators understand how technology, pedagogy, and content are connected and interrelated. These domains are critical to establishing a successful learning environment. Integrating each domain helps teachers enhance learning by not simply establishing routines that encourage students to consume information but instead applying the information being learned (Makawawa et al., 2021). By keeping the focus on learner-centered modalities, all the components of the TPACK framework can provide educators with consistency to check whether they are aligning all the components, including technology, content, and pedagogy. Ricardo (2019) stated that knowledge of TPACK allows educators to adjust their instruction, which increases student involvement and motivation by including activities where they could apply their knowledge.

Mourlam et al. (2021) examined educators' TPACK competencies as they taught online and their ability to transfer their TPACK knowledge to create a digital learning environment. The results indicated unsuccessful implementation of TPACK when the context changed to remote teaching from the traditional face-to-face instructional settings. This was not because the instructor's knowledge about teaching with technology decreased but instead because they were expected to create learning activities in a new context.

TPACK framework can be used to understand how effectively educators were able to integrate all the aspects of TPACK – technology, pedagogy, and content mainly because they were compelled to shift from traditional teaching styles and solely use technology to deliver instruction during Covid-19 (Makawara et al., 2021). Kainat et al. (2021) discussed using the TPACK model during Covid -19 and indicated that teachers were intentionally and unintentionally using the TPACK model. During Covid-19, students practiced new self-directed learning methods as they used technology daily during emergency remote teaching. The rapid transition requires examining how well educators blended the TPACK framework's different aspects to ensure student learning was enhanced and not just transitioned from traditional to online.

Constructivist Digital Pedagogical Approach

Vaataja and Ruokamo (2021) explained that changes in teachers' pedagogy could occur with the inclusion of digital technologies and a specific pedagogical orientation. The researchers divided teacher's pedagogical orientation into two types, constructivist pedagogical orientation and traditional pedagogical orientation. Constructivist pedagogical orientation focuses on collaboration, student-centered activities, and the active participation of students rather than a teacher-led transfer of information. Traditional pedagogical orientation is teacher-centered and

incorporates one-way communication between teachers and students. In the constructivist approach, technology serves as a tool that supports student learning. In the traditional pedagogical approach, technology is used to support teacher-centered activities. Sailin and Mahmor (2018) suggest that the learning process of students should be constructivist and learner-centered as digital technologies are integrated into teaching. Learner-centered approaches are expected to enhance students' skills for the 21st century; these skills include collaboration, critical thinking, and creativity.

The constructivist approach to digital pedagogy can be achieved when there is a shift in the teacher's and student's roles (Vaataja & Ruokamo, 2021). The teacher's role becomes a facilitator that helps students control their learning process and increase student collaboration. Technology can help teachers practice constructivist and student-centered approaches (Tondeur et al., 2017). Scholars consider constructivist and student-centered approaches beneficial for integrating technologies in a meaningful way because this method encourages teachers to adopt new technologies (Vaataja & Ruokamo, 2021). Furthermore, teachers with constructivist beliefs tend to be active technology users and frequently use student-centered activities that allow technology as a tool for problem-solving and developing higher-order thinking skills (Sailin & Mahmor, 2018). Vaataja and Ruokamo (2021) further suggested that in the constructivist digital pedagogy approach, learners should be given the opportunities to communicate and contact individuals out of the immediate locality to become creators of knowledge.

Although constructivism and traditional approaches differ in how students learn, Shah (2019) argues that constructivism must not be misunderstood by considering these two approaches as extreme opposites. Instead, teachers in a constructivist classroom still need content knowledge expertise to create an effective learning environment. Also, academic rigor and in-

depth exploration of the subject matter still need to be necessary rather than lessons that are solely entertainment to increase student engagement. Constructivist teaching is effective as it helps students construct their understandings. However, educators must avoid the risk of not obtaining content expertise and reducing learning to entertainment. Effective pedagogy requires educators to actively create a learning environment that helps students build connections between known and unknown knowledge, explore and compare ideas, and adjust teaching based on the depth of student understanding. Educators can utilize digital technologies to align with constructivist pedagogic approaches to enhance student learning (Taber, 2017).

Pedagogical Digital Competence

From (2017) defines pedagogical digital competence (PDC) as,

> the ability to consistently apply attitudes, knowledge, and skills required to plan and conduct, and to evaluate and revise on an ongoing basis, Information and Communication Technology (ICT) - supported teaching based on theory, current research, and proven experience with a view to supporting students' learning in the best possible way. (p. 48)

Thus, Pedagogical Digital Competence relates to knowledge, skills, attitudes, and the relationship between digital technology and learning theory. The main characteristic of educators having PDC is the ability to develop/improve instruction by using digital technology in a professional context (From, 2017). Guillén-Gámez et al. (2021) emphasized the need for educators to have an adequate level of PDC as it enables them to transfer the subject matter to students adequately and vastly improve teaching. Furthermore, they argued that competence requires teachers to receive continuous development and that regular training must ensure adequate use and knowledge of technologies in the classroom.

Pettersson (2018a) addressed four themes associated with PDC: policy, organizational infrastructure, strategic leadership, and teachers' teaching practices. These themes demonstrate PDC's complexity and the stakeholders that are involved, thus making it a school-wide organizational matter with educators and school leaders. Furthermore, the concern is not only the teachers, school leaders, and students' digital competence but rather how to develop a digitally competent school organization that provides a supportive structure for digitalization for all the stakeholders (Pettersson, 2018b). Schools can become comprehensive, stable, and digitally competent organizations by setting the school's direction with common goals and visions, providing new digitalized learning, and developing an environment that embraces change and evolution.

Considerable efforts are being conducted at the international level to equip teachers with the knowledge to become pedagogically digitally competent (Benali et al., 2018). Many countries are developing or revising frameworks to guide teachers in obtaining the necessary competencies to use the full potential of technologies to enhance teaching and learning as technology is rapidly changing. Mezentceva et al. (2020) identified the six most prominent frameworks of pedagogical digital competence. The following are the frameworks – the European Commission's Joint Research Center's digital competence of educators (DigCompEdu), UNESCO's ICT competency framework for teachers, TPACK framework, the teacher educator technology competencies (TETCs), R. Krumsvil and K. Jones' model, the Substitution, Augmentation, Modification, Redefinition (SAMR).

DigCompEdu is a common European framework for teachers for the development of pedagogical digital competence, and it consists of six groups of skills: (a) professional engagement; (b) digital resources; (c) teaching and learning; (d) assessment; (e) empowering

learners; (f) facilitating learners' digital competence. UNESCO'S ICT framework also contains six groups of skills: (a) understanding ICT in education policy; (b) curriculum and assessment; (c) pedagogy; (d) application of digital skills; (e) organization and administration; (f) teacher professional learning. However, UNESCO's framework has a much broader focus because it is more concerned with educational change, transformation, and leadership. The TPACK framework emphasizes integrating all the components of pedagogical digital competence (pedagogy, content, and knowledge). The TETC framework is designed to support specialists that are responsible for professional teacher development; however, it can be modified by educators to develop digital skills. The framework developed by R. Krumsvik and L. Jones is organized in a hierarchical level of digital proficiency that includes: (a) basic ICT skills; (b) pedagogical knowledge of ICT usage; (c) using digital learning strategies for professional self-development and teaching ICT to students; (d) developing ethical considerations regarding the use of ICT in education (Mezentceva et al., 2020). Although there is availability for several prominent frameworks, developing pedagogical digital competency can be challenging for educators, mainly when constant and rapid changes occur in educational technologies (Amhag et al., 2019).

External and Internal Barriers

In the United States, the first-order and second-order barriers to technology exists. The first-order barriers (external) include access to technology tools, and the second-order barriers (internal) includes educator's ability to integrate technology successfully. The second-order barriers are still present and continue to be a concern for educators even though external first-order barriers have lowered (Durff & Carter, 2019). Since there is a significant positive impact on student achievement when technology is effectively integrated, it is essential to understand

the impact of second-order barriers since first-order barriers have decreased (Higgins et al., 2019).

The implementation of technology in the classroom is highly dependent on the teachers' internal barriers rather than external barriers (Makki et al., 2018). There is a strong association between teachers' ability and valued beliefs than external barriers regarding technology integration (Atman Uslu & Usluel, 2019). Another study conducted with 16 schools in the United States also had similar findings about technology integration: the quantity and quality of technology integration had a strong positive relationship between teachers' ability and beliefs than external barriers (Vongkulluksn et al., 2018).

Sociocultural surroundings, attitudes, and pedagogical are second-order barriers that influence teachers' integration of technology (Durff & Carter, 2019). Durff and Carter explained that the sociocultural barriers, referring to the school culture and social connections, influenced the classroom use of technology for student learning. The school culture is developed through the administration's leadership, beliefs, and attitudes of teachers. The second barrier that Durff and Carter discussed was the attitudinal barrier, which referred to how teachers felt about technology – whether they believed technology positively or negatively influenced the learners. Lastly, the pedagogical barriers are formed in teacher education programs and through personal experiences when teachers were students. The study revealed that teachers overcame difficulties in technology integration as they overcame sociocultural, attitudinal, and pedagogical barriers. Teachers were able to overcome these difficulties through a team approach among administrators, technology support personnel, and teachers. Other factors that helped included appropriate professional development, developing collegial support system among teachers, training teachers to locate relevant technology resources, and establishing value for the use of

technology for learning. Leftwich et al. (2018) emphasized that teachers' perceived barriers and technology integration are malleable and can change over time; therefore, it is essential for teachers to consistently engage in a technology-supported environment so that their self-efficacy may increase.

Teacher perspective is one factor that influences technology integration into the classroom (Duraku & Hoxha, 2020). Stenman and Pettersson (2020) studied the perspectives of teachers that participated in remote teaching. These participants indicated that remote teaching has the potential to solve many issues for schools, such as equitable practices and flexibility in teaching methods. Furthermore, it can provide students with new opportunities to learn. Duraku and Hoxha (2020) also argued that educational technologies had enabled educators to expand teaching methodologies for greater flexibility and allow students to be more independent and self-determined.

Teachers' personal pedagogical beliefs influence their decisions regarding when and how to integrate technology. Teachers' perceptions of changing and adapting their teaching methods and their use of technology are highly influenced by their perceptions of good teaching and effective learning (Kopcha et al., 2020). Njiku et al. (2019) argued that effective use of technology requires an understanding of not just the technological infrastructure and the availability of tools but also the attitudes of teachers by focusing on elements related to technology integration, such as their level of confidence and anxiety. Tondeur et al. (2016) suggested that long-term professional development will change teachers' beliefs regarding technology integration.

Educators' pedagogical beliefs are essential to technology integration and whether they implement teacher-centric or student-centric practices (Tondeur et al., 2017). Teacher-centric

classrooms employ traditional behaviorist learning theories that include lectures and discipline, with teachers as experts providing students with knowledge. On the contrary, student-centric classrooms implement constructivist learning theories, including students building their knowledge, group work, and self-directed learning (Durff & Carter, 2019). Ally (2019) stated that learners, rather than teachers, are considered at the center of learning with technology in the digital era because they are active learners developing their knowledge base and creating an understanding of the world around them. A survey conducted by World Innovative Summit in Education with 645 experts from different fields showed that in the future, teachers will become guides and facilitators for learning rather than deliverers of information since information will be accessible in digital format.

Taimalu and Luik (2019) studied the perceptions and factors that influence teachers' abilities as digital pedagogues. They concluded that teachers should develop student-centered teaching practices as facilitators and continue strengthening professional knowledge. Furthermore, teachers should create a supportive environment through digital pedagogy and increase learning possibilities. An et al. (2021) stated five comprehensive beliefs for K-12 online school teachers, including building a connection with students, fluid practice, helping students engage with the content, managing the course, and designing a support system for student success.

Tondeur et al. (2016) made five conclusions after surveying studies on teachers' pedagogical beliefs and their educational technology use. First, the relationship between pedagogical beliefs and technology use includes a bi-directional relationship – a technology-rich learning experience can change teachers' beliefs towards becoming innovative and feeling encouraged to implement new learning methods. Second, pedagogical beliefs can act as a barrier

to technology integration. If teachers do not believe technology can be used to teach effectively, they will be reluctant to integrate it into their pedagogy. Third is the importance of a multi-dimensional approach – teachers include multiple beliefs and approaches towards technology use and do not hold one pedagogical orientation. Fourth includes issues related to professional development because not all teachers benefited from professional development interventions provided to them. Some educators continued their teaching practices before receiving professional development for integrating technology. Fifth is the supportive school environment that includes school policies based on a meaningful integration of technology.

Xie et al. (2021) examined changes in teachers' perceptions of external and internal barriers related to integrating digital educational technology in K-12 classroom settings. The researchers found a significant increase in teachers' perception of a shared vision for technology integration even though access to technology remained the same. Although external and internal barriers impact teachers' technology integration, it is critical to examine how these factors interact and change over time (Kopcha et al., 2020).

Challenges for Integrating Technology at Proficient Level

There are several reasons teachers struggle to use technology proficiently in the classrooms (Hyndman, 2018). Teachers' experience with technology and the availability of technology support significantly influences classroom technology integration (Liu et al., 2017). Three specific variables – teacher confidence and comfort using technology, teacher use of technology, and classroom technology integration influence each other. Liu et al. found that teachers' confidence and comfort in using technology were positively related to the number of years of teaching experience with technology, access to technology in the classrooms, and support provided by the school. Therefore, school administrators must take action toward

developing technology competency and helping change positive attitudes toward technology through deliberate and meaningful opportunities (Yildiz, 2019). School administrators can provide quality support staff to help resolve technology-related issues (Liu et al., 2017). Educators are often expected to experiment with technology without proper guidance and continue practicing with the new digital tools until they find methods for virtual learning environments (Rehn et al., 2018).

Integrating educational technology requires educators to be competent to engage students in their learning in a manner that is not simply a substitute for traditional pedagogical practices but proliferates their learning experiences. Chauhan (2017) conducted a meta-analysis to study technology's impact on elementary students' learning effectiveness. The study found that the way students utilize the resources provided by the teachers and how teachers apply their digital competency will result in a specific level of academic achievement for students.

For successful online teaching, teachers are required to perform the pedagogical skills that include designing and implementing instruction, creating engaging discussions, providing direct and indirect feedback, and navigating the students' discussions and engagement (Ogodo et al., 2021). However, Farmer and West (2019) found that educators are deficient in these skills due to inadequate teacher preparation; therefore, they suggested that teachers need to have the competency to design well-planned online instruction. When addressing the proficiency levels of educators for implementing technology, Maderick et al. (2016) emphasized that self-assessments regarding teacher’s digital competency must be carefully evaluated as teachers can demonstrate an overestimate on surveys of their competency in regard to knowledge and skills necessary for technology integration. When school leaders aim to understand educators' competency and proficiency for integrating technology, subjective and objective tools must be used to assess the

learning needs of educators. Multiple challenges involve teachers' digital competency, including school context and teacher background (Hernandez et al., 2022). The school context includes the availability of technology and common practices for technology integration. Teacher's background refers to their knowledge and experience with technology. Thus, a holistic understanding of elements that influence teachers' abilities to implement digital practices at a proficient level must be considered (Maderick et al., 2016).

Student Teacher Preparation

Current teacher education programs inadequately integrate digital competence for pedagogical purposes (Ahmag et al., 2019). Typically, teacher preparation programs offer a single required educational technology course, leading to inadequate development of internal factors, including knowledge, beliefs, and attitudes, needed to effectively create enriching learning environments (Trust & Whalen, 2020). Ahmag et al. (2019) argued that college instructors responsible for preparing student teachers have insufficient knowledge and skills for effectively implementing educational technologies. Therefore, student teachers cannot be expected to reform and improve their teaching when their instructors are inadequately trained. Furthermore, these researchers found that out of the four different ways of implementing technologies, including teaching, communication, administration, and research, instructors from education programs did not primarily use technology as a pedagogical tool to improve teaching and learning. Technology was primarily used for communication and administrative purposes.

When considering teacher education programs, student teachers should be able to receive meaningful learning that helps them improve their digital pedagogy (Sailin & Mahmor, 2018) Sailin and Mahmor found five attributes of meaningful learning that student teachers believed enabled them to improve their digital pedagogy– active, constructive, authentic, intentional, and

cooperative. The attribute of "active" refers to student teachers not being passive listeners; instead, they actively participate in learning activities, manipulating objects and information. The attribute of "constructive" relates to student teachers constructing their knowledge, reflecting, and articulating their understandings of phenomena observed. The attribute of "authentic" is that student teachers are engaged in realistic tasks rather than memorizing abstract ideas. The attribute of "intentional" allows student teachers to set their learning goals and plan their learning activities and direction. Lastly, "cooperative" attributes involve student teachers working with peers to solve problems and conduct discussions to apply their knowledge. Participants from this study revealed that meaningful learning activities contribute to improving their knowledge and skills in using Web 2.0 – which refers to 21st-century internet applications.

Caliskan et al. (2019) associated Web 2.0 technologies with various web platforms that emphasize participation and communication and enable content distribution, sharing, and co-creating instead of passively retrieving information, which is Web 1.0. Web 2.0 technologies have gained a significant reputation in educational contexts for social networking, blogs, wikis, web-based presentation tools, and interactive and responsive learning environments. These digital tools allow exploratory learning, peer learning, project-based learning, team teaching, and reflective practice. Implementing these digital tools can create an effective learning experience that could encourage student teachers to successfully implement digital pedagogy in their future instruction (Sailin & Mahmor, 2018)

The sole purpose of Web 2.0 is not only for the user to obtain information but to participate actively and engage in learning by creating and sharing information with others (Almekhlafi & Abulibdeh, 2018). Creating a blog can enhance learners' writing and technology skills while having full ownership and control of their assignments. Although Almekhlafi and

Abulibdeh explained many digital pedagogy benefits of integrating Web 2.0 tools, Ahmed et al. (2016) argued that many teachers are hesitant to integrate Web 2.0 technologies for reasons including lack of knowledge and skills, limited digital pedagogy, limited technical support, and other organizational barriers.

The goal of educational institutions should be to restructure teaching programs that educators complete with modern technology since education is not merely a transfer of knowledge from teacher to student (Rahman et al., 2017). Graziano (2018) argued that the content of educational technology courses for educators should be more comprehensive than technology skills proficiency. The learning activities should provide opportunities for preservice teachers to increase self-efficacy.

Teacher Professional Development

Teacher professional development must involve continuous efforts of learning throughout an educator's career (Amhag et al., 2019). Hasty solutions cannot resolve the complexity of digital competence because teachers need training that not only helps them use new technologies but also teaches them how to integrate them effectively into the curriculum and meet the needs of their students (Gunter & Reeves, 2017). Furthermore, Amhag et al. (2019) argued that professional development aiming to provide digital pedagogical competence requires continuous follow-up as technology changes. However, isolated training without follow-up provided to teachers does not suffice the necessary knowledge and practice needed to develop confidence for educators (Mannila et al., 2018; Powell & Bodur, 2019).

Mannila et al. (2018) examined teachers' challenges and the support teachers mentioned that should be included in professional development. The results indicated that teacher training and educational efforts must focus on helping teachers develop strong self-efficacy since it is the

critical factor for teachers that helps them remain resilient through difficulties when adopting new technologies. Other common problems associated with professional development include a lack of systematic organizational approach to continuous learning, frequency of general technology training rather than customized based on the different specializations of teachers, and focus on programs and applications that are becoming obsolete over time (Mezentceva et al., (2020)

Many countries, including the United States, Australia, and some European and Latin American countries, are rethinking teachers' professional development and creating drafts of educational technologies standards for initial and ongoing training (Fernandez-Batanero et al., 2020). Perifanou et al. (2021) stated that 15 European countries (Austria, Bulgaria, Cyprus, Czechia, Estonia, Finland, France, Portugal, Serbia, Slovenia, Switzerland, Spain, United Kingdom -ENG, WLS, NI) have adopted the use of self-assessment and self-evaluative tools for teachers to determine their proficiency level to identify their needs and plan their professional development. Six of these countries (Cyprus, Czechia, Estonia, Finland, France, Portugal, and Spain) used the European self-assessment tool based on the European framework for digital competence of educators (DigCompEdu), while others created their own self-assessment tools. Similarly, many educational systems (Egypt, Kenya, Tunisia, Rwanda, South Africa, Togo, and Zimbabwe) have adopted UNESCO's ICT competency framework for teachers to find pre- and in-service teachers' training needs on digital technologies for instruction. Due to the continuous changes in society caused by digital technology, it has become pertinent and necessary to provide effective and updated training to help teachers become digitally competent in their pedagogical practices (Fernandez-Batanero et al., 2020).

After studying the perceptions and experiences of educators regarding professional development, online and in-person, researchers identified the multifaceted challenges regarding access to quality professional development (Avidov-Ungar, 2020; Caena & Redecker, 2019; Fischer et al., 2018; Powell & Bodur, 2019). The literature reveals that one of the major concerns is that educators are provided with one-time training for all without consideration of the relevancy of information for educators (Powel & Bodur, 2019). Schools must avoid one solution for all issues because this approach fails to consider the various situations teachers experience (Hyndman, 2018). Additionally, educators expressed that professional development courses needed to be designed that address relevancy based on their career stages (Powel & Bodur, 2019). Avidov-Ungar (2020) synthesized career stages for educators in three broad groups: early life phase (0-5 years of experience), middle life phase (6-12 years of experience), and late life phase (13 or more years of experience). Veteran teachers and teachers with less experience mandated to attend the same professional development may not need to learn the same information because veteran teachers could potentially be already utilizing the techniques addressed in the professional development (Avidov-Ungar, 2020; Powell & Bodur, 2019).

Relevant and personalized learning can be critical to teachers' self-efficacy in implementing effective technology and instructional practices (Hall & Trespalacios, 2019). Veteran teachers conveyed that their knowledge of integrating technology into teaching is inadequate and would prefer professional development to address this concern. Regarding entry level teachers, they expressed a greater need for professional development related to teaching practices and effective lesson planning relevant to students since they have not established the same level of confidence in teaching as their tenured colleagues (Avidov-Ungar, 2020). Teachers' motivation to participate in professional development and implement the learned

content depended on whether they valued the content for providing them with learning gain at their current career stage (Avidov-Ungar, 2020; Powell & Bodur, 2019). Organizing and designing professional development in a bottom-up fashion is much more effective than the top-down approach (Powell & Bodur, 2019). The bottom-up approaches encourage educational leaders to understand the needs of their educators and provide professional development that supports those needs, rather than providing professional development that they consider necessary without including consideration from teachers.

Furthermore, the availability of a self-assessment tool can be utilized by educators to determine their areas of need so that professional development can be designed to address and solve real issues they are experiencing (Caena & Redecker, 2019). This process can encourage motivation, agency and voice, and resiliency among educators as they are given opportunities to share their competence levels through self-assessment. Professional development must be designed through constructivist principles and use research-based frameworks to enhance the quality of professional development (Powell & Bodur, 2019). Educators' perceptions of essential features of effective professional development included relevancy, authenticity, usefulness, collaboration and interaction, reflection, and context.

Similarly, authentic and useful activities should also relate to the instructional practice based on classroom realities. Educators expressed a lack of social collaboration and interaction during professional development and requested follow-up activities and discussions with experts and colleagues to be essential. Reflection is another fundamental tenet of professional development that should occur in the individual setting or groups so teachers can reflect on their improvement experiences (Powell & Bodur, 2019). Lastly, additional contexts, such as the time needed to complete the professional development and flexibility in how it can be completed, also

influence the need to complete the professional development, and flexibility in how it can be completed also influences the effectiveness of professional development. The goal of professional development should be of high-quality experiences that reflects value and practicality for educators in the classrooms (Fischer et al., 2018).

The teacher's willingness to adapt to extreme changes, such as implementing technology, is critical for transforming educational practices. The ability to transform students' learning experiences requires educators to update their competence for 21st-century challenges. This endeavor of teacher's pedagogical digital competence involves school administration and the district because one of the ways educators gain competency is through the professional development provided to them. These opportunities must be continued throughout the teaching careers of educators so they can remain current with the competencies needed for 21st-century skills (Philipsen et al., 2019).

Teaching During the Covid-19 Pandemic

Despite online education availability in K-12 public schools, no single school site was 100% online prior to Covid-19 (Lynch, 2020). Gerber (2020) found that 41 large school districts across America, which represented 85% of the total sample, did not have an existing plan for teachers during the pandemic. Teachers were grappling on their own and navigating the new digital platforms. Furthermore, teachers were expected to construct lessons to meet various learning modalities of students without adequate preparation, guidance, or resources. Thus, it became a daunting task for teachers to design quality lessons during the emergency shift (Hodges et al., 2020). Teachers felt overwhelmed and frustrated because they were expected to use the new digital tools while providing support to students as they learned to navigate through them (An et al., 2021).

Additionally, Pellerone (2021) conducted a study that focused on teacher self-efficacy and burnout during the pandemic and found teacher self-efficacy as an influencer of emotional competence and personal accomplishment. Teacher self-efficacy is a critical component associated with their ability to accept new challenges, success with instructional practices, and engagement with students and parents (Dolighan & Owen, 2021). Pressley and Ha (2022; 2021) stated that administrative support significantly influenced teacher self-efficacy during the pandemic. Especially during unprecedented times, such as the pandemic, Pressley and Ha suggested that school administrators need to support teachers by limiting extra work, limiting the pressure put on teachers, and letting them know they are valued and seen.

Ogodo et al. (2021) conducted a study to examine teachers' experiences, digital competency, and instructional technology self-efficacy as the transition took place from in-person teaching to remote learning environments during Covid-19. The study indicated that 39.4% of students had complete access to digital tools essential for remote education, and the other 60% had limited or no digital devices. Regarding teachers' digital competency, 47.7% of the teacher population indicated basic/limited digital competency, and 52.3% indicated proficiency with rudimentary instructional technology. The researchers also found that 64% of the teachers had high self-efficacy using digital devices, and 35.8% had low self-efficacy. Furthermore, the teachers with high self-efficacy had prior knowledge of basic and complex digital tools before the pandemic. Ogodo et al. stated that the challenges that teachers experienced with virtual teaching included low student participation and engagement, lack of personal interactions, reduced content and instructional time, and context/subject-specific issues. Although, some school districts rapidly transitioned while others, especially in low socio-

economic regions, had limited access to digital tools and resources, and schools within these communities used assigned packets to provide instruction (Ogodo et al., 2021).

Several school districts reported being unprepared to transition from in-person teaching to completely virtual as they lacked digital instructional skills (Gerber, 2020). In addition, the unequal access to and use of technology created further challenges. Shamir-Inbal and Blau (2021) conducted a study to examine the experience of K-12 teachers with emergency remote teaching as they implemented synchronous and asynchronous instruction during the Covid-19 pandemic. The expectation is that emergency remote teaching would allow immediate teaching and learning with flexibility anywhere and anytime, thus providing students with options and choices of when, where, and how they can learn (Cheng, 2020). However, the rapid transition to online learning during the pandemic created challenges for school administration, teachers, and schools (Dong, 2020). Challenges identified for school administration included logistical issues such as the school's integrated regulations and providing flexibility and autonomy for teachers and students. Challenges for teachers were due to inadequate technological and pedagogical support and the lack of experience using online tools daily. For students, the challenges included self-regulation skills and responsibility as they experienced learning at home in an isolated environment (Dong, 2020). Students grasping the new method of complete online learning posed challenges that created fear and anxiety among students (Karalis & Raikou, 2020).

The level of use of technology by teachers prior to Covid-19 also influenced their abilities to teach effectively during emergency remote teaching. Teachers had limited experience with online teaching because their classroom technology was primarily used for retaining information or researching teaching materials. Thus, it is critical to examine the level of preparation provided to educators for using educational technology since Covid-19 has

highlighted new circumstances and concerns in education. Furthermore, factors such as inadequate cooperation between school management and the distribution of information to teachers were associated with the quality of online education (Duraka & Hoxha, 2020).

It is critical to inquire about educators' perspectives during Covid-19 to understand whether online teaching allowed educators to provide equitable learning that ensured all students received access to quality education or whether there was a hindrance due to their competence, self-efficacy, or resources available (Duraka & Hoxha, 2020). For equitable learning, several key factors are essential, including the technology resources available for educators to use and subscriptions to online resources. Similar to traditional learning styles, during remote learning, students should also be instructed on effective ways to create, share, and connect knowledge to real-world applications. Digital tools during remote learning should provide collaboration opportunities that catalyze meaningful learning and increase student motivation. For students to have these opportunities during remote learning, educators need to develop pedagogical skills, both individually and collectively, that enable students to discover, explore, and connect to meaningful learning (Oyedotun, 2020).

Tawfik et al. (2021) explored the challenges of the transition to online learning in emergency remote teaching. The researchers studied the first-order barriers and the second-order barriers. Although the first-order barriers have been reduced as most schools had the infrastructure with the one-to-one computing initiatives (Gray & Lewis, 2020), this issue became apparent as students lacked the infrastructure while studying at home during online learning (Antoni, 2020). Ogodo et al. (2021) also described the impact on students from low socioeconomic status; these students had limited access to online learning resources during Covid-19 and were coupled with less supportive or knowledgeable caregivers. However,

students from affluent school districts had access to online instruction 90% of the time, while students from low-income signed in to digital learning for about 60%.

There were several challenges and benefits identified of emergency remote teaching. The pedagogical difficulties reported by teachers included the need to rapidly adapt their current teaching method to the new medium. The technical issues mentioned by teachers included insufficient training for the immediate use of different learning management systems or digital tools. Furthermore, students had difficulty learning independently and self-regulating while developing study routines at home. Teachers also had personal challenges that included managing family Covid-19 protocols and needing attention and help for their children with their learning (Shamil-Inbal & Blau, 2021). An et al. (2021) conducted a mixed-methods study with K-12 teachers about their feelings, experiences, and perspectives about online teaching during the Covid-19 pandemic. There were challenges and significant themes in better preparing teachers for future emergencies. An's findings concurred with Shamil-Inbal and Blau findings. There was minimal student participation and engagement, issues with students' access to technology, lack of face-to-face interactions with students, limited work-life balance, and learning new technologies. The researchers also discovered that because participation was not required, some students did not engage in online learning. The work-life balance became extremely difficult as heavy workloads and other personal responsibilities were added to the teacher's regular expectations (An et al., 2021). Additional tasks included documenting logs that showed contact with students and parents, posting daily announcements, and constructing new digital lessons and activities. These tasks required teachers to spend additional time on work-related duties and care for their at-home students.

Hartshorne et al. (2020) revealed four significant challenges teachers experienced during the pandemic related to equity, including the homework gap, the digital divide, mental wellness, and accessibility issues. The homework gap became an issue as students lacked face-to-face support from the teachers and did not have support from home (Clausen et al., 2020). Hall et al. (2020) argued that the digital divide that became paramount as the disparity between students with access to the internet technology and students without at home would greatly influence the effectiveness of emergency remote teaching during the pandemic. Mental wellness issues for educators increased and became an alarming priority as the sudden changes in routines and uncertainty about the impact of the pandemic took place (Holmes et al., 2020). An et al. (2021) also described students without access to technology as challenging during virtual teaching and schools not having sufficient resources to distribute to students.

A pertinent factor to consider with online instruction is that learners were in an isolating environment (students following stay-at-home orders) compared to traditional classroom settings that incorporate in-person collaboration among various students (Antoni, 2020). Even with the use of videoconferencing tools, teachers' ability to monitor the student's learning environment was reduced. As students navigated at home with online learning and teachers attempted to make online learning the new routine, struggles with reliable internet access persisted as 27% of Americans lacked broadband internet access (Tawfik et al., 2021). Additionally, in online learning environments, learners must be technologically savvy, self-regulated, intrinsically motivated, and able to manage time; however, with K-12 learners, these skills may be minimal (Borup et al., 2020).

Although teachers and students perceived many challenges during emergency remote teaching, teachers expressed benefits and opportunities for personal and professional growth.

Regarding pedagogy, teachers obtained new teaching and technological skills as they maintained learning routines adapted to the pandemic reality. Moreover, teachers reported being introduced to many technological tools that allowed them to implement advanced pedagogical methods while maintaining e-communication with students and parents (Shamil-Inbal & Blau, 2021). Digital tools such as Zoom were effective for video-conferencing as schools transferred to virtual teaching during the pandemic (Lowenthal et al., 2020). Although teachers obtained useful digital tools that allowed them to shift rapidly to virtual teaching, Trust and Whalen (2020) argued that K-12 teachers still must develop online teaching skills and stated that further research is needed to examine methods to prepare them in case of future emergency instruction.

Tawfik et al. (2021) discovered that the sudden transition to online learning significantly impacted planning, designing instruction, and adapting instructional materials. Additionally, the time constraints due to abruptly transitioning to online teaching became critical to technology training because the adoption of new digital tools increased the responsibilities of teachers for accessing and learning to navigate the new technology independently. Regarding suggestions during emergency remote teaching, Barbour et al. (2020) stated that teachers pursued administrative support for consistency in communication, digital tool recommendations, policy, and professional development.

Additionally, Barbour et al. (2020) identified the lack of unified digital tools that created challenges for teachers when collecting artifacts of student learning, communicating with parents, and disseminating information. Although first-order barriers were identified, such as software and broadband access challenges, teachers could remain resilient and resourceful with the available digital tools (Tawfik et al., 2021). Barbour et al. (2020) highlighted that teachers

recognized the importance of limiting the number of software tools to use for students to ensure less student and caregiver anxiety and cognitive overload.

Another aspect that was beneficial to teacher success in establishing an online learning environment was collaboration for sharing materials, determining the best tools to meet student learning needs, and refining instructional practices (Kimmons, 2020). Tawfik et al. (2021) highlighted the benefits of online learning as educators contended that some students had performed better academically online than in a traditional face-to-face setting. Also, there had been an increase in the value of digital tools by educators, although they had to seek additional digital pedagogical support and training from the administration. Kimmons (2020) argued that experienced teachers recognized the value of technology in the classroom and will continue implementing those resources to benefit their instructional practices. The current research focuses on the initial phase of distance learning that highlights the struggles of the transition from face-to-face to emergency remote teaching, and there is a need to examine the different circumstances and challenges that were experienced by different school districts such as rural communities (Tawfik et al., 2021). As An et al. (2021) mentioned, there are different perspectives on the new normal due to Covid-19, and scholars need to continue to research and understand K-12 teachers' perspectives of the new normal to be better prepared as teachers transition back to classrooms.

Summary

The purpose of this multiple case study was to understand the pedagogical digital competency and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during emergency remote teaching of the 2020-2021 school year. Bandura's (1977) self-efficacy theory was used to examine educators' pedagogical digital

competence. Currently, research indicates that self-efficacy is impacted based on several factors for educators when they implement educational technology in traditional classroom settings (Mannila et al., 2018); however, there is a need for research on educators' self-efficacy during virtual teaching. There is a need to understand how educators' self-efficacy was impacted and how their self-efficacy affected their ability to provide instruction during emergency remote teaching. Both competence and self-efficacy drive and predict effective instructional practices during remote teaching (Ogodo et al., 2021).

Researchers have discussed that educators' beliefs, perceptions, and attitudes significantly influence their pedagogical digital competence (Duraku & Hoxha, 2020; Durff & Carter, 2019). These elements also transfer into their self-efficacy. Although there has been a tremendous amount of discussion on the topics of external and internal barriers to integrating technology in the classrooms, these topics need to be reexamined because issues related to these topics have resurfaced with new circumstances caused by Covid-19 for instructional practices (Durff & Carter, 2019; Higgins et al., 2019; Makki et al., 2018; Ottebreit – Leftwich et al., 2018). Furthermore, researchers also explained the challenges that educators experienced while integrating technology effectively and what has prevented them from integrating at a proficient level (Hyndman, 2018; Liu et al., 2017; Resta et al., 2018). Researchers have suggested methods to improve the conditions of pedagogical digital competence through strategic professional development, a constructivist digital pedagogical approach, and TPACK (Hall & Trespalacios, 2019; Vaataja & Ruokamo, 2021). Additionally, the pandemic led researchers to examine with a close lens the educators' instructional practices as they transitioned from face-to-face instruction to completely virtual (An et al., 2021; Hodges et al., 2020; Kainat et al., 2021; Lynch, 2020).

The pandemic reemphasized the need to examine how technology was being integrated for instructional purposes and whether educators were equipped with the knowledge to create an effective learning environment for a completely digital learning environment (Tawfik et al., 2021). To understand these elements, self-efficacy was the theoretical framework that was useful in understanding the pedagogical experiences of educators during Covid-19. The results could lead to areas of improvement and strategies that will guide administrators and school districts to fulfill the instructional gaps that emerged.

CHAPTER THREE: METHODS

Overview

The purpose of this multiple case study was to understand the pedagogical digital competency and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during the emergency remote teaching of the 2020-2021 school year caused by the Covid-19 crisis. During the Covid-19 pandemic, teachers were expected to use contemporary educational technology techniques in a systematic and organized manner to deliver quality education via a learning management system (LMS). The Covid-19 pandemic disrupted schooling and forced K-12 education to abruptly shift to online (Kang et al., 2021). During emergency remote teaching, teachers were provided with little or no time to plan synchronous and asynchronous instruction, which created new challenges, impacting their confidence and leading to stress and negative emotions (Portillo et al., 2020). This chapter provides details for the research design of a multiple case study, lists the central question and sub-questions, and specific selection of sites and participants. Also presented are the researcher's positionality, the procedure, data analysis, and ethical considerations.

Research Design

For this research, a qualitative multiple case study approach was used in order to study cases within the real-life and contemporary settings (Yin, 2018). Qualitative research is used to interpret non-numerical data using methods such as interviews, artifacts, documents, or observations. Furthermore, a qualitative study is conducted when a problem or issue needs to be explored and understood holistically through open-ended questions such as 'how,' 'why,' and 'what' (Creswell & Poth, 2018). Quantitative methodology was rejected because it is used to evaluate an issue through the formation of a hypothesis and gathering numerical data that test

causal relationships among variables. A qualitative approach was valid for this study because it allowed the researcher to examine in-depth understanding of participants' perspectives and experiences on pedagogical digital competency during emergency remote teaching.

Creswell and Poth (2018) defined case study as a "qualitative approach in which the researcher explores real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information (e.g., observations, interviews, and documents) and reports case themes" (p. 96). In a multiple case study, the researcher focuses on the research problem but uses multiple cases to show different perspectives and meanings of the issue through cross-case analysis. Yin (2018) stated that the case could either be an individual, event, entity, or even broader topics such as communities, social movements, and school sites. This research was a multiple case study because the experiences of educators from two school sites, cases, was investigated using data from the timeline, interviews, and artifacts, to explore their pedagogical digital competency during emergency remote teaching.

Research Questions

Central Research Question

What were the K-6 elementary school teachers at Delta Technology Elementary School and MacArthur Elementary School pedagogical practices while integrating technological resources during Covid-19 emergency remote teaching of 2020 - 2021 school year?

Sub Question One

How did the K-6 elementary school teachers implement pedagogical digital practices learned from the professional development during Covid-19 emergency remote teaching of 2020 - 2021 school year?

Sub Question Two

What was the self-efficacy of elementary school teachers regarding their pedagogical digital competence during Covid-19 emergency remote teaching of 2020 - 2021 school year?

Sub Question three

How did K-6 elementary school teachers implement two of the seven (2.1 learner and 2.5 designer) ISTE standards for educators in their pedagogical practices during Covid-19 emergency remote teaching of 2020-2021 school year?

Sites and Participants

This section provides information regarding the specific school sites and participants that were selected for this case study. Each site was essential for the purpose of this study, and the participants, K-6 educators, were selected based on specific criteria. Both sites have unique characteristics with their specific visions and missions regarding instructional practices. The sites were useful for collecting data that allowed reflection on teachers' experiences during the 2020-2021 emergency remote teaching.

Sites

For this qualitative study, the research was conducted at two different school sites. The first site, Delta Technology Elementary School provides students with specialized, integrated technology-based curriculum and is located in central California. This site is a tuition-free independent charter school that was established in 2013. The school provides instruction for students from kindergarten through eighth grade with specialization in technology curriculum and uses project-based learning approach. At this site, technology is employed to increase student’s communication skills, creativity, and exposure to digital tools that students will use as young adults when they enter college and careers. Furthermore, the administration specializes in

providing teachers with professional development that helps them leverage technology to improve student learning. This site also provides every student with an iPad or a Chromebook for in-class instruction and homework, has a one-to-one ratio of computer to student, and thrives to introduce students to technology-enriched approach to learning.

This site has an executive director, principal along with assistance principal and program administrator. The technology needs of students and teachers at this school site are addressed by the site IT Support Technician. This technician is responsible for all the daily operations of the school site such as setting up equipment, helping students and teachers with technology issues, and training on the usage of technology resources. In regard to teacher certification, 60% of the teachers are fully credentialed and have completed the two-year induction programs; they are classified as tenured teachers. The other 40% of the teachers are currently in the two-year induction program; they recently completed their multiple subject credentials through an accredited university and have been hired as emergency teachers with teaching permits such as Short-Term Staff Permit (STSP) or Provisional Internship Permit (PIP). The demographics of students at this site include 13% English language learners, 78% minority students and 27% students who are from low-income households. These are the percentages for specific race and ethnicity: 37% Hispanic, 20% White, 16% Asian, 13% Filipino, 6% Black, 6% two or more races, 1 % Pacific Islander and 1% Native American.

MacArthur Elementary School was the other selected site. This is a traditional public K-8 school and part of a large school district. MacArthur Elementary School is also located in the same city as Delta Technology Elementary School. This site's goals include utilizing meaningful and measurable data for all students to achieve mastery of grade level standards in all subjects. The teachers at this site implement learning experiences that are stimulating and responsive to

the individual learning styles of all the students. The leadership of this site includes a principal and three vice principals. At this school, there is a to one-to-one computer to student ratio; however, learning through technology is not as much of a priority compared to Delta Technology Elementary School. Additionally, teachers are provided with curriculum and training that helps them design instruction to challenge students academically while helping students remain accountable for their academic success. The technology support for students and teachers at this school site are addressed by their Technology Support Specialist, who works closely with the site teachers and students. However, major technical issues can also be sent to the district's Information Technology Department. This department provides leadership, support, and technology services to the schools within the district. In regard to teacher certification, 85% of the staff are fully credentialed teachers and have completed their two-year induction programs and now considered tenured teachers. The other 15% of the teachers are currently participating in the induction program; they recently completed their multiple subject credentials through accredited universities and have been hired as emergency teachers through teaching permits such as Short-Term Staff Permit (STSP) or Provisional Internship Permit (PIP). Regarding the demographics, 25% of students are English language learners, and 50% of students are from low-income families. Additionally, demographics of students include 42% Hispanic, 18% Asian, 12% White, 12% Filipino 8% Black, 6% two or more races, 2% Pacific Islander, and less than 1% Native American.

Participants

This qualitative study used convenience and purposeful sampling to select specific participants. Since the researcher was employed at Delta Technology Elementary School the previous school year, convenience sampling can be used to select participants. Convenience

sampling was also used for MacArthur Elementary School because the researcher can request access to work with participants from this site since there is a strong rapport with the principal. Purposeful sampling was used because a specific number of participants that meet particular qualifications and criteria were selected. From both sites, six educators within the grade levels first through sixth grades were recruited to be participants. The participants selected for this study were teachers in the core content area that include English language arts, math, science, and social studies. Also, the researcher requested one special education teacher from each site to participate in this study. These 12 educators must have worked at their specific sites for at least two years prior to 2020-2021 school year to ensure they have had adequate experience with the adopted curriculum/resources, rules, and regulations. For this study, participants' ages, ethnicities and gender varied; however, both sites have more female educators than male educators. In regard to certification, fully certified educators that have completed their multiple subject credentials and induction programs were selected.

Researcher Positionality

The following section provides the beliefs that have guided my actions as a researcher for this study. Additionally, it contains information regarding the theories that have influenced my positionality in this qualitative research. The following sections include my interpretive framework and philosophical assumptions.

Interpretive Framework

Creswell and Poth (2018) described interpretive frameworks as paradigms or beliefs that a researcher associates with the process of research. My interpretive framework was social constructivism as I wanted to understand the participant's experiences of pedagogical digital competency during the pandemic. Creswell and Poth (2018) described social constructivism as

the process in which individuals seek to understand their world and develop their own meaning through interaction with others and their experience. Individuals are active participants in the creation of their own knowledge and the learning occurs through interactions over periods of time (Davis et al., 2017). In this study, the questions that participants were asked are broad and general to construct the meaning of their experiences from the emergency remote teaching. My intent for this study was to interpret the meaning as educators interacted with their colleagues, students, and school administrators to create effective learning environment during distance learning.

Philosophical Assumptions

Creswell and Poth (2018) stated that assumptions influence the way researcher seeks information to answer questions. Philosophical assumptions guide the researcher and the direction of research goals and interpretation of the findings. The following three philosophical assumptions will be addressed – ontological, epistemological, and axiological.

Ontological Assumption

Ontology is the study of being and addresses the existence of reality. My ontological assumption was that each participant has their own interpretations and thoughts regarding their experience with integration of technology during emergency remote teaching. They have a reality based on their individual experiences of emergency remote teaching which had been impacted by their knowledge, skills, and self-efficacy. It was critical to understand their reality as it relates to their experiences with digital pedagogy. Consequently, l studied individuals from both of the elementary school sites while collecting multiple forms of evidence and then developing themes as they represent different realities (Creswell & Poth, 2018).

Epistemological Assumption

Epistemology is the study of knowledge and addresses the process of acquiring knowledge and how that knowledge is obtained (Guba & Lincoln, 1988). My epistemological assumption was that knowledge is learned through objective and subjective evidence assembled from the experiences of people (Creswell & Poth, 2018). Furthermore, the interactions between researcher and participants were necessary to gain an in-depth understanding. During research, I interacted with the participants and collected data based on their individual experiences and views. I visited each school site and asked the research questions at the site where participants work to further understand the contexts for each participant.

Axiological Assumption

Axiology is the study of values (Creswell & Poth, 2018). My axiological assumption was that I value effective technology integration in education. The use of TPACK framework and ISTE standards are an effective guideline that addresses technology integration with high impact and ensures equitable learning for all students. Therefore, school districts must provide training to inform all educators about the TPACK framework and ISTE standards so that all educators are able to integrate technology in a highly proficient manner.

Researcher's Role

According to Creswell and Poth (2018) there are four ways that an observer can be engaged during the research including complete participant, participant as observer, nonparticipant or observer as participant, and complete observer. From these different ways of getting involved, I chose to be a complete participant in order to be fully engaged with the participants. I have been an elementary classroom teacher for the past six years in a different school district. I have witnessed the challenges, in terms of learning new knowledge and skills in

regards to educational technology amongst colleagues as they aimed to meet the instructional needs of emergency remote teaching. I am also informed of the ISTE standards through the ISTE educator certification. I was able to use the information from ISTE standards when evaluating the teachers' experiences with technology. Since I worked at Delta Technology Elementary School last year, I have great rapport with employees from this site. In regard to both school sites, I do not have authority over any of the participants.

Procedures

In this section, the specific steps used to conduct the study are outlined and they provide thoroughness for the study could be replicated. The specific permission that was needed are addressed in this section. Also, the recruitment plan demonstrates the process that was used to reach participants and eventually engage with them for the study.

Permissions

Both Delta Technology Elementary School's principal and MacArthur Elementary School's principal were contacted to request access to their school sites. The researcher emailed both principals to schedule a meeting. The meeting occurred in person with both principals to request for permission. They were provided with necessary information related to the study and they were assured that the study will be anonymous so the school site's name and the participants' names will be omitted and rather pseudonyms will be given. After the principals provided their verbal permission, the researcher provided them with a letter that contained information in a written format about the study's purpose, method of selecting participants, and the method of data collection (see Appendix A). Principals were given a week to provide the written permissions. Both copies of the permissions with each principal's signatures were received (Appendices B and C).

After the researcher successfully defended the proposal, an IRB application to Institutional Review Board (IRB) was submitted to request to conduct the research. After the approval was received for the study from IRB (see Appendix E), the principals were emailed to initiate the process of obtaining participant names so that the researcher can begin contacting them. The participants that showed interest were emailed the recruitment letter along with consent agreement (see Appendices E and F). After the participants emailed back the consent form with their signature, the researcher assured them in an email response that their anonymity will be confirmed throughout the research with the use of pseudonyms and that their identities and information shared will be respected. Then correspondence began with each participant to begin the process of data collection.

Recruitment Plan

To begin recruiting participants, principals from each school site were contacted via email to schedule a meeting to discuss the process of the study and provide them with an outline about the interaction between the participants and the researcher. The principals were given a week to contact teachers from kindergarten through sixth grade from their school site, including their special education teachers and ask if they are interested in participating in the study. At the end of the week, the researcher contacted the principals via email to discuss the participants that showed interest in being part of the study.

After the principals were contacted, the researcher sent the recruitment email and consent form (see Appendices E and F) to provide introduction and information regarding the study. After the researcher received signed copies of the consent form, the researcher emailed all the participants a copy of the timeline activity for them to complete before the interviews and asked

for their available times to schedule the interviews. Majority of the interviews were conducted face-to-face except for one that was online via Zoom.

Data Collection Plan

The researcher used multiple methods to collect data for this qualitative case study. Three rigorous data collection methods including timeline template, interviews, and artifacts/documents were used for this study. These methods were used to gather relevant information regarding the central research question of pedagogical digital competence of educators during distance learning of 2020-2021 school year. The timeline template was used to help teacher recall the events they experienced in chronological order. The interviews were conducted to understand how teachers addressed the pedagogical changes as they were mandated to teach online. Lastly, the artifacts and documents were collected to understand how educators supported emergency remote teaching. The following subsections provide reasoning for selecting the three specific data collection techniques.

Timeline Template

Kolar et al. (2015) stated that during research, visual timelines in tandem with in-depth narrative interviews can enhance data collection experience and the quality of data, especially when participants are reflecting on difficult experiences that may elicit anxiety. Timelines also allow participants to recall events in chronological order and they can serve as a navigator to supplement the data collected from interview. Yin (2018) stated that compiling events in chronological is a frequent technique in case studies and allows researchers to trace events on time. For this study, a timeline were used as a tool to understand the experiences of participants during Covid-19 emergency remote teaching of 2020-2021 school year (Monico et al., 2020).

After the consent forms are obtained, the participants will be provided with a timeline template as a first source of data collection (Appendix G). The timeline template will be emailed to teachers and they will return either electronically or as a hard copy. The estimated time to complete the is 20-30 minutes. The timeline addressed the research questions regarding the educator's pedagogical digital competency and self-efficacy as they navigated through the school year of emergency remote teaching. Also on the timeline, they were be asked to share their memories and insights of technology they integrated prior to emergency remote teaching and their reflection on the challenges and the success they experienced during emergency remote teaching on the timeline. They were asked to share about various tools that they utilized to make emergency remote teaching effective and how these tools differed from resources provided to them prior to the pandemic.

Timeline Data Analysis

Barry (1997) suggested researchers to use timeline prior to conducting interviews in order to code for themes that could potentially be expanded during the interviews. Yin (2018) suggests that timeline to be used for identifying emerging patterns as it provides insightful comparison of experiences. Kolar et al. (2015) stated that timelines can be coded for content and encouraged researchers to identify differences amongst responses of the participants. Thus, the researcher initiated the data analysis with information gathered from the timelines so that additional ideas can be addressed during the interviews. Creswell and Poth (2018) articulated the following steps to follow for data analysis. First, the researcher will review the data by reading through the responses of the participants on the timeline template. Then, sections and phrases will be highlighted that are relevant to the research questions and organize the information by generating codes through shorthand labels. The researcher will look for specific commonalities and

differences such as the dates of professional development. The codes will be developed according to common and significant different experiences amongst participants from each school site, and information that is relevant to the research questions. Next, codes will be generated and reviewed to combine them to develop themes. The themes will describe the codes in a broader sense and identify major patterns that appeared often within the codes.

Individual Interviews

For this qualitative study, interview was one of the methods of data collection. It allowed the researcher to socially interact with the educators from both sites and allow the interviewees to share their experiences (Brinkmann & Kvale, 2015). Through interviews, the researcher gathered answers from the research questions as participants shared their individual point of views about their experiences of emergency remote teaching. One-on-one interviews were conducted by going physically to both sites. Only one interview was conducted viz Zoom because the participant preferred a specific later time in the evening for the interview.
The responsive interviewing model by Rubin and Rubin (2012) was used for the interview inquiry because the researcher had the flexibility to adjust the questions.

The researcher contacted each participant via email to initiate conversation and schedule interviews. During the interview, the app voice memos on my phone and zoom on my laptop were used to record the conversations of the interview. Since one interview was conducted on Zoom, the interview was recorded by the recording feature on Zoom. The in-person interviews were completed in each teacher's classrooms when students were not present in the classroom to ensure the interview area was distraction-free so the participant felt comfortable and safe. Since the interview were semi-structured, the interview questions were refined depending if additional information was needed to understand the circumstance of emergency remote teaching of the

participant and the participants asked for clarification if needed in order to respond to the questions. Throughout the interview, the researcher remained courteous while listening attentively to the responses provided and record each response on the researcher's personal cell phone using the voice memo app and, on the Zoom. The researcher also wrote brief notes on the printed copy of interview questions of intriguing things mentioned by the educators. In the notes, any clarifying questions were written that need to asked. Each educator from both sites were interviewed once using a set of questions with a specific focus such as technology resources implemented, experiences with trainings/professional development provided to prepare for digital learning, and instructional practices with the educational technology.

Individual Interview Questions

1. Please introduce yourself to me, as if we just met one another.
2. What has been your role at this specific school site and how long have you been employed?
3. When and which trainings did the district or school provide to help teachers at your site prepare for emergency remote teaching caused by the Covid-19 pandemic? **SQ1**
4. Which new educational technology resources did you utilize to design, plan, and implement instruction during emergency remote teaching? **CQ**
5. Describe your confidence level using the technology resources the district or the school provided for emergency remote teaching? **SQ2**
6. How did your instruction differ during emergency remote teaching compared to in class instruction with the use of new technology? **CQ**
7. What was your comfort level (on the scale 0-5, 0 being none and 5 being very comfortable) with using the learning management system (LMS) during emergency

remote teaching and how did you use it for effective instruction for different subjects? **SQ2**

8. Describe your experiences throughout the emergency remote teaching with the LMS. **SQ2**
9. How did you continue to improve your practices by using technology to improve student learning? **CQ**
10. In what ways did you design authentic, learner-driven activities and environment that recognize and accommodate learner variability? **CQ**

Questions one through two were general so that basic information regarding the educator's experience and role at their specific school site can be obtained. These questions were intended to be relatively straightforward and ideally served to help develop rapport between the participant and the researcher (Charmaz, 2006). These questions had flexibility in a sense they were adjusted as necessary for each participant, based on the background information each educator provided for their own employment history and unique experiences (Agee, 2009).

Questions three through five were designed to determine the educational technology resources and trainings that were provided to educators from their specific school sites. Educators were able to share their insights for the level of preparedness that occurred at their individual school sites and questions were altered when experiences differed based on grade levels. Agee (2009) also stated that questions should emerge as the researcher examines the perspectives in the inquiry process based on the relation to the participants. Furthermore, these questions relate to the theoretical framework as I analyzed teacher self-efficacy as the school sites aimed to prepare teachers with new technology to make the shift from face-to-face instruction to virtual (Pressley & Ha, 2022).

The following question number six was regarding each educator's instructional experience and their level of success with the use of new educational technology that was made accessible to them through their specific school sites. This question was designed to show the impact that their planning and instructional practices had on student achievement. The data from this question brought the focus to research problem regarding competency of implementing educational technology to create a successful learning environment during emergency remote teaching. Gerber (2020) stated that the transition from in-person teaching to completely virtual demonstrated lack of instructional digital skills, therefore, this question helped examine how the teachers from these two specific schools' sites report their instructional experience.

Questions seven and eight were related to the educator's pedagogical competency as they were asked to provide information about how was their delivery of instruction with the Learning LMS that they were asked to use for emergency remote teaching. These questions also provided a focus towards their content knowledge for the various subjects they were required to teach since they are elementary school teachers with multiple subject credentials. These questions were associated with specific components of the theoretical framework - Technology, Pedagogy, and Content Knowledge (TPACK) (Ju Joo et al., 2018). Lastly, questions nine and ten were selected from the International Society of Technology for Education (ISTE) standards for educators because these two questions helped understand how educators continued to improve their instructional practices to improve student learning and how they designed instruction to meet the various needs of the students. There are seven ISTE standards for educators based on the following criteria: leader, learner, citizen, collaborator, designer, facilitator, and analyst (Crompton, 2017). The two standards selected were from the learner and designer criteria. Additionally, these questions helped analyze educators' theoretical framework of self-efficacy for

their ability to facilitate student learning with technology based on the professional development they were provided and their competencies for using digital resources (Durak, 2019).

Individual Interview Data Analysis

The answers to interview questions were analyzed using the theoretical propositions that led to the case study (Yin, 2018). Bandura's (1977) Self-efficacy theory was the theoretical framework utilized for this study, and the original objectives of this case study were based on the theoretical propositions that also led to the generation of research questions. The audio for interviews conducted in person was recorded on a personal iPhone using the app Voice Memos. Similarly, the interview was recorded on Zoom, and the recording feature of Zoom was used to record the audio. The audio of the interviews was then transcribed using Otter.ai, a transcription software. After the interviews were transcribed, the researcher performed member checking so each participant was able to review their transcriptions. The researcher read the transcripts to initiate the data analysis. Along with the transcriptions, the researcher reviewed any notes taken during the interview. Rubin and Rubin (2012) provide the following interview analysis steps. First, in Otter.ai, all the transcripts were organized in two separate folders according to educators from both sites. Then the researcher highlighted sections and phrases of the interviews that were relevant to the research and responses that were potentially intriguing. Annotating the transcripts by identifying relevant words, phrases, and sentences was useful in identifying the patterns (Creswell & Poth, 2018). As the researcher highlighted parts of the transcripts, the comment feature in Otter.ai was used to create labels on the side to represent the codes. Each code described the idea and information expressed under each interview question. The researcher sorted and compared the patterns that emerged and made sense of the data through interpretations (Lincoln & Guba, 1985). After the entire transcript was reviewed for each

individual participant, the researcher organized the codes in a Google document for each interview question as they provided the main points and common ideas throughout the data. A two-column chart in Google doc was created, in which the left column was labeled as “codes” and the right column was labeled as “themes.” Then the researcher reviewed the generated codes and identified the common patterns and then begin to develop themes. This process involved combining codes into themes (Creswell & Poth, 2018).

Artifacts/documents

Additional artifacts and documents were collected from participants for this study, including lesson plans and PowerPoint slides or Google Slides created during emergency remote teaching. The reason for collecting lesson plans and these digital activities was to understand how they planned and implemented digital resources during emergency remote teaching and to examine how they designed specific learning activities to meet the academic needs of the students. Yin (2018) suggests that the strengths of collecting documentation for case studies is that they contain exact details and references of the events and can cover a long span of time. Additionally, documentation can be reviewed repeatedly. Thus, teachers were asked to share their lesson plans, digital activities such as Google Slides or PowerPoint designed to provide instruction, student work, schedules, and screenshots of how they organized LMS.

Artifacts/documents Data Analysis

For the analysis of documents, each of the collected primary documents was analyzed to interpret the findings. When analyzing the documents, coding occurred first and then that information was incorporated into themes. The variety of artifacts and documents were gathered and objectivity was maintained as the analysis process took place. Documents can provide specific details to corroborate information gathered from other sources such as interviews (Yin,

2018). Each artifact or document obtained from teachers went through the analysis stage in groups.

First, the researcher organized all the artifacts that were shared digitally in a Google Drive according to each school site and the hard copies provided were placed in physical folders. The researcher began the process of analyzing by grouping the artifacts in their appropriate categories, for instance, lesson plans, digital activities (slides), student work, schedules, and screenshots of LMS. After all the artifacts were organized in their specific category, analyzing each artifact to uncover valuable insights and experiences was initiated. The researcher searched for common strategies used to plan instruction and delivery through virtually. Also, any other digital activities produced by teachers via technology-based resources provided to guide instruction and create effective learning environment for students during emergency remote teaching was analyzed by checking for common usage. Specifically, the researcher analyzed which methods of instruction delivery were used by educators during emergency remote teaching. The researcher used thematic analysis to search for themes from educators' experiences and their views on effective delivery of instruction. The artifact and document analysis helped understand and identify the strategies educators implemented to pivot their instruction so it adhered to the online format and found the common methods that became essential for virtual instruction (Yin, 2018).

Data analysis procedures used for analyzing timelines and interviews were also used to analyze artifacts and documents. First, the researcher was familiarized with the data and organized items shared by the educators. Then the data were coded by highlighting parts of the artifacts and annotating to create labels as codes to describe the information (Creswell & Poth, 2018). The themes were generated after reading and studying the codes. After identifying

themes, the researcher reviewed them to ensure they were useful and accurate data representations. Lastly, the researcher defined and named each theme to demonstrate exactly what is meant by each of them and how it helped understand the data (Creswell & Poth, 2018).

Data Synthesis

The researcher began the process of synthesis by reexamining the research questions and bringing the focus back to the purpose of research. The goal at this stage of research was to uncover new insights through clear and thorough analysis of the data that was gathered while keeping an open mind. The researcher first organized and reviewed the data analysis. Multiple sources of data were analyzed to determine evidence for each step as events took place in chronology during the school year 2020-2021 as teachers implemented emergency remote teaching. The researcher organized the analysis by segmenting different phases of the school year. First, the beginning of the school year data was organized in a manner that shows the type of professional development and resources that were provided to teachers to facilitate emergency remote teaching and how often they were provided with support throughout the year. Furthermore, data from the timeline and interviews was used to compile the themes derived from shared experiences between teachers from both school sites individually and all the teachers from both school sites combined.

The researcher synthesized the data in stages: initial stage of emergency remote teaching, during emergency remote teaching, and events that took place after the emergency remote teaching. The major codes and themes developed from timeline, interview, and documentation data were synthesized using graphic organizer such as a multi-flow map to help visualize the direction of all the themes put together.

Stake (1995) advocates categorical aggregation as one form of data analysis in case studies. Using the categorical aggregation, the researcher pursued to collect instances from all the gathered data to find issue-relevant meanings as they emerge (Creswell & Poth, 2018). This particular technique allowed the researcher to generate a list of themes by examining the major common experiences that were gathered from Delta Elementary School and McArthur Elementary School. This process allowed the researcher to look at multiple instances to develop a relevant meaning about the lesson that can be learned from the cases or themes. The researcher synthesized the commonalities and differences from challenges or the success that educators perceived at each stage – initial, during, and after – emergency remote teaching.

Furthermore, when the patterns and themes were recognized, it helped the researcher understand the major gaps in digital pedagogy. The themes developed from each data collection method including timeline template, interviews, and documents, were compared. Then themes from each case were directly compared with the ISTE educator standards using a two-column chart with the standards listed on the left and experiences shared by educators on the right side so that a contrast can be done to evaluate and synthesize the gaps that current educators express. Cross case synthesis is a technique that was employed to look at similarities and differences among cases (Yin, 2018). In order to utilize triangulation, each set of data (timeline, interviews, and artifacts/documents) to synthesize findings using coding and memoing was used to organize data and find recurring themes.

Trustworthiness

The trustworthiness of this qualitative study was addressed through credibility, dependability, transferability, and confirmability. Throughout the study, detailed field notes by using recording devices were used to ensure stability of responses. The purpose of establishing

trustworthiness is to inspire reliability of the collected data and its interpretations. In order for the readers to accept the research findings, establishing trust is critical so that future research can build upon the results of this study (Lincoln & Guba, 1985).

Credibility

The researcher used triangulation of data sources and methods to establish credibility of this study. Using triangulation, the same research questions were be asked from the educators from the same site to understand how they were supported by their specific school sites during emergency remote teaching. Also, member checks were be used to enhance the analysis by thorough participant validation to ensure credibility of the results (Creswell & Poth, 2018). Each educator was asked to review the data collected and my interpretations of that data through member checks. The interview transcriptions were emailed to the participants so they can review the validity. This process allowed participants to verify their statements and provide additional information to fill any gaps they identified.

Transferability

For this study, transferability was established through thick description as the data includes voices, feelings, actions, and meanings of information gathered from the participants (Creswell & Poth, 2018). Close attention was given to contextual details while interpreting the meaning of data gathered. The purpose of thick description was to show instead of tell the information to help the reader visualize the information being described. Thick descriptions involved detailed narrative explanations with additional details so that the readers fully understand the meaning derived from the data.

Dependability

Peer analysis was utilized along with an external audit of the data. The auditing process required the researcher to exclude themselves from examining the research study's process and interpretations (Creswell & Poth, 2018). The purpose of auditing was utilized to evaluate the accuracy and to determine whether the interpretations are precise of the collected data. The audit trail helped the researcher confirm the findings with an in-depth approach and allowed the analysis to be reviewed and verified to check the process of the study.

Confirmability

Throughout this study, direct quotes were collected during the participant's interviews to confirm the information and insights that were shared. Memoing was also used to scan and the comments in the margins of the field notes helped to explore the database. Memoing allowed connections and identifying major ideas by reflecting on the collected data.

Ethical Considerations

Participants might have felt that the information they share about the trainings they received to integrate technology for emergency remote teaching during Covid-19 could cause issues with administrators if it was considered inadequate. Participants were assured the information will remain confidential. Participants may raise the issue that the information they share about their implementations of educational technology during emergency remote teaching and their effectiveness of the use of technology may be used as evaluations by administrators. Participants were assured the information would remain confidential. Information shared by participants will be protected using secure electronic filing techniques and pseudonyms will be utilized. Additionally, IRB consent was obtained to ensure participants experience safe conditions during the research.

Summary

Chapter Three incorporates procedures, research design, and analysis of this particular study. This chapter articulates multiple case study as the research design and why this approach was appropriate. In this chapter, specific settings that includes carefully chosen elementary school sites are addressed to understand any differences of similarities that occurred amongst teachers as they implemented emergency remote teaching with the use of educational technologies. Through specific data collection with timeline, interviews, artifacts/documents. My goal was to find how educational technology was leveraged during the pandemic by the educators from these two sites. Barton and Dexter (2020) emphasized that teachers are not consistently maximizing the potential of educational technologies to improve student learning and performance. Additionally, teachers primary use of technology is still to create teacher-centered instruction and issues that are prohibiting teachers to develop student-centered learning needs examination. Barton and Dexter (2020) stated professional development that increases technology confidence and proficiency needs to be a focus for school districts. After data were collected, I conducted data analysis to determine certain patterns and themes that were formulated with how teacher's used technology to meet students' learning goals. Also, the trustworthiness through credibility, dependability and transferability were checked with the use of several techniques such as triangulation, member checks, and auditing. Ethical considerations were the utmost critical aspect to protect the participants and data storages which is also described in this chapter.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this multiple case study was to understand the pedagogical digital competency and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during the emergency remote teaching of the 2020-2021 school year caused by the Covid-19 crisis. Chapter Four begins with participant information with two tables and a narrative description of each participant from both school sites, for a total of 12 participants. Each table categorizes the participant's years of teaching experience, content area, and grade level. In addition, a table with codes and themes is included, the results of the data and answers to the research questions.

Participants

Through convenience and purposive sampling, the research included six participants from each school site, Delta Technology Elementary School and MacArthur Elementary School. Each participant met the required criteria: (a) certified classroom educator with a multiple subject teaching credential, (b) must teach core subjects – either ELA, science, math, or social studies, (c) can be a special education teacher with a completed special education credential, (d) must have taught at their specific school site for at least two years before 2020-2021 school year, and (e) must have taught the entire school year of 2020-2021 when emergency remote teaching was mandatory. Initially, a total of 18 participants showed interest in participating and were sent the recruitment email (see Appendix E); however, four teachers did not meet at least one of the criteria. Collectively, 12 participants were selected to conduct this research as per the goal. Each participant completed a timeline template, participated in semi-structured interviews, and

provided documents/artifacts related to their instruction from the 2020-2021 school year. Table 1 presents participant data from Delta Technology Elementary School:

Table 1

Delta Technology Elementary School

Pseudonym	Years Taught	Content Area	Grade Level
Christy	8	Multiple Subject	4
Zoey	5	ELA	4
Mackenzie	5	Multiple Subject	1
Margaret	30	Multiple Subject	1
Charles	6	Special Ed.	4-6
Serenity	6	Multiple Subject	3

Christy

Christy is a fourth grade teacher at Delta Technology Elementary School, and she has been teaching at this school site for the past five years. She previously taught the seventh and eighth grades at a middle school. She is completing her administrative credential and will be the vice principal at Delta Technology Elementary School next year. She has an extremely outgoing personality and seemed very active during the interview. During the 2020-2021 school year, she taught fourth grade, and she mentioned that her team members have all changed after that year. She had a strong personality and a leadership demeanor.

Zoey

Zoey is currently a fourth grade teacher; however, during the 2020-2021 school year, she was a 6th-grade teacher at Delta Technology Elementary School. Zoey has two daughters that also attend Delta, fourth and fifth grade. Zoey began teaching as part-time at Delta during her first year at this site; however, she was offered a full-time position within the year when additional students were added to sixth grade, and the additional class was added. She feels that working at this school site has given her a great sense of community, and she was grateful for beginning her teaching career at Delta. She considers herself a team player and enjoys working with educators. She actively participates in various planned activities for students, such as spelling bee contests and science fairs that involve students' creating science projects.

Mackenzie

Mackenzie is a first grade Delta Technology Elementary School teacher and has been teaching for five years. She began working at Delta Technology Elementary School as a long-term substitute for fifth grade for three months. She mentioned she “got lucky” and was hired as a sixth grade teacher during the following school year. After teaching sixth grade for a year, she taught first grade and has been teaching first grade since then. She enjoys working with her first team because there is a plethora of different experiences represented among them. She expressed immense gratitude towards her team members, who supported her throughout her teaching career.

Margaret

Margaret is a first grade teacher at Delta Technology Elementary School and has been teaching for 30 years. She comes from a rural family background and has lived locally in the neighboring city her entire life. She is very familiar with this community and has witnessed all

the changes with new school buildings and development in the area. She helped start Delta Technology Elementary School when it first opened in 2015. Being one of the first cohorts of teachers to begin this school site, she is thoroughly familiar with all the curriculum, programs, and changes that have occurred. She had an outgoing personality and is proud of her teaching abilities.

Charles

Charles is a fourth-sixth grade special education teacher at Delta Technology Elementary School and has been teaching for six years. He is able to collaborate with the resource teacher on campus, who also helps with providing small-group instruction to students with moderate learning difficulties. Charles has an extremely friendly demeanor and always wants to engage with his special needs students with patience. He finds it meaningful to build connections with other educators on campus and makes an effort to get to know members of the other grade levels.

Serenity

Serenity is a third grade teacher at Delta Technology Elementary School. She has taught for six years at the same grade level. She has had many different team members because some of them quit during the year or some left for a long period of time for maternity leaves. She has worked with several new team members since she was at Delta, and she embraced these opportunities with a positive outlook. Teaching is her first career, and she recalls wanting to be a teacher ever since she was a young girl. She enjoys leading many events that take place throughout the year and working with students developing creativity. Each year she organizes a dance competition with another teacher and helps students learn to present themselves with confidence.

Table 2 presents data from participants from MacArthur Elementary School.

Table 2

MacArthur Elementary School

Pseudonym	Years Taught	Content Area	Grade Level
Elizabeth	23	Multiple Subject	3
Amy	13	Multiple Subject	2
Shelly	18	Multiple Subject	1
Ally	28	Multiple Subject	1
Kendal	5	Special Ed.	4-6
Chelsea	14	ELA	6

Elizabeth

Elizabeth is a third grade teacher at MacArthur Elementary School, and she has taught for 23 years at various school sites. In 1991, she started as a bilingual instructional aide and was selected as one of the six aides to become a teacher; the district paid for her college tuition. The principal at her previous site was going to open a new school (MacArthur Elementary), and Elizabeth was invited to be one of the first teachers. She has been teaching at MacArthur Elementary since it opened in 2007. She had a really sweet and gentle demeanor and was very eager to be part of this study. I remember when I first met her, and she said, “I really want to be part of this research, but I am not sure if I’ll be a good candidate because I am really old school and not a techie person.” I assured her she would be an excellent candidate because she meets all

the criteria to participate in this study, and I value her years of teaching experience. Throughout the data collection, she was so excited to share her experience of the 2020-2021 school year.

Amy

Amy is a second grade teacher at MacArthur Elementary School and has been teaching at this site since 2010. During her 13 years of experience, she worked with many different educators who were part of her grade-level team. Before becoming a teacher, she was a journalist. She changed her career because she believed that teaching was more family oriented; she has two children, so she wanted her schedule to mirror theirs. She spoke softly during our conversations. She has other family members that are also educators, including her husband. She enjoys helping students develop writing skills and believes that skills learned during second grade can provide a foundation for future grade levels. She wants to continue teaching second grade.

Shelly

Shelly is a first grade teacher at MacArthur Elementary School, and she has a total of 18 years of teaching experience. She has been at MacArthur Elementary for 15 years; she has taught first grade for almost all the years except one when she taught first and second grade combined. She enjoys being part of the community at MacArthur, especially because she has had the opportunity to work with some of the same educators throughout the years. She is eager to grow professionally and continue learning from her colleagues.

Ally

Ally is a first grade teacher at MacArthur Elementary School, and she has experience teaching various grade levels at different school sites. She taught kindergarten, first, fifth, and sixth grade at other school sites. She has taught for a total of 28 years, and she moved to

MacArthur Elementary six years ago and taught first grade. She is excited as she looks forward to retirement. She has her administrative credential but chose not to pursue an administrative role because she wanted to teach. Ally said that she really appreciates this opportunity to share her insights for 2020-2021 emergency remote teaching because the voices of teachers need to be heard so appropriate changes can be made to improve for future emergencies. Ally was the only participant whose interview was conducted via Zoom because of scheduling.

Kendal

Kendal is a fourth-sixth grade special education teacher at MacArthur Elementary School, and she has been teaching at this site for five years and is in the same position. She is the only special education teacher on campus, so she does not have someone to collaborate with; however, she does get opportunities throughout the year to exchange insights with the other special education teachers within the district. Although she is not an active member of school committees, she attends meetings to learn about different experiences offered to students so she can help her students participate as much as possible. She is really passionate about helping special needs students and works closely with all the parents.

Chelsea

Chelsea is a sixth-grade teacher at MacArthur Elementary School, and has been teaching for 14 years. She taught fourth grade for five years while at MacArthur Elementary. She is very much involved with leadership tasks at the school site. She is currently the instructional team lead, positive behavior interventions and support (PBIS) lead, and a student council leadership team member. She values the use of technology for educational purposes, and when emergency remote teaching began, she was really excited to take on the challenge of providing complete

online instruction. She is extremely active and had a strong sense of desire for professional growth.

Results

During the analysis of data, specific themes and sub-themes emerged based on the information discussed most frequently on the timeline template, interviews, and document/artifact analysis. The major themes that emerged from data analysis include resilience for online teaching, insufficient/unreliable preparation, unanticipated challenges, in-person education preferred, and advanced hardware technology. Additionally, outliers that presented information that did not and did not represent the majority are stated at the end of the results section. Table 3 presents codes, the number of code appearances, themes, and subthemes.

Table 3

Theme Development

Codes	Enumeration of code appearance across data sets	Themes	Subthemes
Stressful teaching	15	Resilience for Online Teaching	Learning Online Teaching Increase in Digital Competence
Overwhelming	10		
Surviving	8		
Engagement issues	18		
Learned New Digital tools	11		
Limited training	31	Insufficient Professional Development	Teacher Collaboration Self-taught
Rushed training	6		
Unreliable training	9		
Learning from and with team members	28		
Learning on our own	24		
Student learning	9	Anticipated and Unanticipated Challenges	Site Specific Challenges
Incomplete work	13		
Low attendance	9		

Low participation	11		
Low engagement	17		
Student reshuffling	6		
Excited at the return of students	5	In-person Education Preferred	
Isolation	13		
Multiple monitors	7	Advanced Hardware Technology	
New MacBooks	6		
Doc Cameras	12		
Dell Laptops	6		

Resilience for Online Teaching

The first theme that emerged was resilience for online teaching. Data collected from the timeline indicate that schools in California were initially shut down in March of the 2019-2020 school year. Educators at both sites were expected to provide a hybrid style of instruction with weekly printed packets while also checking in with students online; however, the expectations of online teaching were lenient as reported by all the participants. During the hybrid instruction, students stayed at home; however, instruction was not completely delivered online because parents were expected to pick up printed weekly packets from their student's school sites on designated days. Amy from MacArthur Elementary described the spring of 2019-2020 school year and stated, "Everything changed! Students did not return from spring break, and we were given a few hours to take anything we wanted from our classrooms to start teaching from home." For both school sites, participants were uncertain how long the stay-at-home orders were going to be implemented during the spring of 2020; they wanted to return to school.

According to the data from the timeline, at the end of summer 2020, participants indicated that the leadership from both school sites informed them that the school would remain

closed and that complete virtual instruction would be implemented. On the timeline, participants were asked the question, "describe your emotional/thoughts as you were informed about the continuation of emergency remote teaching [July 2020 – August 2020]?" In their responses, most participants indicated that the news was extremely disheartening because the most daunting aspect of beginning the 2020-2021 school year was the uncertainty it presented with providing complete online instruction, especially to younger students from kindergarten through third grade. As second grade teacher Amy stated, "I was very stressed about how I would be able to effectively teach these kids, especially knowing they had missed quality instruction their last trimester of first grade, a critical time for growth." Participants stated during the interviews that they abruptly digitalized their lessons and gathered resources to supplement their instruction on their own. Several participants shared their Google documents in the document/artifact analysis, including a curated list of digital resources they planned to use during the 2020-2021 school year. At MacArthur Elementary, Amy shared a document listing various digital resources she planned to use during distance learning (see Appendix I).

Although online teaching during 2020-2021 presented new challenges with teaching that participants from both sites had never experienced, they worked tirelessly to ensure instruction was as effective as possible. Ally from MacArthur Elementary stated during the interview, "Almost nothing about my initial plan [designed during the 2020 summer] to run my class actually worked [online instruction], but I figured out what would work very quickly." Another educator from MacArthur, Kendal, mentioned, "When the school year started [August 2020], it was like sink or swim. It was panic, pure panic. I thought to myself, I have to do this. I've got to get online. I've got to figure out how to use this." When sharing data, Kendal expressed her experience profoundly and deeply. It was evident from the data collected that she was impacted

at a personal level due to the emergency remote teaching for various reasons. She shared the following statement,

> I fell into a deep depression and was riddled with anxiety, all while trying to maintain my professionalism. The district was so overwhelmed that it was hard for them to remember that we were all people with home lives that were also falling apart. I had to continue working while my own kid's schooling was completely destroyed."

Among the participants, she was the most emotional when recalling the events that occurred during the 2020-2021 school year. She experienced immense challenges with her special education students the entire time there was online teaching. She mentioned that her confidence was extremely low initially, and she had to overcome many challenges to ensure she provided instruction as effective as possible.

When recalling her 2020-2021 school year experience, Amy stated the following on her timeline,

It was a traumatic experience because of all the new challenges I had to overcome to teach online effectively. It was depressing being stuck and isolated at home because I was all by myself and teaching only through the computer without interacting in person with students, not something I looked forward to each day. I had to make online teaching as lively as possible, but I felt very exhausted.

Learning Online Teaching

This subtheme of learning online teaching emerged since a common sentiment that all participants shared was that online teaching had to be learned as they implemented it. Referring to the optional mini-training sessions on Microsoft Teams that were offered at the beginning of the 2020-2021 school year, Amy stated during the interview, "The training was somewhat

adequate, but since no one truly knew everything about teaching online, we were all just learning as we went into the year." In congruence, Kendal also mentioned, "Not only did I have to figure out how to use our LMS platform Teams myself, but I also had to teach students how to use it." Although participants from both sites used digital resources in their classrooms before the 2020-2021 school year, the complete transition to online teaching was something they had to learn while teaching online. As Ally stated, "We just learned on the fly." Mackenzie also stated during the interview, "It was live and learn, trial and error. If something didn't work, we changed it the next day. A lot of learning was from experience." Furthermore, Kendal stated on her timeline, "I had to be patient with myself, which wasn't easy because there was such a sense of urgency in everything. I had to be patient while learning new resources and skills to teach online." From the data analysis, it was evident that the majority of online teaching was self-taught, and continuous efforts to improve were made throughout the year.

Increase in Digital Competence

The second subtheme that emerged under the theme of resilience for online teaching is the increase in digital competence. Ally stated that educators on her campus showed perseverance through the extreme challenges they experienced with online teaching during the 2020-2021 school year; as a result, educators valued the newly acquired pedagogical digital skills. Ally proclaimed, "I feel like I had learned how to do a completely different job. Honestly, I was pretty proud of myself!" Additionally, she mentioned, "I had always been in favor of using tech in the classroom, but when the 2021-2022 school year [the year following emergency remote teaching] began, I had a whole new collection of tools to use." The new skills and resources educators learned during emergency remote teaching have helped increase their digital competence and efficiency for providing instruction. Chelsea stated, "I still use the Teams

platform for my writing assignments. Since I am an ELA teacher for sixth grade, keeping 100 papers in a Teams file is easier than on my desk." The new apps and digital resources learned have continued to help teachers scaffold instruction and use them as a supplement to their teaching. Additionally, Elizabeth from MacArthur Elementary stated that the new education platform, Edmentum, that they learned during the 2020-2021 school was not as effective as the district had hoped. Edmentum resulted in being really useful for providing differentiation during the following school year of 2021-2022. Some of the digital programs that participants stated they continued to use after the 2020-2021 school year include, Flipgrid, Padlet, Screencastify, and Go Noodle.

Insufficient Professional Development

The second theme, insufficient professional development, was identified during the data analysis. The responses from participants of MacArthur Elementary School and Delta Technology Elementary School indicated that the professional development was inadequate due to the abruptness of transitioning to emergency remote teaching. According to the timelines of all the participants at MacArthur, they were provided with one day of Microsoft Teams training since the district required all the school sites to use Teams as the LMS. This training was provided in March of 2020 when the initial shutdown occurred. On the timeline, participants stated that the school site was on spring break, and during the spring break, they were given the instructions that the school was extending spring break to another week. Shelly stated on her timeline, "They [admin] gave us one week to do online training to learn how to use Teams and figure out how to set up our classes in the digital world." During the second week of the spring break, a one-day training for Microsoft Teams was conducted, and participants had a few hours to come on campus and take home the essential instructional materials. After this training,

participants were provided with many videos to watch on their own time to learn how to navigate the features of the LMS. During the interview, Chelsea stated, “we were given short mini-training for about an hour on the basics of the Team, and then videos were provided to watch on our own during the extra week off. Each video was about 30 minutes long. But no training over the summer before the 2020-2021 school year began.” Most of the participants from MacArthur Elementary mentioned that the one-day training was insufficient, and they did not feel comfortable teaching on Teams.

During the interview, first, second, and third grade participants at MacArthur stated that since they did not feel adequate to use Teams, their grade level teams (educators that teach the same grade level) chose other methods for providing instruction. Each participant from these grade levels stated on the timeline that they created their own YouTube channel and recorded daily sessions that they made accessible to parents and students. On the timeline, Ally stated,

> We were given access to Teams, but there was little to no training given. We were not required to use Teams, but we were heavily pressured to do so by the district. Many of us did not use it only because we didn’t know how. I chose to create a YouTube channel and I uploaded two videos each day, one for the whole class and one of my ELLs (English language learners). I also sent a daily email to parents with instruction for what their children should complete.

Amy also stated on the timeline that in the YouTube videos, she provided instructions for completing the weekly packets she gave students and the digital resources they expected students to use for certain daily minutes (see Appendix J). Some of the participants at MacArthur Elementary stated they continued to use YouTube as an additional resource because it was easy for parents to navigate when trying to help their students. However, the administration at

MacArthur was extremely pressuring their educators to use Teams for online instruction. On the timeline, a question asked, “How would you describe administration support at the initial stage and thus far (by the end of the first quarter/trimester) with emergency remote teaching [August 2020-December 2020]?” Ally responded on the timeline,

> It [conditions beginning of the 2020-2021 school year] was almost an unsupportive and oppressive environment at the beginning. The push to use Teams was so intense that it overshadowed everything. I was personally reprimanded for making YouTube videos for my parents to see how to access different apps because I should’ve been using Teams. I was just trying to make it as simple as possible for the parents. By the end of the first trimester, admin eased up.

On the timeline, each participant at MacArthur Elementary School stated that when the 2020-2021 school year began, they were provided with optional professional development that they could attend after school to learn about Microsoft Teams. However, Elizabeth, Amy, Shelly, and Ally said that learning to use the LMS while also expected to teach online was extremely arduous and difficult. Elizabeth stated, “it [referring to emergency remote teaching] was tiring, and I was exhausted. I didn’t have enough energy to attend training after work. I also had to plan my online instruction in the evenings for the following day” Also, the optional training focused on the basics of using the LMS, they did not provide any strategies related to creating effective online instruction. Amy from MacArthur Elementary said,

> Our district was so focused on Teams that we felt like we were on our own to supplement it with other programs. It was also frustrating that we had to figure some critical pieces out on our own – many teachers paid out of pocket for screen capturing service but later

> discovered it could be done through Teams, but it wasn't something covered in professional development.

Similarly, participants at Delta Technology expressed that no specific training for emergency remote teaching was provided. According to each participant's response on the timeline, when the shutdown in March of 2020 occurred, educators at Delta were asked to use Zoom to meet students online and then changed to Google Meet when the 2020-2021 school year began. However, all the participants said during the interview that no professional development was provided on using either. Educators were given the option to ask their IT department for support if needed on Google Meet. These digital resources were used for video conferencing; however, educators were not provided with professional development for online instruction. Zoey from Delta stated,

> We didn't have any specific training for distance learning, but we worked with our teams during the two weeks prior to the beginning 2020-2021 school year and planned for distance learning. We chose which platforms to use and how to turn things digital. My team decided to use Google Classroom, but no training was provided.

Teacher collaboration

Teacher collaboration is the first subtheme under the theme of insufficient professional development. The data from the timeline and interviews indicated that the professional development was overwhelming, rushed, or too short; however, all participants said they relied heavily on their grade level teams to make online teaching effective. Elizabeth stated during the interview, "I honestly can't remember much about PDs because all of the training was so rushed, and it feels like a blur. At the moment, none of it even seemed useful." Participants from both

sites worked closely with their grade-level team members to make emergency remote teaching effective. Ally stated,

> The only thing that took the edge off the panic and helped me approach it with a truly positive attitude was that I was not alone. We were all panicking, brainstorming, and practicing with each other. The way we supported each other was our salvation.

Participants shared new resources they discovered with each other, designed digital lessons together, and helped keep the morale up. Participants from both school sites provided their digital weekly lesson plans as documents/artifacts for this research. The weekly lessons they shared had scheduled time blocks for each lesson for asynchronous and synchronous learning. Although the design of the lessons varied between the grade levels from each site, the information on them was very similar. The lesson plan indicated when students were logging in online (either on Teams or Google Meet) and which content was planned to be covered for a specific number of minutes. Also, the lessons contained digital resources students were expected to use to work on their individualized learning goals. Some of those digital resources included MobyMax, Prodigy, Khan Academy, Lexia, and Epic. The fourth grade participant, Christy, at Delta Technology Elementary provided a few Google slide presentations as an artifact that their team designed to project each day for instruction. The slides had information regarding daily routines, scheduled times for specific content areas, notes, and homework (see Appendix K). Their grade level used Google slides to lesson plan, and each team member worked on the content of a specific slide that the team planned to teach.

The level of support that participants described they received from each other was exceptionally commendable. The participants shared knowledge of online teaching with each other. During the interview, Amy mentioned some concepts about screen sharing and a few other

features that she learned from her husband, who is also an educator and teacher of computer science. Then she shared that information with her team. Also, Margaret from Delta stated, “My son and my team were astute with technology, and they supported me a lot and helped with my technical needs.” The reliability of grade-level team members was evident, and each participant credited their team to be a major component for surviving online teaching.

Self-taught

The second subtheme is self-taught, under the theme of insufficient professional development. Another aspect participants associated with their success with emergency remote teaching was teaching themselves. According to the timelines from both sites, participants stated that they spent countless hours at the beginning and during emergency remote teaching acquiring new skills and learning about supplemental resources to increase student engagement. Elizabeth stated on her timeline,

> As I said earlier, I am old school, and all of this [teaching online] was a bit scary, to say the least. I remember going through the resources my team members shared or I found online through my own search. For example, one of the thew engaging online tools I had to learn on my own was Flipgrid. I also had to constantly go through the other resources I found and get myself familiar enough to present them and use them with my students.

During the interview, each participant mentioned that they had to learn many concepts on their own because the training was insufficient and unreliable. Zoey stated, “We didn’t have any training, so a lot of the learning was on my own. It was just going in and testing digital tools, so almost all of the learning with technology to teach was self-taught.” Participants from MacArthur Elementary School criticized that the training offered for Teams was unreliable because the platform was created for adults in business. Ally mentioned on her timeline,

> The professional development was somewhat helpful for some things related to Teams, but Teams wasn't created as an educational tool. It was made for business. There wasn't anything existing to tell us how to use it effectively for teaching, but we figured it out and made it work.

During the interview, participants from MacArthur Elementary School mentioned that the district also expected them to do the majority of the learning to teach online on their own; consequently, instead of providing direct training, they shared videos that participants could watch on their own time. These videos provided basic information for navigating the LMS Teams; however, the participants at MacArthur argued that the videos addressed meeting online with other adults, not young students, because these were prerecorded videos that Teams shared with the district. Ally mentioned that since the videos were geared towards adults, she had to choose which were useful from the provided ones. Kendal stated, "If you couldn't attend the online training, which was not feasible for me, so I watched the videos later at night trying to figure out how to use different features of Teams." Kendal is the only special education teacher on her campus, and the learning experience for making online teaching effective was very isolating for her since she was not able to share the specific challenges she encountered with her special needs students with anyone else.

Anticipated and Unanticipated Challenges

When participants were informed that instruction would be completely online beginning the 2020-2021 school year, they anticipated challenges that would be encountered during emergency remote teaching. Similar concerns existed for each participant from both sites; however, many unanticipated challenges that severely impacted online teaching were also experienced. The most frequently mentioned anticipated challenge was related to student

learning online. Participants were concerned about not being able to see students' work while they completed their assignments. Ally, the first grade teacher, stated, "young students really need to put pencil to paper to show their understanding of concepts, especially when learning to write."

On the timeline, when asked which new digital resources participants used, a common digital resource used at both sites to make lessons interactive and engaging at both school sites were Nearpod and Peardeck. Also, digital curricula for ELA and math were available at both sites; however, not all grade levels were successfully able to utilize them during emergency remote teaching. First through third-grade participants expressed struggles with getting students to log in because students frequently forgot their login credentials or had difficulties navigating them. So, they had to use the digital curricula only for direct instruction but used other resources to have students submit their work, such as Teams at MacArthur Elementary and Seesaw/Google Classroom at Delta Technology Elementary.

Participants were also concerned that they could not provide effective and timely feedback as students completed work at home independently. Additionally, there was a concern regarding accuracy and reliability in student tests and assignment submissions. All the participants from both sites experienced these anticipated results.

The unanticipated challenges included the high level of low attendance, participation, and engagement. Shelly stated during the interview,

I tried to keep the same instructional routines as in previous years without altering too much. Even though my goal was to minimize too many changes, I felt that I had to adapt to online teaching in significant ways because student engagement was really low.

From MacArthur Elementary, some of the participants shared evidence of Google sheets that had data derived from Google forms. The Google sheets data showed responses from students on specific questions the teacher asked daily. The Google form designed by the participants was a method of checking in with students daily, and students had to respond to questions, "(a) today I am feeling ____ (b) I completed all the tasks assigned yesterday in Teams (yes/no) (c) I still need help with the following concepts ____ (c) My goals for today are _____." After students responded to these questions on Google forms, the participants were able to transfer the data to Google sheets automatically, and they shared those Google sheets with me. For one of the classes, out of a total of 28 students, on average, 17 students responded to the questions. The data from this document indicates, on average, 17 students were present online from the four weeks of September that were shared with me.

Participants from MacArthur Elementary and Delta Technology Elementary were able to share screenshots of their LMS. Participants from MacArthur Elementary shared images of their classroom on Teams with specific assignments that were posted for students to complete. The screenshots shared by Chelsea showed that the majority of the students were not submitting their assignments. She uploaded an assignment regarding writing a summary for one of the informational texts her class read as a whole group. However, only four students out of 30 submitted their work. Similarly, participants from Delta Technology Elementary shared screenshots of Google Classroom with specific topics and folders they created for their students. Margaret shared screenshots of her Google Classroom that various topics such as the weekly opener, unit 5 song, workstation cards, science, decodables, etc. (see appendix L). The second and third screenshot in this appendix shows that zero students out of 24 submitted their assignments. The data indicated that for most of the assignments, the majority of the students

either submitted incomplete work or did not submit at all. The students that submitted were almost the same students each week.

Mackenzie from Delta shared images of work students submitted on Seesaw, and the data indicated an average of 14 students that did not submit their work regularly. On Seesaw, students were expected to upload an image of their completed work from their workbooks or the packets provided. Also, participants from Delta Technology were able to share videos of their lessons since each participant was expected to record their daily lessons for parents and students to view later. During the videos that I watched, it was evident that only six to seven students regularly participated, while the majority did not respond to the questions and had their videos turned off the entire time they were online. I also observed that students left online classes without informing their teacher.

Although participants had prepared their instruction in ways that would encourage participation and engagement online in creative ways, they had not anticipated the extreme levels of noninvolvement and nonparticipation. Shelly from MacArthur shared the lessons she created on Flipgrid, where students could respond to her opinion prompts by creating two – three-minute videos instead of typing their responses. Mackenzie stated, “attendance was incredibly low. Or the [student’s] cameras were off the whole time.” The kindergarten and first grade students at Delta Technology Elementary were provided with Ipads, and students struggled to face the Ipads towards themselves. Mackenzie mentioned that many times, educators saw fans and ceilings and constantly repeated the expectations of facing the camera toward the student throughout the day. Each day, four to eight students participated while everyone else had their cameras off. This was a common experience shared amongst all the participants.

Site-specific Challenges

The subtheme site-specific challenges is under the theme anticipated and unanticipated challenges. Educators expressed site-specific challenges that impacted the overall emergency remote teaching experience. According to the data from the timeline and interviews, when Delta Technology Elementary School started the second trimester in November 2020, all participants stated that there was a constant reshuffling of students from teacher to teacher because parents were given the option of either having their children learn online or return to campus. Margaret stated during her interview that not all the teachers taught in person for safety precautions. When students that were on campus got Covid, they had to return to distance learning again and were assigned to teachers that provided distance learning. Zoey also stated in her interview that the reshuffling of this manner of students and teachers was frequent to adjust the placement of students, whether in person or in distance learning, as situations changed. Mackenzie stated during her interview, "with new students to teach, we were constantly having to either reteach concepts and expectations or help the new students acclimate to our classroom culture." Maria stated during the interview that she had 30 - 38 students for nearly four months (August 2020 – November 2020) with the support of two aides while she provided distance learning.

The participants at MacArthur Elementary stated during their interviews and on their timeline that the major unanticipated challenge was the introduction of a new digital assessment system called Measure of Academic Progress (MAP), and an online learning program called Edmentum that the district expected teachers to implement for the first time. Amy stated,

> We were already struggling and panicking to create effective online instruction; amidst these challenges, the district asked teachers to begin using an assessment system that also needed immense training to get familiar with administering it.

Participants from MacArthur Elementary stated that requiring them to use this online assessment system and the learning program while they were learning to navigate emergency remote teaching was a poor decision that was time consuming and caused stress. Amy stated,

> I got pretty confident at using Teams, but I found it very frustrating when MAPs was introduced since that program was not designed for online learning. We didn't understand why the district couldn't just put that on hold since we were dealing with so much.

The same sentiments were shared among all the participants at MacArthur Elementary School. Ally stated, "We were expected to use MAPs assessment without proper training, so we just did what we were told." Furthermore, Ally stated that the intention of this new assessment was to provide educators with a way to monitor progress with formal data; however, it was introduced when educators were already overwhelmed. The implementation was rushed and not useful during emergency remote teaching. Elizabeth stated to MAPs assessments and Edmentum, "I tried to take in the information provided on new resources such as MAPs and Edmentum but at the moment, I wasn't able to use because neither of these was useful or intended for online learning." Participants had other assessments that provided formal and informal data. They felt this assessment certainly should not have been introduced during the 2020 – 2021 school year because it created additional challenges in learning this new system and making it useful online.

Kendal had a unique situation because the unanticipated challenges impacted her self-efficacy significantly. She was the only Special Education teacher at MacArthur Elementary, which meant she had no one on campus she could collaborate with since other educators had their grade-level teams. Even during the interview, she became emotional and had tears when she described her experience of emergency remote teaching. She has three grade levels to teach, fourth, fifth, and sixth, and her teacher aide, who normally helped with rotations, was not

allowed to teach online unsupervised, per district policy. Additionally, she had to be extremely careful of maintaining Individualized Education Program (IEP) compliance for each student. She stated on her timeline,

> Special education was thrown into complete turmoil because IEPs are law-binding contracts, and we were out of compliance with all the special education students as soon as the stay-at-home orders went out. This amounted to massive loads of paperwork to try and change the wording and still provide services while expected to "teach" online students that were in shock and with their learning disabilities.

Kendal's concerns and stress level were elevated as she was expected to manage all the tasks for providing online instruction to her special education students alone. She could not rely on her aide or another adult to cover service minutes, log the minutes and track students that were present, and provide support with rotations for students. She still needed to create separate groups of her different grade level students since their performance levels varied. All these unique situations impacted her self-efficacy significantly and caused her to doubt the effectiveness of her teaching online for a long time throughout the year until she was able to feel comfortable with the routines.

In-Person Education Preferred

The fourth theme identified was that in-person education was preferred after the data analysis consisting of responses from the timeline and insights shared during the interview. On the timeline, participants were asked to describe their memories as students returned to campus in early 2021, around January and February. All the participants stated that they were glad to see students in person. Ally stated on her timeline, "I mostly remember just being so happy I could see my kids in person." Participants expressed relief and excitement when finally able to see

their students on campus. Although, some did mention that they had to be very alert that students maintain social distancing to follow the protocols and guidelines of Covid-19. Kendal mentioned on her timeline the following,

> For me, I was eager to use pencil and paper again. I feel it is important that the kids do not become too dependent on technology for everything. I still use their devices for school apps for learning. But students must know how to access learning outside of technology, and they have to be able to write comfortably as well as read materials since a lot of the material was read to them online.

Other participants shared similar emotions on the return of students back on campus. Amy stated,

> I just hope I never have to go through it again – it just didn't feel like effective teaching, and staring at a screen for so long was mentally and physically draining. It was hard to work with struggling kids and hard to be in people's homes on a screen, and hard to keep kids engaged online at all times.

The isolation had become unbearable to many of the participants, and they recalled feeling depressed, lonely, and miserable. Not engaging and interacting with students in person was difficult for all the participants. The participants described missing interacting with colleagues and used digital tools to stay in touch. Amy used the Marco Polo app and sent short videos back and forth to her colleagues almost daily discussing various topics. The isolation was unbearable not only for the participants of the study but also for their students. During the interview, Mackenzie shared a story of one of her students who begged her parents to send her to campus when students were given the option to return in November 2020. She wanted to return to school because she wanted to see her teacher in person. Mackenzie recalled being so touched by this moment.

Another point addressed on the timeline was by Elizabeth on the last question when asked to add anything else that describes their experience during emergency remote teaching. Elizabeth wrote,

> I also saw a big change in the students that I have had since emergency remote teaching began. Their attention span, their focus, and their interest in some students had vanished. The students depend so much on technology. Plus, the students I had showed lacking social, emotional, and problem-solving skills. I am convinced that technology has produced many of the problems students face now.

Overall, almost all participants shared a common message that they value technology but consider human-to-human connection a significant aspect of teaching.

Advanced Hardware Technology

The fifth theme that emerged from data analysis is advanced hardware technology. One of the positive aspects regarding the emergency remote teaching of the 2020-2021 school year was that participants appreciated the hardware technology they received. All the participants at both school sites stated that their administrators provided new technology equipment at the beginning of the 2020-2021 school year. Elizabeth stated during her interview that when the initial shutdown occurred in March 2020, participants had to finish the school year with their old technological resources, which caused difficult situations such as delays and slow processing speed because the resources were outdated. However, during August 2020, administrators ensured that participants at both sites began with all the appropriate technical equipment needed to implement emergency remote teaching. Charles at Delta stated, “we [all the teachers] received brand new MacBook pros, and I personally believe Chromebooks that we previously had were

more difficult to manage; maybe for learning, they are easier. I think virtual instruction was easier with the new Macs that were given to us."

At MacArthur Elementary, all the teachers received several new types of equipment for emergency remote teaching. During the interview, Chelsea excitedly stated,

> A lot of new technology was given, such as new laptops, three Dell monitors, a Logitech camera system, an extra keyboard/mouse, document cameras, and Promethean boards. I even received a camera that followed me around in the classroom, and I was able to point to different areas of the classroom to show students when we were online.

The data from both school sites indicated that participants received advanced technology that made it much easier for them to use. Participants did mention that students experienced connectivity issues and other technical concerns with their Chromebooks during online learning.

Outlier Data and Findings

Even though themes were consistent throughout the data collected from all the participants from both sites, there were outliers. Two of the participants at MacArthur Elementary had different opinions on their confidence in using technology than the other participants. Elizabeth, a third grade teacher who has been teaching for 23 years, stated that when emergency remote teaching began, her confidence was extremely low, similar to the responses from the other participants. However, she also mentioned that her confidence, even towards the end, was still developing. On the contrary, all the other participants mentioned that their confidence in teaching online had significantly improved, and they became adept at creating successful online instruction.

Chelsea, also at MacArthur Elementary, shared different opinions regarding her confidence and support provided by the district than her colleagues. She is a veteran teacher and

has been involved in leadership opportunities through various different groups such as the student council, PBIS, and the instructional team. Since she considers herself a technology enthusiast and possesses great knowledge of digital resources, she felt extremely confident with online teaching from the beginning. Her statement agreed with the others from her site that a small amount of professional development was provided to equip educators with emergency remote teaching; however, she felt that was enough for her. Chelsea stated, "I became adept at using Teams and technology. The professional development was enough to allow me to expand my teaching in a way I had never thought I would." She certainly needed to learn on her own to make online teaching engaging and become proficient at using Teams; however, she did not mention that she was overwhelmed or felt she was surviving emergency remote teaching, as others had mentioned. Instead, her statements demonstrated that she was thriving. She also mentioned that, "I felt like this was my time to shine," because she had an opportunity and a challenge to explore and employ technology at great lengths with teaching than before. Chelsea stated,

> I have ADHD, so I always look for challenges, and this was a challenge. I ate it like a bowl of soup. I grabbed everything [hardware and software resources the district provided] – I was using all the monitors and everything, but the rest of the team said they were not going to do all that. I came back on Teams at the beginning of the school year, and I was doing backflips, somersaults [implying the use of all the different features of Teams] and all that, and everybody else was coming over to me asking me, how do you do this or how do you do that?

Research Question Responses

For this multiple case study, a central research question along with three sub-research questions were identified. The purpose of the central research question was to gather evidence regarding the pedagogical practices while integrating technology during emergency remote teaching during the 2020-2021 school year. The sub-research questions specifically focused on professional development, self-efficacy, and experience related to ISTE standards. The following sections provide direct answers to the research questions using themes developed in the previous section.

Central Research Question

What were the K-6 elementary school teachers at Delta Technology Elementary School and MacArthur Elementary School's pedagogical practices while integrating technological resources during the Covid-19 emergency remote teaching of the 2020 - 2021 school year? The first theme identified - resilience for online teaching - addressed this question. Participants from both sites indicated that their pedagogical practices needed to focus on being collaborative and interactive for online learning. Participants had to learn new LMSs and other digital resources while also expected to implement them during emergency remote teaching. There was a high need to design instruction that encouraged active learning as much as possible, so pedagogical approaches involved learning activities that had students interacting with each other and the teacher.

According to data analysis, all educators from both sites aimed to create an engaging learning experience while students were isolated at their homes. The biggest concern related to pedagogy that educators expressed was that they wanted instruction to be engaging because students were not used to sitting in front of the screen for the entire instructional period. In order

to prevent online instruction from becoming mundane, educators attempted to use their learning management systems (LMS) and other supplemental digital resources to provide engaging learning opportunities.

Sub Question One

How did the K-6 elementary school teachers implement pedagogical digital practices learned from the professional development during the Covid-19 emergency remote teaching of the 2020 - 2021 school year? The theme of insufficient professional development addressed this question. Participants implemented a few ideas for the pedagogical digital practices; however, the professional development at both sites were insufficient and unreliable. From the professional development, MacArthur participants learned the basic features of the LMS Microsoft Teams that they were expected to use but not how to use it to effectively teach online. Participants at MacArthur Elementary indicated professional development to be inadequate in preparing them for pedagogical digital practices. Similarly, minimal to almost no professional development was offered to prepare educators at Delta Technology Elementary School participants as well.

Sub Question Two

What was the self-efficacy of elementary school teachers regarding their pedagogical digital competence during the Covid-19 emergency remote teaching of the 2020 - 2021 school year? The theme of anticipated and unanticipated challenges addressed this question as participants discussed the challenges that impacted their self-efficacy. All the educators at MacArthur Elementary, with the exception of one (Chelsea), stated that they began the 2020-2021 school year of emergency remote teaching with low levels of self-efficacy with their pedagogical digital competence. They doubted whether their instruction would be effective and

engaging while using the new platforms of Teams that they were expected to use. They began the school year with little knowledge of Teams, which caused doubts and uncertainties that led to having low-self-efficacy. However, as the year progressed and they had ample amount of time to collaborate and learn from their team members, their self-efficacy for using different digital resources and their LMS platform increased. Kendal stated,

> It was extremely low at the beginning! Most of the time, our situation was learn as you go. It got better as we continued to do distance learning. At least I felt comfortable doing the basic things like getting myself and kids online, sharing screen, and accessing website and sharing with them.

The majority of educators at Delta Technology Elementary started the 2020-2021 school year with medium to high self-efficacy, except for two of the educators, Margaret and Charles. Margaret, who is the most experienced teacher among the participants at Delta Technology Elementary, stated she had somewhat of a low self-efficacy at the beginning of the school year, but she used many creative ways to provide online instruction that did not require digital resources and her team helped her gain a significant amount of knowledge for the digital resources that she did use. She stated,

> I did try to run it like you're in school. I used clip charts with stickers that students could see, and I bought them all whiteboards in case the kids needed to go outside to observe something like pretend to be a scientist.

Sub Question Three

How did K-6 elementary school teachers implement two of the seven (2.1 learner and 2.5 designer) ISTE standards for educators in their pedagogical practices during the Covid-19 emergency remote teaching of the 2020-2021 school year? This question was addressed with the

theme of resilience for online teaching. Data analyzed from both school sites indicated that educators had similar practices and experiences in regard to the two ISTE standards. The ISTE educator standard 2.1 is related to how educators continue to improve their practice using technology to improve student learning. Educators at both sites had a strong desire to improve their instruction, and they used online videos to learn new skills that would improve their instructional practices. They also researched online to find and explore various new digital resources that they could use to help accelerate their student's learning experiences. Especially to increase student engagement, educators mentioned they had to keep up with the new technological changes, as Margaret said, "even sometimes basic things like using emojis or bitmojis."

The ISTE educator standard 2.5 is related to how educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability. Educators at both sites mentioned they used the breakout rooms on Zoom (MacArthur Elementary) and Google Meets (Delta Technology Elementary) to help with differentiation. Educators used the informal and formal data to learn about students' individual needs with as much accuracy as possible and designed small group instructions to support the different learning needs. Educators challenged the enrichment students while providing extra practice and reteaching opportunities for struggling students. Kendal, the special education teacher, stated, "I have kids from very low to very high. I tried to make a lot of visuals and use manipulatives on the camera. Moving things and showing them things like fractions cards and making small groups even smaller." From the data, it is evident that the majority of the educators at Delta Charter Elementary were able to use the additional adult support as they continued to use aides. Margaret mentioned, "I used my aides during synchronous times to help with small groups."

Zoey used the color-coding information method to support her English language learner students and during whole class notes.

However, some of the other teachers were not fully able to address the various learner needs during emergency remote teaching. Ally stated, “The truth is, I mean, if I’m going to be honest, I don’t know that I thought too much about different learner modalities. If we continued online teaching longer, I’ve gone there next.” She did scaffold during instruction based on informal data on certain tasks. In comparison, Serenity also answered to the question regarding accommodating learner variability by saying, “not so much, but we did try to create breakout rooms during assessments and read the assessment to kids that struggled to read.” Mackenzie also stated, “differentiation was really hard! I mostly followed the curriculum, but I made separate Nearpod tests for lower students and higher students, and we would reteach concepts.”

Summary

This chapter provides the primary themes of resilient online teaching, insufficient professional development, and anticipated/unanticipated challenges based on the concepts that the participants from both sites most frequently shared. During the research, participants shared their experiences of emergency remote teaching through timeline template, interviews, and documents/artifacts. Although educators at both sites had similar experiences with emergency remote teaching, there were also some significant differences based on their unique situations. It is evident from the data analysis that educators showed great persistence in providing an effective online learning experience while experiencing a myriad of challenges that they had never encountered before.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this multiple case study was to understand the pedagogical digital competency and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during the emergency remote teaching of the 2020-2021 school year caused by the Covid-19 crisis. Chapter Five presents a discussion of findings through the following sections: (a) interpretation of findings, (b) implications for policy and practice, (c) theoretical and empirical implications, (d) limitations and delimitations, and (e) recommendations for future research. The chapter concludes with a summary of the study.

Discussion

The five subsections in this chapter provide a discussion related to the findings of this research. Participants from two school sites, Delta Technology Elementary and MacArthur Elementary shared their experiences, insights, and emotions related to pedagogical digital competency during the emergency remote teaching of the 2020-2021 school year. Chapter Four included themes that emerged during data analysis from a culmination of 12 timelines, 12 interviews, and 64 artifacts/documents. The following section presents inferences drawn from the themes identified in chapter Four.

Interpretation of Findings

This research focused on exploring educators' pedagogical digital competency and self-efficacy as they provided emergency remote teaching during the 2020-2021 school year due to the Covid-19 pandemic. Participants shared their experiences, including challenges and successes, as they aimed to create effective online learning. This section provides a summary of

thematic findings and follows with the interpretations of the findings that include: the importance of collaboration, teacher feedback, the value of technology, and the importance of self-efficacy.

Summary of Thematic Findings

The five themes that emerged from the data analysis of this multiple case study were: resilience for online teaching, insufficient professional development, anticipated and unanticipated challenges, in-person education preferred, and advanced hardware technology. The theme of resilience for online teaching had two subthemes: learning online teaching and an increase in digital competence. Participants described that 2020-2021 emergency remote teaching was stressful and overwhelming as they were expected to learn and implement new digital resources simultaneously. The second theme of insufficient professional development emerged as participants explained limited, rushed, and unreliable training provided by their school site administrators. The two subthemes were teacher collaboration and self-taught, as participants shared that the most vital aspect of their ability to provide effective emergency remote teaching can be attributed to their grade level team's support and their own learning. The third theme from data analysis was anticipated and unanticipated challenges that participants experienced related to students' low participation, engagement, and attendance. This third theme had a subtheme of site-specific challenges that included students reshuffling at Delta Technology Elementary and an introduction of a new assessment and learning program at MacArthur Elementary School as participants aimed to provide emergency remote teaching. The next theme of in-person education preference emerged because participants discussed the value of using technology, yet they expressed the importance and preference for in-person interactions with students. Lastly, the theme of advanced hardware technology emerged as participants described the distribution of new technology equipment that was provided for emergency remote teaching.

Importance of Collaboration. Throughout the data, each participant described the importance of their grade level team collaboration as a significant factor that influenced various aspects of emergency remote teaching. Collaboration was extremely important because participants did not have the knowledge or skills to provide complete virtual instruction when they began; therefore, they relied on each other's expertise and support through all the abrupt changes that were experienced. The participants were able to remain resilient in online teaching because of the support they received from their grade level team members that taught the same grade level at both school sites. Additional struggles surfaced for one participant, Kendal, a special education teacher at MacArthur, because she did not have anyone to collaborate with. Kendal stated, "This [online teaching] was incredibly stressful. I taught online alone for months. I can't remember if things ever got easy for me because I was managing everything on my own, and we continuously experienced abrupt changes." On the contrary, all the other participants had an immense amount of support from their grade level teams, and almost all the participants stated that their success with online teaching is credited to their collaboration with their team. Participants shared with their grade level team members their daily struggles with online teaching and discussed the effectiveness of new digital resources and ways to increase student learning online.

Teacher feedback. The participants' disconnect from the administration was a critical component that impacted the stress of teaching online during emergency remote teaching. In the data, participants expressed that the professional development provided was not useful for them to transition their classrooms to online. Although at Delta Technology Elementary, educators were allowed to use the LMS of their choice but encouraged to use Google Classroom, MacArthur Elementary educators were extremely pressured to use the same LMS throughout

each grade level. Participants at both school sites stated that they had to learn how to use the LMS on their own without much reliable support from the administration. The participants showed leniency and compassion to the administrators because all the changes were abrupt, and the administrators were not prepared to manage a situation such as emergency remote teaching. However, it was evident that administrators should have established a system of collecting feedback from the educators that would have resolved some of the challenges because, through discussion, educators would have expressed their unique issues, and appropriate support could have been provided. The challenges for primary grade levels (kindergarten – fourth) and intermediate (fifth and sixth) were different because of how much students could navigate the technology independently due to various age levels.

Value of technology. Despite the challenges that participants at both school sites had to overcome during the emergency remote teaching, they expressed that they value using technology. Participants stated that before emergency remote teaching, they used technology in their classrooms and various apps that helped students practice skills at their performance levels. Several participants had described using technology during independent practices in the classroom using programs such as MobyMax. However, after emergency remote teaching, participants experienced an increase in pedagogical digital competency. They acquired knowledge of new digital tools to enhance student learning, progress monitoring, and engagement. The participants expressed appreciation for the newly acquired knowledge and skills of educational technology. Many participants stated that they continued to use the new digital tools in the classrooms that they learned during emergency remote teaching to scaffold the content of their lessons and differentiate to meet the various learning needs of students. The new

digital tools that participants implemented to continue providing education using online platforms have been useful after instruction returned to in-person.

Importance of Self-Efficacy. Participants indicated that, without much time to reflect during the Covid-19 pandemic emergency remote teaching, they responded to all the abrupt changes and did not think much about self-efficacy. However, during the research, participants were given the opportunity to reflect on the different stages of emergency remote teaching as they completed the timeline. They evaluated the development of self-efficacy through the pandemic. It was evident that the majority of the participants began emergency remote teaching with extremely low levels of self-efficacy with using technology, and it gradually increased as they developed the skills and knowledge to teach online. As participants reflected on their experiences of emergency remote teaching, their self-efficacy played a critical role in providing effective instruction online with the use of technology. The majority of participants mentioned that because their self-efficacy with using the new digital tools was so low, they questioned their success with online instruction at the initial stages of emergency remote teaching. The participant's self-efficacy increased as they progressed through emergency remote teaching while remaining resilient, learning on their own and with their grade level team members.

Implications for Policy or Practice

Based on the findings of this study, there are several policy and practice implications for school administrators and districts at the local levels. During this research, responses from participants made it apparent that school administrators at both sites were not prepared to shift education completely online. District officials and school administrators also had to learn ways to support online learning since the shift to emergency remote teaching was an unanticipated event. Although both school sites had educational technology resources available to support

student learning prior to emergency remote teaching, the educators were not equipped with the skills and knowledge to design and implement quality education for completely virtual instruction.

Implications for Policy

A policy implication is that the school administrators and district officials provide adequate professional development for integrating technology in education, allocating funding to acquire updated and current technology, and prioritizing educators' social and emotional well-being. The concern that all the participants reiterated during this research was the lack of preparedness for virtual instruction and having to learn technology on their own and teach concurrently. Albeit the emergency remote teaching was an unprecedented and unexpected event that had a vast impact on the educational system, it is critical for districts and school administrators to give importance to providing educational technology training for their educators. Districts and school administrators must continue to design and prepare professional development opportunities for educators that encourage the innovative use of technology to remain current with the knowledge and skills for using educational technology.

It is essential for educators to know different frameworks, such as Technological Pedagogical Content Knowledge (TPACK) and the International Society for Technology in Education (ISTE), that have been developed by researchers for implementing educational technology to design pedagogical practices. Before I began asking questions related to the ISTE standards during the interviews, I briefly asked all the participants if they had any knowledge about the ISTE standards. Only one participant, Ally, said she knew about the ISTE, and that was because her brother was one of the directors of the ISTE organization. ISTE is a worldwide organization that focuses on accelerating innovation in education through the use of technology

in education. The research from this study indicated a need for educators, school administrators, and district officials to continue to develop and update digital competencies focused on pedagogy. There are ISTE standards for educators, students, education leaders, and coaches. Incorporating ISTE standards in professional development would provide the ongoing learning essential to learning, teaching, and leading in the digital age.

Furthermore, ISTE standards should also be incorporated into teacher education programs at universities. Teacher candidates should be knowledgeable about ISTE so they can align their strategies for transforming learning with technology before they enter the classroom. ISTE organization itself provides educator certification that focuses on pedagogy and helps deepen and expand teaching skills with technology integration. Teacher education programs can encourage candidates to pursue this certifications.

Furthermore, districts and school administrators need to evaluate the appropriate funding and time for updating technology hardware. Education leaders must allocate funding to ensure they have technology that helps educators provide accelerated learning opportunities for digital-age learners. Participants from this study indicated that when emergency remote teaching initially occurred in March 2020, they were expected to use their outdated digital equipment, which caused issues with speed and connectivity. However, when they received new updated equipment to teach during the 2020-2021 school year, the teaching experience was much more efficient and effective. The emergency remote teaching of 2020-2021 allows administrators to consider allocating funds to update technology in case something similar happens again.

Additionally, school administrators and district officials must also prioritize the emotional well-being of educators and explore ways to support educators who experience high levels of stress. When emergency remote teaching was implemented, participants explained the

process of online teaching caused extreme levels of stress and trauma. Two of the participants even expressed falling deep into depression and being engulfed with anxiety. The majority of the participants stated they gave their best efforts to maintain professionalism but struggled with the overwhelming workload and online teaching. School administrators and district officials must explore ways to provide educators with a professional and personal balance and implement strategies to check in on their mental health. Perhaps, districts can bring in wellness coaches to support educators' emotional and mental health.

Implications for Practice

An implication for practice is for school administrators to give importance to teacher collaboration. During the research, a key factor for the success of participants with online teaching was the collaboration among the grade level team members. It is important that school administrators provide designated professional learning community (PLC) time blocks each week for educators at their school sites. During this time, educators can share their knowledge and expertise to improve teaching skills and instructional practices.

Participants at Delta Technology Elementary stated they do not have PLC time and had to find time before and after school to meet with their team members to discuss the changes they needed to make during emergency remote teaching. Participants at MacArthur Elementary mentioned they do have designated PLC time each Wednesday, however, during emergency remote teaching, many of the PLC times were disrupted by staff meetings to update the new guidelines that participants needed to follow regarding Covid-19. Whenever it was possible, Chelsea from MacArthur Elementary stated that they made their PLC time as productive as possible. She shared that the team collaborated on a Google document to create an agenda. Before they began their discussion regarding the topics on the agenda, each member answered

the following question: “what were the three things that you did not like this week and three things that you did like?” Furthermore, she stated that these questions typically encouraged her grade level team members to share their challenges and success and then worked together to resolve any concerns. Therefore, school site administrators must provide adequate protected PLC time for educators so they can have designated time blocks to collaborate and share ideas on improving instructional practices.

Theoretical and Empirical Implications

Bandura’s (1977) self-efficacy theory was used to provide the framework for this study. The self-efficacy theory is defined as the belief in one’s ability to perform necessary tasks to achieve goals. He claimed that people pursue difficult situations differently depending on if they have high or low self-efficacy. Individuals with high self-efficacy will consider difficult situations as challenges to accomplish. On the contrary, individuals with low self-efficacy doubt their abilities and view difficult situations as intimidation.

Bandura’s (1977) argued that an individual’s self-efficacy plays an important role during adversity and influences the individual's actions. In order to feel confident in providing virtual instruction, participants engaged in discussions with their team members and self-learned new methods that helped them create an effective online learning environment. Bandura identified four influences on self-efficacy development: mastery experiences, vicarious experiences, social persuasion, and physiological and affective states. The first source is considered the most effective way of developing a strong sense of efficacy, which also proved to be the case during this research. When participants developed confidence in using their LMS and preserved through the difficulties of the initial stage of emergency remote teaching, it lifted their confidence and helped increase self-efficacy.

Self-efficacy theory was viable for this research because participants' low level of self-efficacy for providing online instruction caused them to remain perseverant and obtain digital competencies. Participants demonstrated low self-efficacy at the initial stage of emergency remote teaching and questioned their ability to provide effective online instruction. However, their commitment to providing education to their students motivated them to learn new strategies and experiment with new technologies to make online platforms useful tools. Most participants began emergency remote teaching with low self-efficacy for online teaching. For several months of 2020-2021 school year, they doubted the effectiveness of their instructional practices. On the contrary, Chelsea's insights demonstrate an example of an individual with high self-efficacy. Even at the initial stage of emergency remote teaching, she stated that she embraced the new challenges because she felt confident in her ability to use digital platforms and was eager to learn new online tools.

A minimal number of studies have addressed California elementary school educators' experiences with emergency remote teaching caused by Covid-19 (Karalis & Raikou, 2020; White & McCallum, 2021; Yan et al., 2021). This study fills the gap in the literature and adds to previous findings by providing data on educators' pedagogical digital competence and self-efficacy during emergency remote teaching from participants of two elementary schools in central California. Previous studies primarily focused on exploring the initial stage of emergency remote teaching (Akojie et al., 2022; An et al., 2021). This study allowed educators to share their experiences a year after the emergency remote teaching so they could reflect on the entire 2020-2021 school year and compare how the use of technology changed or remained the same, returning to in-person. Similar to the findings from Kimm et al. (2020) investigation, the evidence from this study also indicates that educators have a low understanding of the ISTE

standards, thus suggesting schools consider designing professional development in alignment with ISTE guidelines and standards. However, this is the only study that discusses ISTE knowledge and educators' practical use of standards during Covid-19. Furthermore, in the study by Pettersson (2018b), it was found that pedagogical digital competence is a school-wide organizational matter requiring various stakeholders' involvement. This study's findings also concur with Pettersson (2018b) in that the involvement of school administrators and teachers in the decisions regarding pedagogical digital competence is critical for the school to become a digitally competent organization. This study also concurs with the previous studies regarding the need for teacher professional development to be continuous and not be a one-time training because there must be a follow up or offering of additional information as educators express their unique needs (Ahmag et al., 2019, Hyndman, 2018; Mannila et al., 2018). Relevant and personalized professional development is critical for teachers' self-efficacy in implementing effective technology (Hall & Trespalacios, 2019).

Limitations and Delimitations

The limitation of this research primarily included geographical confines. The study explored two elementary school sites within the same city in California. MacArthur Elementary is the only traditional public school in the city; although it is part of a larger school district, the other sites are within neighboring cities. In order to explore and compare the experiences of educators with the educators from Delta Technology Elementary School, MacArthur was the only traditional public school site the researcher was limited to select within the same city. Also, I was limited to selecting elementary school educators since there is only one high school in the city. Including high school educators in the study would not have provided a valid comparison with the elementary school educators due to teaching vastly different age students.

There were several delimitations for this study. The first delimitation was the choice of Delta Technology Elementary because this school site is unique since it provides a technology-based curriculum and is an independent charter school. The reason for selecting this school site was to explore the similarities and differences between the experiences of educators from a technology-driven site in comparison to a traditional public elementary. The second delimitation of the study was the selection of educators that were experienced rather than novices. There were specific criteria set for the selection of participants to ensure they did not include experience related to being a new teacher; instead, they could focus only on the factors that contributed to emergency remote teaching. Another delimitation included selecting educators specifically instead of administrators and students because the researcher was focused on learning about the impact of emergency remote teaching on educators. Keeping the focus on only educators allowed the researcher to discover educators' in-depth experiences and perspectives, conduct comparisons, and draw inferences.

In regard to the delimitations for selecting participants, the following criteria were used: (a) certified classroom educator with a multiple subject teaching credential, (b) must teach core subjects – either ELA, science, math, or social studies, (c) can be a special education teacher with a completed special education credential, (d) must have taught at their specific school site for at least two years before 2020-2021 school year, and (e) must have taught the entire school year of 2020-2021 when emergency remote teaching was mandatory.

The first category of choosing certified classroom educators with a multiple subject teaching credential was so that educators had complete knowledge of implementing various instructional practices learned during their teaching education programs. Also, the certified

classroom educators must have completed their induction programs, and this two-year program that inexperienced educators complete provides them with the necessary models and tools as they begin their careers. Being fully credentialed meant that educators had a vast amount of knowledge on effective teaching strategies, so the experience of Covid-19 presented circumstances that were true to its nature.

Secondly, I purposefully limited the selection of participants that taught core subjects because I was aware that the other subjects, including art, music, and Physical education, were canceled for most of the schools since students were not receiving synchronous learning for their normal number of hours. Since I was an educator during the 2020-2021 school year, I had learned that school administrators around the state are asking educators to keep the focus on just the core subjects as everyone was learning to navigate the disruptions that were being caused due to Covid-19. Also, studying the implementations of educators that taught the core subjects would give me an opportunity to compare their experiences.

Next, I chose to include a special education teacher because I was interested in how their experiences differed from those of general education teachers. While teaching during 2020-2021, I remember never interacting with other grade levels, and I certainly had no communication with the special education teachers. Typically, special educators need to organize and deliver instruction using different methods that address the learning needs of their students, so their experiences for this research would have provided a glimpse into their world during emergency remote teaching.

The fourth limitation I set for this study was that the participants must have taught for at least two years before the 2020-2021 school year. Educators need some time to get familiar with school policies, curriculums, digital resources, and regulations. Hence, I believed two year

period would provide educators with opportunities to interact with the school-adopted curriculums and have the chance to implement the rules and regulations. I believed it was important for them to know the different aspects related to school, so their experiences of emergency remote teaching were only related to the new issues that appeared.

The fifth limitation for participant selection was for them to have taught at their school site for the entire 2020-2021 school year. The reason for setting this limitation was that educators could reflect on the entire school and explain how the experiences with technology and instruction changed or remained the same. Since changes occurred during the entire 2020-2021 school year, educators had to adjust and modify their teaching based on new circumstances.

Lastly, I was limited to selecting the school year 2020-2021 because this was the only year when instruction was mandated to be completely virtual. Although, online instruction was implemented during the spring of 2019-2020 school year, however students were not required to come online because they received printed learning packets to complete at home. For this study, I selected to study the experiences and perspectives of educators from the entire 2020-2021 school year since various abrupt changes occurred while they were expected to provide emergency remote teaching.

Recommendations for Future Research

Since emergency remote teaching is still a relatively new topic, researchers should continue to add to the literature and fill in the gaps by exploring experiences during Covid-19. This study did not include the perspectives and experiences of administrators. Since they hold authority over the implementations that occur at the school sites, it would be beneficial to incorporate their knowledge and perspective of emergency remote teaching. Another stakeholder that played a pivotal role in continuing the education of students was the parents. Future research

should incorporate their experiences and perspectives of what they believed was effective and ineffective during emergency remote teaching. Paraprofessionals such as teacher aides should be studied since they are essential to supporting student learning. Because they do not hold teaching credentials, their insights on emergency remote teaching would provide important information on the use of technology and instruction. Another recommendation for future studies would be learning about the experiences of students from various grade levels, including primary and intermediate. Also, there are not many studies that have considered the perspectives of special education educators and students, I recommend future research to incorporate their perceptions and experiences of emergency remote teaching. Lastly, research should include the impact on various disciplines, including music, art, and subjects that require specific facilities such as science labs.

Conclusion

The purpose of this multiple case study was to understand the pedagogical digital competency and self-efficacy of educators from Delta Technology Elementary School and MacArthur Elementary School during the emergency remote teaching of the 2020-2021 school year caused by the Covid-19 crisis. The theoretical framework guiding this multiple case study was Bandura's (1977) self-efficacy theory. Two elementary schools in central California provided the setting for data collection and data represents the findings of experiences shared by educators from these two sites. There is a need to continue exploring educators' unique experiences during emergency remote teaching to understand the appropriate changes needed in instructional practices with technology integration. The data from this study indicated that educators shared similar and different experiences, and to support educators in the future for

pedagogical digital competence and self-efficacy, it is important to explore viable solutions that prevent the distress experienced during emergency remote teaching.

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Appendix A: Recruitment Letter to Principals

Dear Principal,
I am writing to request permission to conduct a multiple qualitative case study at your school site. The nature of this qualitative case study is to learn about the digital pedagogy competence of educators as they instructed during emergency remote teaching of 2020- 2021 school year. Furthermore, the purpose of the study is to investigate the challenges and the success educators experienced as they engaged in emergency remote teaching caused by the covid-19 pandemic.

All certified teachers instructing core subjects at the school site will be welcomed to participate in the research. From the candidate pool, six certified teachers willing to participate will be considered participants for the study. The participants will be provided with consent forms that ensure their confidentiality as well. Their time and information shared will be respected at all times. The school's name and any other collected data will remain confidential.

The first method of data collection will be a timeline template that has questions related to their instructional experience with technology prior, during, and after emergency remote teaching. The next for of data collection will be a semi-structured interview with pre-determined questions. Participants will be asked for the most convenient way for the interview – whether in person or via online though Zoom. The semi-structured interview will be transcribed through a credible third-party, and anonymity will be maintained. All participants will remain anonymous throughout the entire research.

Additionally, participants will be asked to share artifacts of their instruction from emergency remote teaching including lesson plans, digital resources they created, or any other artifact they deem essential to learn about their pedagogy that required technology integration. The aim of this study is to understand how educators responded to the sudden shift of transitioning from face-to-face to virtual teaching. The research questions are designed to learn how educators designed and implemented instructional practices during emergency remote teaching.

Please consider allowing me to conduct this research with six willing certified participants. Additionally, considerations related to Covid-19 will be upheld following the CDC guidelines.

If you have any questions about the study, please contact me. My phone number is [redacted] and I will be happy to discuss any questions you may have. Alternatively, you can email any questions you may have to [redacted], and I will be happy to correspond.

Thank you very much for your consideration.

Sincerely,
Teerath K. Grewal

Appendix B: Principal's Approval Letter (Delta Technology Elementary)

Name of School: [redacted]
Name of Researcher: Teerath K. Grewal
Date: November 23, 2022

I, [redacted], principal of [redacted] grant Teerath K. Grewal an approval to conduct a qualitative case study at [redacted]. She is given permission to conduct confidential research to learn about the digital pedagogy competence and self-efficacy of educators as they provided instruction during emergency remote teaching caused by covid-19 pandemic. She has permission to collect data through timeline templates, interviews, and artifacts as long as they maintain full anonymity of student and staff names along with our school's name.

Thank you,

[redacted]

[redacted]

Appendix C: Principal's Approval Letter (MacArthur Elementary School)

Name of School: [redacted]
Name of Researcher: Teerath K. Grewal

I, [redacted], principal of [redacted], grant Teerath K. Grewal an approval to conduct her qualitative multiple case study at [redacted]. She has my permission to collect the information needed for the study. This is a confidential study, as stated by the researcher and thus, pseudonyms will be used for all the teachers and the school's name. She has the approval to learn about the digital pedagogy competence and self-efficacy of educators while collecting data that includes timeline template, interview, and artifacts/documents. We appreciate her study and provide permission to conduct research for needed information at [redacted].

Thank you,

[redacted]

[redacted]

[redacted]

Appendix D: IRB Approval

Dear Teerath Kaur, Susan Quindag,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2.(iii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

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

Appendix E: Participant Recruitment Email

Dear teacher,

As a graduate student in the School of School of Education at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The purpose of this study is to understand the pedagogical digital competency and self-efficacy of educators during emergency remote teaching of 2020-2021 school year caused by Covid-19 crisis, and I am writing to invite eligible participants to join my study.

Participants must be certified classroom educator with multiple subject teaching credential. The teacher must teach core subjects – either ELA, math, science, or social studies and NOT other subjects such as art, music, and P.E. The participant can be a special education teacher with completed special education credential. The participant must have worked at their specific site for at least two years before 2020-2021 school year. The participant must have worked the entire year school year of 2020-2021 when distance learning was mandatory. Participant cannot be paraprofessionals, TOSAs, district level employees, or administrators. Participants, if willing, will be asked to complete a timeline template (20 minutes), interview (40-45 minutes), and provide documents and artifacts such as lesson plans or digital learning activities (30 minutes). Names and other identifying information will be requested as part of this study, but the information will remain confidential.

To participate, please contact me at email [redacted].

The consent form is attached to this recruitment email. The consent document contains additional information about my research. If you choose to participate, you will need to type your name and date the consent document and return it to me via email before we proceed with any research procedures.

Participants will receive a $25 Starbuck's gift card as compensation for their participation.

Sincerely,

Teerath Kaur Grewal
[redacted]

Appendix F: Participant Consent Agreement

Title of the Project: Elementary School Teachers' Pedagogical Digital Competency and Self-Efficacy During the Covid-19 Pandemic: A Multiple Case Study
Principal Investigator: Teerath K. Grewal, Doctoral Candidate, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. In order to participate, you must be a certified classroom educator with a multiple subject teaching credential. You must teach core subjects - either ELA, science, math, social studies and NOT other subjects such as art, music, and P.E. You can be a special education teacher with a completed special education credential. You must have taught at your specific site for at least two years before 2020-2021 school year. You must have taught the entire school year of 2020-2021 when distance learning was mandatory. Taking part in this research project is voluntary and you may ask question for any further clarifications.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the study about and why is it being done?

The purpose of this study is to understand the pedagogical digital competency and self-efficacy of educators during emergency remote teaching of 2020-2021 school year caused by Covid-19 crisis.

What will happen if you take part in this study?

If you agree to be in this study, I would ask you to do the following things:

1. Complete a timeline template questionnaire that incorporates questions related to your experience with educational technology prior, during, and after emergency remote teaching. Also, the questions will be related to the professional developed that you received at your site. The questionnaire will take 20 minutes to complete and can be completed through email or on paper.
2. Participate in an interview for 40-45 minutes (depending on the time used to answer the specific questions for each interview). The interview will be recorded for transcription purposes. If the interview is conducted in person, it will be audio-recorded. If the interview is conducted through Zoom, it will be audio- and video-recorded.
3. Provide artifacts and documents that supported emergency remote teaching such as lesson plans and digital learning activities and resources specifically created to implement instruction for emergency remote teaching. The artifacts and documents can be provided through email or on paper.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include school districts learning about how they can better support educators in obtaining knowledge and skills on effective integration of educational technology. The data will inform about the self-efficacy of educators as challenges were experienced with pedagogical practices during emergency remote teaching. Furthermore, the results will inform K-12 schools how to better support educators with the integration of technology in the future if an emergency situation such as emergency remote teaching were ever to occur again.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher, faculty sponsor, and doctoral committee member will have access to the records.

- Data from participants will not be shared and will only be used for the purposes of the study.
- Each participant will be given a pseudonym to protect their identities and the confidentiality of their responses.
- Interviews will be conducted in an environment in which each participant feels safe and comfortable, and others will not easily overhear the conversation.
- Data will be stored on a password-locked computer and in a locked filing cabinet. After three years, all electronic records will be deleted and all physical records will be shredded.
- Interviews will be recorded and transcribed. Recordings will be stored on a password-locked computer for three years and then erased. Only the researcher, faculty sponsor, and doctoral committee member will have access to these recordings.

How will you be compensated for being part of the study?

Participants will be compensated for participating in this study. Participants will be handed a physical $25 Starbucks gift card after the artifacts/documents are provided.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please contact the researcher at the email address included in the next paragraph. Should you choose to withdraw, data collected from you will be destroyed immediately and will not be included in this study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Teerath Kaur Grewal. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [redacted]. You may also contact the researcher's faculty sponsor, Dr. Susan Quindag, at [redacted].

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

☐ The researcher has my permission to audio- and video-record me as part of my participation in this study.

_____

Printed Subject Name

_____

Signature & Date

Appendix G: Timeline Template

Before emergency remote teaching (Aug 2019 - Feb 2020)	Please describe in what ways you integrated technology in the classroom?
	Identify and describe digital resources available to you that you used during your instruction. Explain how you used these resources on a daily basis or occasionally.
Spring March 2020 - June 2020	When initial orders were given to stay at home as covid-19 cases increased rapidly, what changes occurred at your school site? Describe how you were able to deliver instruction to students.
	What challenges did you anticipate would occur if emergency remote teaching continued to the beginning of the 2020-2021 school year?

July 2020 - August 2020	Describe your emotions/thoughts as you were informed about continuation of emergency remote teaching?
	Which new digital tools were provided?
	Describe the professional development that was provided to support emergency remote teaching and explain the course of PD - How many days consisted of the PD(s)?

August 2020 - December 2020	Which previous digital tools were useful during emergency remote teaching and briefly explain how they were useful?
	What were some challenges/successes you experienced during the 1st quarter/trimester of school year with emergency remote teaching?
	How would you describe administration support at the initial stage and thus far (by the end of 1st quarter/trimester) with emergency remote teaching?

When students returned on campus in 2021 (different month for school sites)	Which month did your school site return back to campus? Describe your memories as you continued to provide instruction with asynchronous/synchronous teaching around this time of the school year?
	How would you describe your confidence and ability to use technology as you approached the end of school year 2020-2021? Discuss whether the professional development received at the beginning and throughout the school year was sufficient and effective?
August 2021 Schools reopened for all students	Please describe your thoughts/emotions regarding instruction with technology as students return back to school. Which tools from emergency remote teaching will you continue to use and how?

	Please feel free to add anything else you would like to describe your experience during emergency remote teaching in the space below.

Appendix H: Interview Questions

1. Please introduce yourself to me, as if we just met one another.
2. What has been your role at this specific school site and how long have you been employed?
3. When and which trainings did the district or school provide to help teachers at your site prepare for emergency remote teaching caused by the Covid-19 pandemic? **SQ1**
4. Which new educational technology resources did you utilize to design, plan, and implement instruction during emergency remote teaching? **CQ**
5. Describe your confidence level using the technology resources the district or the school provided for emergency remote teaching? **SQ2**
6. How did your instruction differ during emergency remote teaching compared to in class instruction with the use of new technology? **CQ**
7. What was your comfort level (on the scale 0-5, 0 being none and 5 being very comfortable) with using the learning management system (LMS) during emergency remote teaching and how did you use it for effective instruction for different subjects? **SQ2**
8. Describe your experiences throughout the emergency remote teaching with the LMS. **SQ2**
9. How did you continue to improve your practices by using technology to improve student learning? **CQ**
10. In what ways did you design authentic, learner-driven activities and environment that recognize and accommodate learner variability? **CQ**

Appendix I: Curated List Websites

Educational Websites	
Math • Funbrain • Prodigy • Math Playground • Splash Learn • Math Game Time • Khan Academy	**Social Studies** • Crash Course (YouTube) • Who was? App/site • Nat Geo Kids • Google Earth • Time for Kids • Smithsonian for Kids
Science • Discovery Mindblown • NASA Kids Club • Amazing Space • Code Academy • How Stuff Works	**Other** • Brain Pop • Ted Talks • PBS Kids • Duolingo • Hello Kids (Drawing)

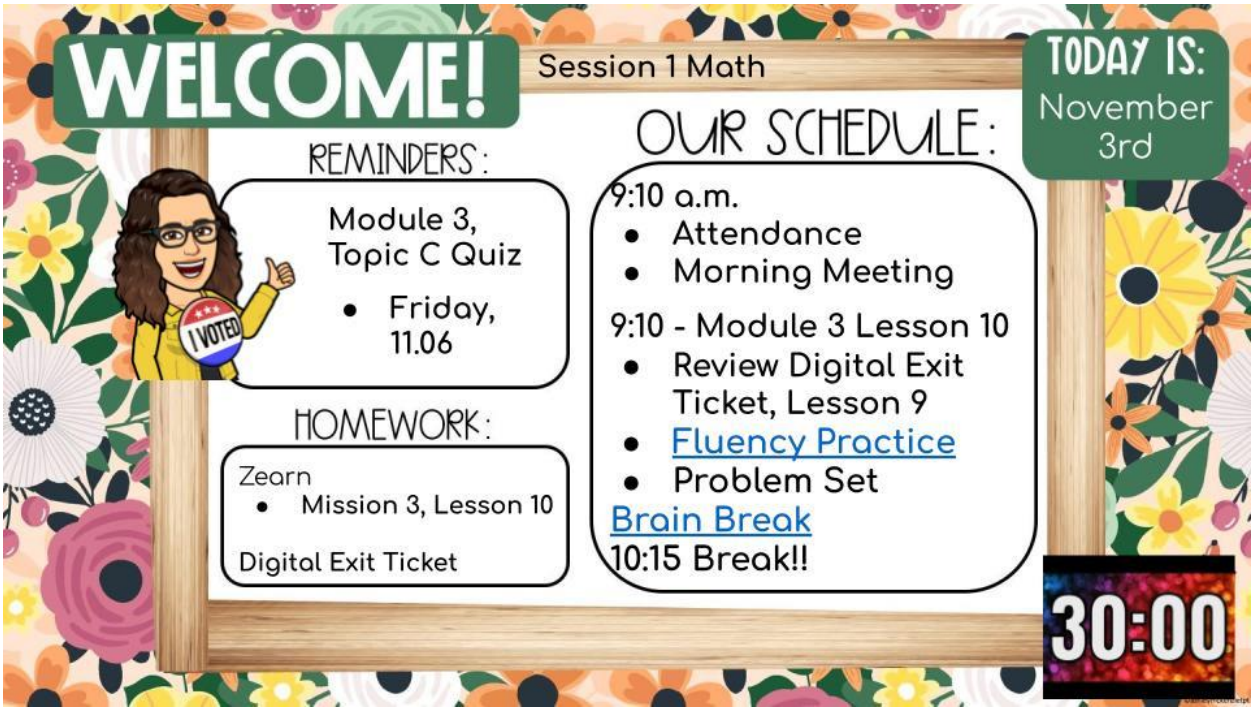
Appendix J: Schedule

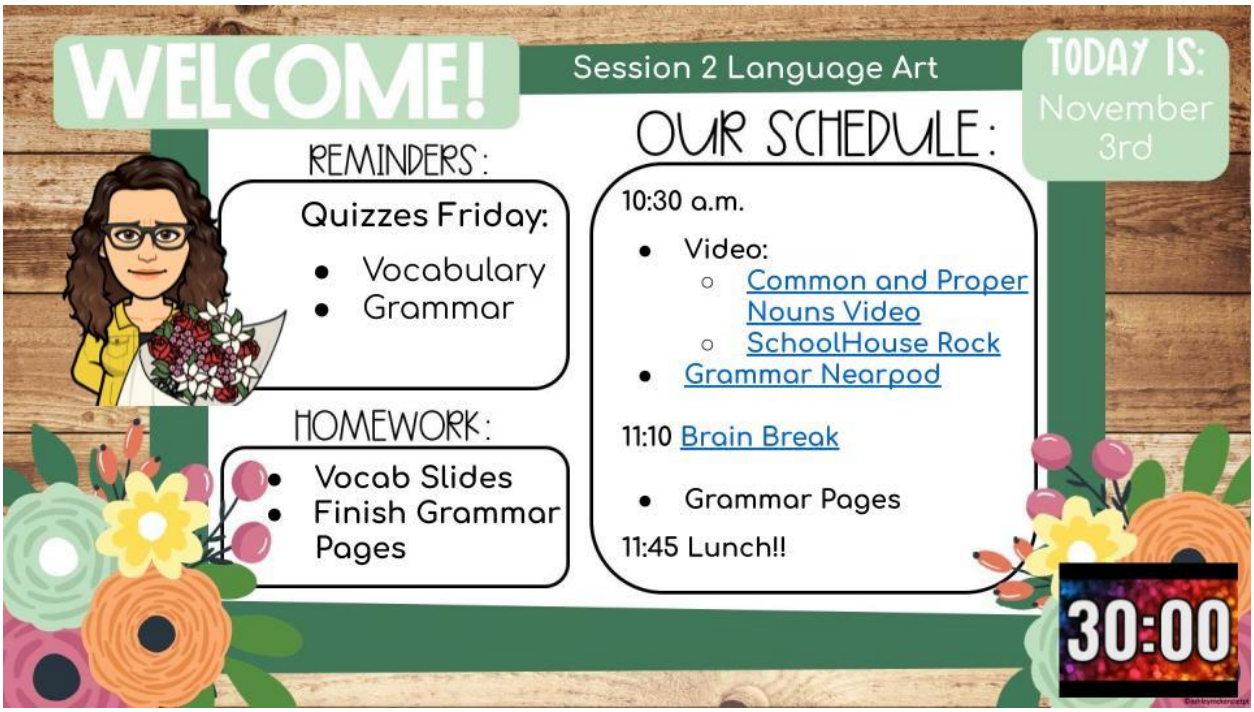
MATH	Approximate Duration 1 hour	Assignment / Task	Conversation pieces to have with your child
Basic Fact Practice Addition & Subtraction **Multiplication for those who were on it from our Fact Fluency Club in Class.* (Email me if you cannot remember your level in class.)	15 minutes	Use flashcards to memorize basic math facts, the "Fact Fluency" half sheet pages we used in class for our Fact Fluency flub, or the following digital programs: • Xtramath.org • Moby Max -Fact Fluency • Connect Ed – Fact Dash	How many facts did you answer correctly in two minutes? Your goal is 30!
Connect Ed Review (This app is accessed from your student's www.office.com account. Go to the "waffle," click on "all apps," then scroll down to connect ed. *Moby Max is also accessed this way.)	30 minutes	• Play any game from chapters 1-10. • Watch any videos from chapters 1-10. • Complete any RETEACH pages from chapters 1-10 (use your own paper to write your answers down on or a wipe board if you have one at home.) • Try any ENRICHMENT pages to be challenged in chapters 1-10.	What game did you like the most? What video did you like the most? What reteach OR enrichment page did you complete?
Math Technology Free Choice	15 Minutes	Choose one of the following sites to work in: https://play.prodigygame.com/ https://www.gregtangmath.com/ https://www.abcya.com/grades/2/numbers https://www.starfall.com/h/math2/ https://www.coolmathgames.com/	What site did you work in? What did you review or learn? What did you like about this site? What

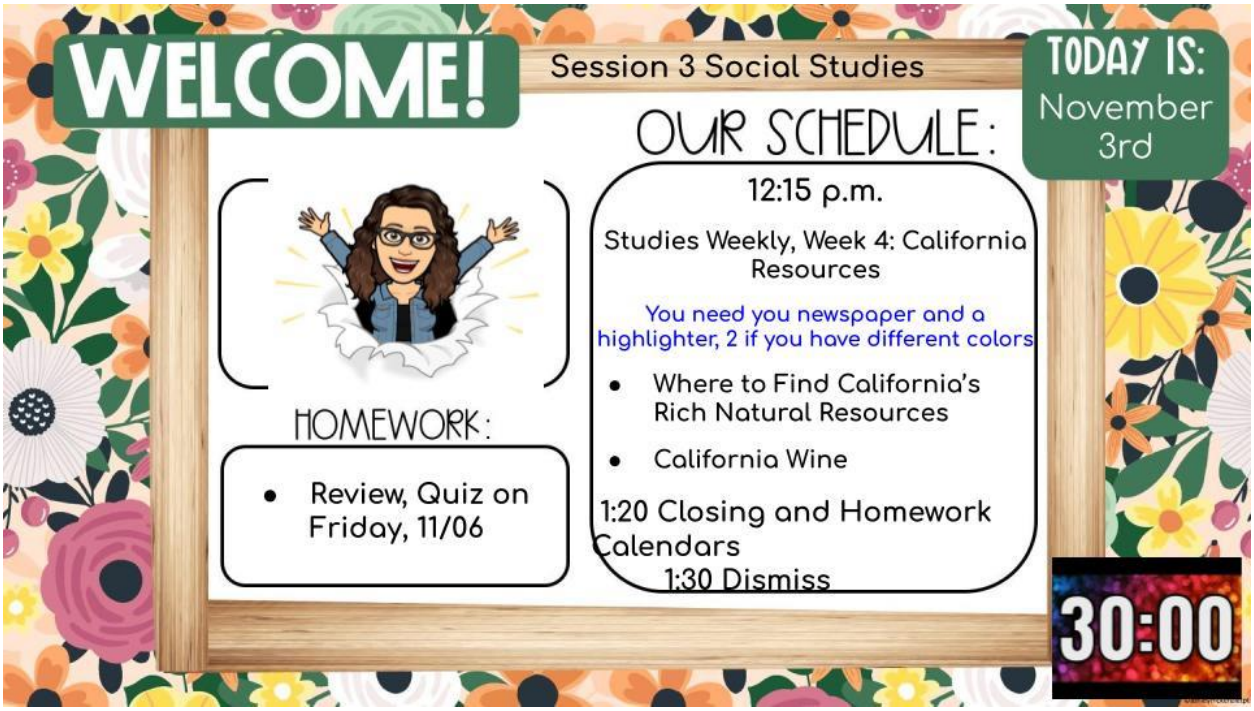
			did you not like about this site?
English Language Arts (ELA)	**Approximate Duration 1.5 hours**	**Assignment / Task**	
Reading	30 minutes	Read a book or on MyOn or EPIC Use the following in Moby Max: • Reading Stories • Reading Skills Informational • Reading Skills Literature	What was the name of the book you read? Did you enjoy it? Why or why not? What was it about?
Writing	20 minutes	• Select a topic from journal writing list, write 2-3 paragraphs on topic • Write a letter • Do a Dear Diary entry about your feelings for today • Write a summary of what you read today • Make a list (shopping, cleaning, your favorite purple things, etc.) • Draw a picture, then write a story to go with it	Did you share your journal with a family member? Did you like today's topic? Email me your topic ideas.
Spelling	20 minutes	Complete a spelling activity from the Spelling Homework Menu like you do for your weekly homework. (See attached menu with review words) Phonics Spelling – Moby Max (When distance learning launches April 6th, a weekly spelling list will be provided aligning with our Wonders Curriculum in conned ed.)	What activity did you choose? What words do you feel you need to practice more?
Vocabulary	20 minutes	Vocabulary – Moby Max (In the future we will be using connect ed. Vocabulary activities & tasks will be placed here.)	What did you learn about? Describe the definitions of the words you studied.

Social Studies & Science	45 minutes	https://www.historyforkids.net/ (In the Future, we will be using our California Studies Weekly accessible from student's office.com account.) Minecraft Education Edition & Mystery Science (access through student's office.com account) *Mystery Doug videos are found in Mystery Science under "mini lessons" which students love! https://kids.nationalgeographic.com/	What did you research? What did you learn? If you worked in Minecraft, what did you build and why?
Physical Education (P.E.) / Recess	90 minutes per week	It is important to play and move! Suggested activities: Just Dance, GoNoodle, Jump Rope, Yoga, play outside with family, dogs, or people who live in your home, Simon Says, Freeze Dance, Cha Cha Slide. We use GO NOODLE for indoor P.E. & recess. Currently, it is free during school closures! https://app.gonoodle.com/	

Appendix K: Daily Digital Slides

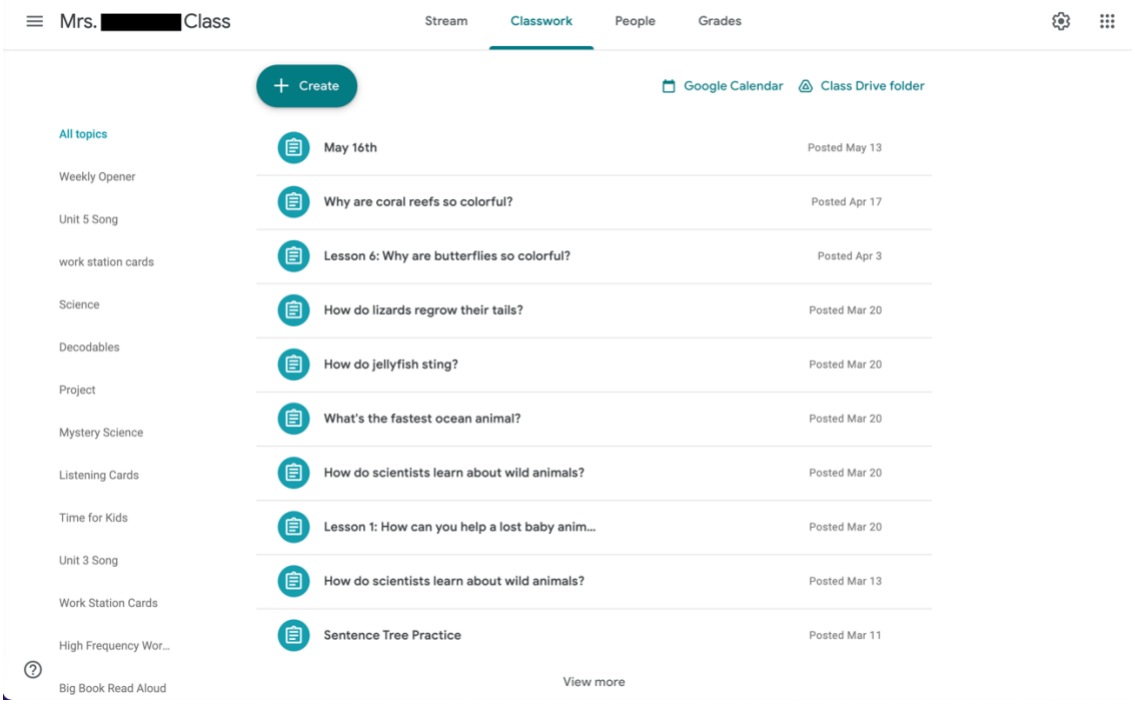



WELCOME!
Session 2 Language Art
TODAY IS:
November 3rd
REMINDERS:
Quizzes Friday:
Vocabulary
Grammar
HOMEWORK:
Vocab Slides
Finish Grammar Pages
OUR SCHEDULE:
10:30 a.m.
Video:
Common and Proper Nouns Video
SchoolHouse Rock
Grammar Nearpod
11:10 Brain Break
Grammar Pages
11:45 Lunch!!
30:00

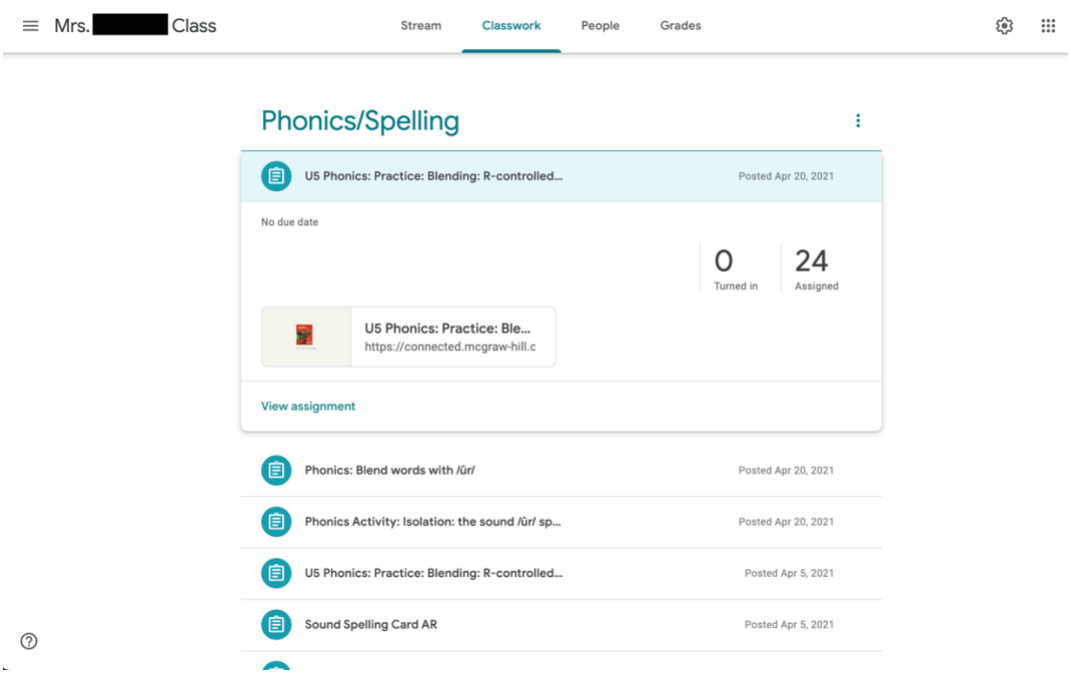

WELCOME!
Session 3 Social Studies
TODAY IS:
November 3rd
OUR SCHEDULE:
12:15 p.m.
Studies Weekly, Week 4: California Resources
You need you newspaper and a highlighter, 2 if you have different colors
Where to Find California's Rich Natural Resources
California Wine
1:20 Closing and Homework Calendars
1:30 Dismiss
HOMEWORK:
Review, Quiz on Friday, 11/06
30:00

Appendix L: Google Classroom Screenshots

Screenshot #1



Screenshot #2



Screenshot #3