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A Phenomenological Study Examining How the COVID-19 Pandemic Changed the Way Teachers Use Technology to Deliver Instruction from March 2020 - May 2021

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by

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ABSTRACT

A Phenomenological Study Examining How the COVID-19 Pandemic Changed the Way Teachers Use Technology to Deliver Instruction from March 2020 to May 2021

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The purpose of this qualitative study was to examine teacher perception of changes in the instructional delivery and learning opportunities via technology during and throughout the COVID-19 pandemic from March 2020 until May 2021. The COVID-19 pandemic has greatly affected educational organizations. School closures in March 2020 forced teachers to change their instructional delivery from an in-person platform to a virtual platform. This disruption to the delivery of instruction with the use of technology changed the way teachers plan for learning, delivery content, present learning activities, and assessment. The urgency required teachers to develop new strategies and experiment with adaptations to their traditional instructional delivery. The purpose of this phenomenological study was to describe the experiences of teachers as they adapted their instruction to a new platform. The theoretical framework used was change theory. The research was accomplished by interviewing 11 core-content classroom teachers from different school systems. Participants described their experiences and approach to the challenges faced while teaching during the uncertainty of the pandemic. The participants in the study described factors that influenced changes in their use of technology and how the different platforms changed the way they used technology for instructional delivery. The researcher used the Change Theory Framework to code responses and identify the internal and external factors that influenced the changes.

DEDICATION

This work is dedicated to my village of family and friends who have supported, encouraged, and loved me through this journey. I dedicate this work to my husband, Shane, your support and love during the past four years has been steadfast, patient, and gracious. Thank you for allowing me the time, resources, and support I needed to complete this degree. Your support kept me going even when I did not think it was possible. I love you very much! To my children, Andrew, Brady, and Claire, thank you for understanding why Mom had to work and for encouraging me to stay focused. I will be here to support you through all your hopes and dreams in life. You mean the world to me.

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Chapter 1. Introduction

In March 2020 teachers across the world experienced a forced change when a global pandemic altered the way they delivered instruction to students. School buildings were closed and teachers were expected to continue with providing instruction to students across a virtual platform. School system leaders, administrators, and teachers were forced to make decisions quickly on ways to maintain instruction and learning for their students. As teachers engaged in this change through the end of the 2019-2020 school year, and through the 2020-2021 school year, they experienced many feelings. This study examined the experiences of teachers during the COVID-19 pandemic to learn how they engaged in the change process.

School closures were a result of government decisions made during the COVID-19 pandemic to decrease community spread. Teachers were forced to move their instructional delivery to an online platform. Their instructional delivery included the way they communicate with students, present lessons, assign learning activities, and assess learning. Teachers have experienced a range of training opportunities to develop their use of technology in the classroom. Systems and schools within systems have different plans for how they want teachers to use technology daily. Understanding that any change requires small actions with support and evaluation, the pandemic did not afford teachers and leaders with time. This change was forced with short notice and little guidance was provided (Winter et al., 2021).

Increased access to and use of technology in classrooms has provided opportunities for teachers to change how they design the instruction of their content (Graves & Bowers, 2018). Policy reform was instrumental in guiding these changes by outlining standards and learning expectations for students. A Nation at Risk (National Commission on Excellence in Education, 1983) reported a decline in high school students' achievement for most standardized tests. This

report indicated these deficiencies at a time when the United States needed more technologically skilled workers. Educational technology skills were identified for students to develop computer-based competencies (Culp et al., 2005).

The No Child Left Behind Act (NCLB) of 2001 (Elementary and Secondary Education Act [ESEA], 2001) identified the technological skills students should achieve in school. This reform focused on integration initiatives, building access, accessibility, and parental involvement. Meeting infrastructure needs for schools and communities were essential to the success of technology integration. This created partnerships between schools and local organizations to provide greater bandwidth. NCLB recommended that students should be technologically literate by the end of eighth grade. Technology standards and goals created for each grade level as a way to build upon students' prior knowledge each year. NCLB sought to achieve the core goal of increasing student learning by integrating technology in all subjects (Culp et al., 2005). Although NCLB recognized the need for increased student learning with the use of technology, the plan to accomplish this goal was left to local education agencies to outline; a resource was provided 3 years later (US Department of Education, 2004).

Teachers recognized the need to address concerns in education with the use of technology and created a nonprofit organization called the International Society for Technology in Education (ISTE). The goal of ISTE was not about technology integration but creating meaningful and engaging learning opportunities by changing how learning happens. Teachers believed technology would provide deeper and more meaningful learning by enhancing the delivery of instruction, practice, and communication of learning. ISTE outlined Computational Thinking Competencies based on roles in education, which included students, educators, education leaders, and coaches (ISTE, 2021).

ISTE standards have evolved since they were first created. The organization has transformed the way educators approach learning and teaching. They realized technology is a primary part of students' lives, but identified a detachment from this reality in the classroom. The goal of the standards is aligned with empowering students to take a central role in creating their own learning opportunities. With approximately 20 states formally adopting the ISTE Standards into their curriculum, state education departments recognized the value ISTE brings to all members of the school (Snelling, 2016).

As technology access increased and educational technology standards became more measurable and observable, schools faced many obstacles that influenced whether and how teachers used technology in their classroom (Thomas & Chinnappan, 2008). Technology use in the classroom could be imbedded in instructional delivery, learning opportunities, presenting or sharing learning, and communicating understanding. Research has identified many barriers to technology integration that range from teacher perceptions or mindset of technology use in the classroom (Thomas et al., 1996) to the lack of time, poor infrastructure, professional development opportunities, access to technology devices or applications, and lack of technical support (Forgasz, 2006; Goos, 2005; Palak & Walls, 2009).

Although there have been national educational reforms aimed at increasing technology integration in schools, research has shown that not all educators use technology (Gao et al., 2019; Vega & Robb, 2019). Transforming the way teachers deliver instruction and creating learning opportunities involves more than having access to technology. Any statewide implementation involves creating a new practice for an idea, program, or set of activities. The people involved attempt or expect to change their pattern of behavior and understanding of the process (Fullan, 2003). It is necessary for schools to be concerned about the way people approach change. Evans

(1996) wrote about how learning a new process requires the replacement of something familiar. This process can create anxiety and uncertainty for most people. Research supports the concept that policy alone cannot bring about change. To move from innovation to change, organizations must consider the personal components of change (Evans, 1996).

Statement of the Problem

The COVID-19 pandemic caused governments to mandate lockdowns and restrictions, disrupting how many people carry out their daily personal and professional responsibilities. Schools moved instruction from a face-to-face format to entirely online (Carroll & Conboy, 2020). Most teachers used some form of technology in their instruction before the mandated closures. However, afterward, they became significantly reliant on technology to send, present, design, and assess their students' learning. Teachers experienced a change in their dependence on technology at the end of the 2019-2020 school year and through the 2020-2021 school year. This study examined the process of how the COVID-19 pandemic changed the way teachers delivered instruction through the use of technology.

Significance of the Study

People continue to increase the use of technology in their daily lives, which makes technology an essential tool for society. Although policy reforms have increased the importance of technology use in classrooms, some teachers rely on their traditional practices for delivering instruction, creating learning assignments, and assessing learning goals. The COVID-19 pandemic forced teachers to change their use of technology for these purposes. In March 2020, schools closed their doors and teachers were expected to maintain their instructional goals on a virtual platform. Teachers were forced to change the way they delivered instruction to their students and use technology in new ways to accomplish these goals.

Results of OECD's TALIS 2018 Teaching and Learning International Survey (Schleicher, 2020) showed that 40% of teachers lacked professional development in technology. Research indicates the need for quality training in the use of technology for teachers to effectively integrate it in their instructional design (Hepp et al., 2015). When teachers have the skill to know how and when to use it, technology can be a tool that supports and strengthens learning goals (Bowen, 2020).

There are many barriers school systems and teachers experience when integrating technology in their instructional design (Ertmer & Ottenbreit-Leftwich, 2010). These barriers are experienced by teachers during typical years of instruction where students attend in person and without restrictions. The COVID-19 pandemic forced teachers to change the way they used and relied on technology to deliver instruction. Change is a process designed to address small areas of refinement at a time, but time was not plentiful during this forced transition (Milman, 2020).

This study is important because leaders and teachers can learn from how teachers engaged in a mandatory change that greatly affected the use of technology in their instructional design. The researcher will disclose the experiences of teachers with different levels of technology integration experience, professional development opportunities, and system expectations. These experiences will provide insight into the challenges and successes of teachers as they lived through this radical shift in teaching. This study details the experiences in a way that can provide leaders and teachers insight into teachers' needs when presented with the task of changing their instructional design (Zhao, 2021).

Statement of Purpose

This study addressed the change teachers in grades 6-8 experienced with the use of technology in the instructional design of standards-based curriculum goals. The researcher

examined the use of technology in classrooms before mandated shutdowns due to the pandemic in March 2020 and the current use of technology to determine how teachers engaged in change. The following question was addressed in the study: How has the COVID-19 pandemic changed the way teachers use technology to deliver instruction after a shift from in-person teaching to virtual or hybrid? By investigating this question, the research may provide information for teachers and administrators to consider how change was experienced and how it affected their instructional design. The results can inform school systems, administrators, and educators on the change process and how barriers affected their ability to adjust to a new way to present instruction. It revealed barriers that halted, stalled, or encouraged changes that occurred with a more in-depth look at analyzing how this mandated change forced teachers to evaluate their use of technology in the classroom.

The purpose of this study was to examine teacher perception of changes in the instructional delivery and learning opportunities via technology throughout the COVID-19 pandemic from March 2020 until May 2021.

Theoretical Framework

The researcher used the theoretical framework of Fullan's Change Theory (Fullan, 2001), pedagogical content approaches to student learning, and Mishra and Koehler's (2006) Technological, Pedagogical, and Content Knowledge Theory (TPACK) construct of technology integration to guide this study.

Fullan's Change Theory Framework (Fullan & Quinn, 2015) was used to classify stages leaders and educators move through to build coherence and engage in meaningful change. This framework was used as a guide to identify themes that change a teacher's willingness to transform their instructional design. These themes include professional training, collaborative

learning opportunities, staff support, and communication.

The researcher used TPACK to identify themes present as teachers designed their curriculum instruction using technology. This framework provided a guide to categorize how teachers consider technology use in their instructional design in regard to pedagogical knowledge and content knowledge. TPACK categorizes the teacher's knowledge of three constructs to design lessons that use technology to encourage higher levels of thinking and engagement (Kohler & Mishra, 2009). This framework was important to understanding teacher choices with technology use in instructional design.

Research Questions

There was one central research question with five sub-questions guiding this study. The researcher sought to describe the experiences of teachers when presented with the forced change of instructional delivery with technology when schools moved from an in-person learning environment to an online platform. The researcher describes how teachers used technology pre-pandemic and throughout the pandemic to identify themes in approaches to integrating technology.

Overarching Research Question

1. What are teachers' perceptions of the changes in the use of technology for instructional delivery because of the COVID-19 pandemic from March 2020 to May 2021?

Supporting Sub-Questions

1. How did technology use change (transition) across the different instructional platforms from the beginning of the pandemic in March 2020 to May 2021? a) in-person learning, b) hybrid learning, c) virtual learning

2. What internal factors influenced changes in the use of technology for instructional delivery?
3. What external factors influenced changes in the use of technology for instructional delivery?
4. How have the different platforms changed the approach to designing instruction with the use of technology?
5. How has the use of technology for instructional delivery influenced teaching strategies in the different instructional platforms? a) in-person learning, b) hybrid learning, c) virtual learning

Definition of Terms

Several terms were used throughout the study. This section provides definitions of the unique terms used in this study.

COVID-19: An infectious disease caused by a coronavirus discovered in 2019 (WHO, 2021).

Instructional Design: The deliberate planning and creation of materials used to provide instruction to learners (Gardner, 2017).

Instructional Technology: Tools or techniques used to aid in learning (Gardner, 2017).

Technology Integration: The use of technology in the classroom to aid in teaching and learning (Wang et al., 2014).

Technological Pedagogical and Content Knowledge (TPACK): A technology integration framework that identifies three types of knowledge instructors need to combine for successful technology integration (Mishra & Koehler 2006).

Limitations and Delimitations

A phenomenological study collects participant experiences through a phenomenon. Through interviews, researchers are able to find emerging themes in the words spoken by the participants (Patton, 2015). A limitation of this type of research is the influence bias has on the interpretation of words. Responses could be altered due to social pressures teachers have to answer in a particular way. Teachers may feel defensive when talking about their perceived inadequacies. The researcher considered it important to be empathetic to the participants and recognized the difficulty teachers experienced with shifting their instruction from in-person to an online setting.

This study was limited to fifth through eighth grade teachers in local school systems. The researcher chose to use teachers in grades 6-8 because students in those grades should have been exposed to some level of instruction in using technology to learn and share. Interviews were conducted to examine the experiences of teachers in using technology to deliver instruction before and during the COVID-19 pandemic. The purpose of the interviews was to analyze the changes that occurred as teachers were forced to move the instructional delivery of their content from an in-person setting to virtual or hybrid depending on the system. The researcher interviewed participants to examine how the pandemic changed decisions to use specific technology tools for instructional delivery.

Overview of the Study

This is a phenomenological study focused on examining teacher perceptions of changes in the instructional delivery and learning opportunities via technology during and throughout the COVID-19 pandemic from March 2020 until May 2021. This study includes five chapters. Chapter 1 provides an introduction to the study, statement of the problem, significance, purpose,

theoretical framework, research questions, definition of terms, and limitation and delimitations of the study. Chapter 2 summarizes a review of literature related to the history of technology in education, student learning, change theory, and pedagogy. Chapter 3 describes the study's methodology, population and sample, collection and analysis of data, assessment of quality and rigor, and the ethical considerations. Chapter 4 presents the findings of the themes in a narrative form. Chapter 5 includes a summary of the findings and recommendations for future research.

Chapter 2. Review of Literature

Overview

Educators prepare generations of students for professions not yet conceptualized. Constant technological advances contribute to this predicament. Technology has evolved to enhance every facet of our lives, including entertainment, daily productivity, communication, and education. We live in a technological world with increased accessibility, convenience, and interaction. Integrating meaningful technology can be challenging for educators when the field evolves at a rate difficult to maintain. Educators must continue to learn about changes in technology integration and technology practices. Designing learning opportunities where students are engaged in learning about their world equips them with the necessary skills for success in a changing system. Technology assists teachers in achieving this goal (Poth, 2019).

Technology integration gained attention in public education with the reauthorization of the Elementary and Secondary Education Act of 2001, No Child Left Behind (NCLB). This act provided national standards for technology integration, giving administrators and teachers an outline of expectations and supports (US Department of Education, 2004). Although the push for technology integration has been present since the early 2000s, it has not been consistently and effectively incorporated into curriculum design (Davies & West, 2014). Many internal and external variables contribute to unsuccessful attempts to use technology in the classroom. Ertmer and Ottenbreit-Leftwich (2010) referred to the external barriers as institutional. The variables include access to technology devices, system-wide implementation plans, daily supports, and adequate training. Internal variables address teachers' value beliefs regarding the significance of technology integration, learning communities, and teacher efficacy; each of these affects the quantity and quality of technology integration in the classroom.

On March 12, 2020, the world entered a crisis when the World Health Organization (WHO) (2021) declared the Coronavirus disease 2019 (COVID-19) to be a pandemic. COVID-19 was caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and was found to be spread from human to human (WHO, 2021). The COVID-19 global outbreak triggered a drastic reconfiguration of societal norms and interaction. Schools shifted to virtual learning to confront the potential health risks of in-person instruction by reducing the transmission of COVID-19 (Viner et al., 2020).

In March of 2020, educational institutes worldwide faced challenges when the SARS-CoV-2 Coronavirus spread throughout the country. United States governors mandated statewide shutdowns of local businesses and schools to slow the spread of the virus. Additional guidance was recommended for communities regarding wearing masks, social-distancing, and stay-at-home orders. The pandemic forced local schools to replace face-to-face instruction with virtual learning in March for the remainder of the 2019-2020 academic school year. Teachers were required to transform their daily instructional delivery and relied predominantly on technology to teach their standards-based curriculum (Dhawan, 2020).

Over the years, the integration of technology in the classroom has been researched extensively (Alsaeed, 2017; Davidson et al., 2010; Shamir-Inbal & Blau, 2016). Studies have addressed changes that arise due to integrating technology in the instructional delivery design for students and educators (Edwards et al., 2015). Hall and Hord (2001) emphasized the importance of a team effort when facilitating change. Leaders placed teachers in a vital role when developing a school plan for technology integration and found that when teachers work collectively with clear goals, the outcome can be long-term and positive (Sharratt, 2018).

The research begins with the history of technology legislation intended to increase accountability measures. Researchers noted the barriers systems encountered when implementing changes that affected their schools. These barriers spanned from infrastructure design to pedagogical approaches. Research addressed student learning theories and how technology integration has evolved to enhance classroom instructional design. With closures of schools in 2020, teachers found alternative ways to instruct their students virtually. School systems had little time to cultivate strategies or train teachers on best practices for the COVID-19 phenomenon (Dhawan, 2020). Schools needed to evaluate their practices and the technology used to determine new goals for future practice. The unprecedented affect COVID-19 had on schools will be examined for years to come. This literature review includes research that outlines the components affecting teachers' ability to transfer their traditional strategies for instructional delivery from in-person to a virtual setting (Espino-Diaz et al., 2020).

Theoretical Framework

People naturally engage in change to make their lives better including personal, health, finance, and professional aspects. Change occurs when desires and priorities shift. As people experience setbacks or achievements, they engage in a mental process to create an explanation to understand why events occurred. They reflect on their behavior, attitude, or performance to determine which actions contributed to the outcome either negatively or positively. This process results in a desire to plan for personal development. A modification in behaviors is necessary to engage in change that achieves the desired result (Turner, 1982).

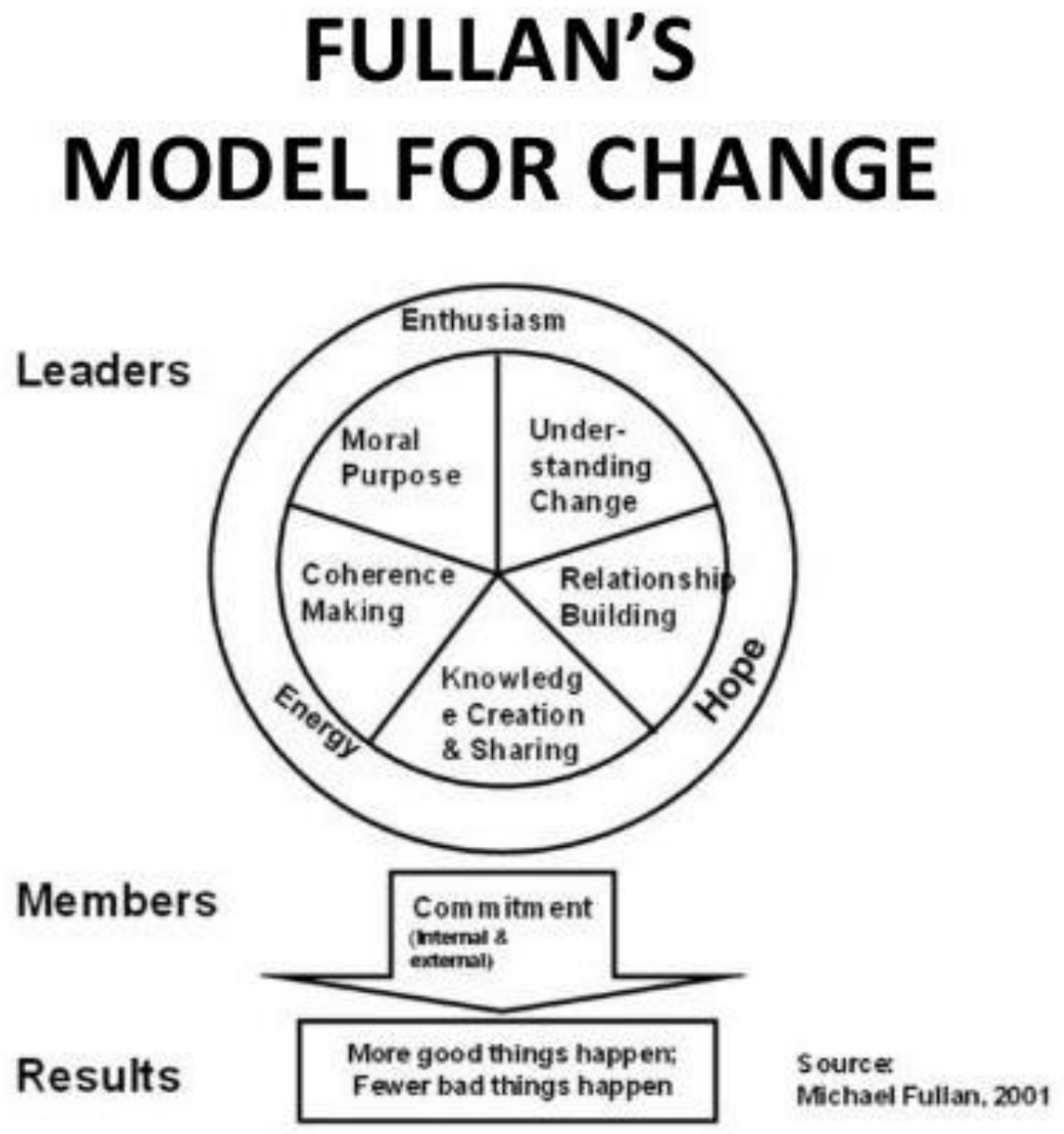
Change theory guides this study to understand how teachers used technology to deliver instruction in a classroom before and through the COVID-19 pandemic. Change is an inevitable part of all organizations. Carlopio (1998) described change as adopting an

innovation where a current practice changes to enhance an outcome. Fullan (1992) claimed that change was the process of learning and understanding new things, whereas Bell and Ritchie (1999) stated that change is the way people improve. Hall and Hord (2001) stated that change is rooted at the individual level of an organization. Their research suggested the process was highly personal and required support at the different stages of implementation. Change involves the practice of improving a regimen to make the processes more effective. Internal and external factors contribute to whether implementing the change in an organization yields successful results (Cenzo & Robbins, 2002).

Change evokes various emotions for people, from fear, anxiety, and panic to energizing, excitement, and improvement. Fullan (2001) emphasized the importance of leadership when addressing organizational change. Creating meaningful and long-term change depends on the work of many. Heifetz (1994) identified leadership as a way to confront problems that have not been successfully addressed. He wrote about how leadership should confront the controversial or divisive areas that require people to acquire new approaches to learn. Fullan (2001) suggested a framework to support a new mindset when leading complex change. The framework shown in Figure 1 includes five components of leadership that are independent and mutually reinforcing for positive change. The components include moral purpose, understanding change, relationship building, knowledge creation and sharing, and coherence making.

Figure 1

Fullan's Framework for Leadership



Note. This figure shows Fullan's (2001) leadership framework.

Leadership involves a determination to achieve and a commitment to preserving a moral purpose (Fullan, 2001). Fullan described moral purpose as an emphasis on both the processes

and outcomes that make schools effective. Effective leaders must remain reflective in their practice and strive to improve their moral purpose. Fullan suggested that a leader cannot be effective without conducting their behavior in a morally purposeful way. Effective leadership seeks to make a difference in the members' lives and equips them with strategies to solve problems. Leaders who strive to be effective encourage accountability and reflection. Members of an organization who exhibit a moral purpose become intrinsically committed to the organization's vision and goals.

Fullan and Langworthy (2014) noted the influence a leader's action has on implementing change in their school. The authors indicated a strong vision as a critical component of leadership to facilitate change. Developing a vision involves a shared commitment from members within the organization, including teachers, administration, parents, students, and key community stakeholders. A shared vision is essential to providing an organization with a mutually accepted direction. Welcoming a variety of stakeholders into the process is a proactive way to reveal concerns that may arise through opportunities to share dialog (Doten-Snitker et al., 2021).

Innovation through collaboration and reflection drives change in any organization, but it is never linear. Change is a multifaceted process that requires a community of people to share a vision and trust one another. A framework for leadership in schools creates a new way of confronting complex issues that require unknown processes. Facilitating change within a school is a difficult task. Fullan (2001) and Sergiovanni (2007) suggested that moral purpose is a guiding force for any learning environment to thrive. Schools include diverse people who align to promote a shared vision within their community. Sergiovanni argued that a leader is technically a head follower because there cannot be a leader if there is nothing worthy of

following. Moral purpose directs leadership by placing student learning above other goals. Student learning should be the purpose of educational policy -- not recognition or achievements. Sergiovanni emphasized the need for steward leadership in schools. Steward leadership remains focused on serving members of the organization and trust is established when the organization's needs are central to the members'.

To successfully foster an environment conducive to change, a leader must understand the complexities of the change process. A leader cannot manage change but instead must organize the process to motivate the members to continuously work toward the desired goal. Change cannot be controlled; it can be guided. Fullan (2001) emphasized how shortcuts do not bring about effective change. Effective change is a continuous process partnered with developing a mindset and an action set. Leaders must ensure they are cultivating a learning environment throughout the change process. Change should be focused on developing learning organizations competent in creating, acquiring, and transferring knowledge (Garvin et al., 2008).

Establishing relationships is one of the most crucial components of change. Leaders cannot effectively lead others without cultivating a relationship with the members of their community or organization. Fullan (2001), Sergiovanni (2007), and Marzano (2009) suggested that the quality of collaboration in a school is a catalyst in working to improve teaching and learning. We can accomplish change by seeking information and examples from various stakeholders at a school: students, parents, teachers, curriculum and technology coaches, and administrators. Moving toward meaningful change requires knowledge of learning and pedagogy with a positive culture and climate. Members rely on collaboration to influence the change in their organization (Fullan & Langworthy, 2014). Teacher effectiveness and expertise are enhanced when collaborative learning environments are supported (Hattie, 2015). Research has

shown positive effects on student achievement when teachers participated in regular collaborative learning activities (Goddard et al., 2010).

Glover's (2013) lead-teach-learn (LTL) triad is also rooted in a leadership practice that highlights the importance of relationships within a community or school. The LTL model reinforces how leaders build upon teachers' strengths to produce ongoing collaboration by supporting the idea that we are all followers and can all be leaders. Collaborative relationships and conversations are the fundamental characteristics of successful schools. When leaders can position teachers as learning leaders, they can develop a learning community committed to change with a common vision in mind. Fullan (2001) supported the idea that leaders must trust this process of sharing knowledge. It makes knowledge-building a priority by forming and supporting processes to collaborate and rely on each other. Leaders should enable their teachers -- not control them. When a leader arranges opportunities for their teachers, the transfer of knowledge sharing becomes a daily activity, not a chore.

Bandura's work in the 1970s focused on the affect shared responsibilities had on performance. He defined collective efficacy as "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (Bandura, 1997, p. 477). Research has supported the idea that a group of teachers believe in their combined ability to overcome challenges and achieve goals, these groups are more effective (Adams & Forsyth, 2013; Eells, 2011; Goddard et al., 2004). Collective efficacy controls school culture by influencing how educators feel, think, behave, and are motivated (Bandura, 1993). Teachers reflect on their practice and the affect it has on student learning. This process leads teachers to become intentional in their understanding of pedagogy and transform their practice through collaboration (Hattie & Zierer, 2019).

Fullan (2001) identified a strategy for pursuing sustainable, consistent, and system-wide change called Leading from the Middle (LftM). Top-down structures of change theories are often ineffective because of the lack of regard to the organization's members responsible for implementing the change process. In education, teachers should have a voice in school policies. The LftM model values the teacher's perspective and shifts the responsibility of leading to members in the middle. Glover (2013) illustrated the importance of autonomy in schools. Middle leading encourages open dialog whereby members share thoughts, beliefs, successes, and failures in a way that promotes growth.

Open dialog among teachers builds trust, respect, and knowledge. Isaacs's (1999) work emphasized the importance of dialog. He noted that when organizations have discussions during meetings, negative matters are often reinforced in the conversations. Dialogic leaders navigate discussions and uncover concealed meanings by awakening personal views, listening deeply, respecting others' views, and increasing perspective. Leaders with this skill create balance within the interactions of co-workers (Isaacs, 1999).

Teachers are typically on the receiving end of any change that must occur and are largely responsible for the implementation that drives the change. Schools are accountable to policymakers who create educational plans aimed at improving education. The policies are driven by national tests that rank students in reading, math, science, and writing. Adverse results such as *teaching to the test* have emerged with high-stakes testing (Zhao, 2011).

Educational change has been influenced by the work of Hargreaves and Fullan (2012). Their work is centered on improving the teaching profession to increase student learning and effective school improvement. They emphasized the role school leadership plays in building a shared vision with collaboration for learning in schools (Fullan, 2007; Harris et al., 2002).

Research by Harris and Jones (2019) identified three key dimensions of teacher leadership concerning educational change: teacher leadership as influence, action, and developing pedagogical excellence. These key dimensions are instrumental as influencers of change within an organization and have been the focus of much research in designing change in school systems (Harris & Jones, 2019; Lieberman et al., 2017). Teachers are at the center of influencing educational change (York-Barr & Duke, 2004).

Leaders will inevitably encounter barriers when engaging in change within their school. Willower (1963) emphasized the importance for educational leaders to be knowledgeable of potential causes and types of barriers to change. He found that change was often a threat to the status of an organization. More experienced teachers were less likely to engage in the change process than newer teachers. They were also more likely to voice their contempt for the changes being implemented. Another reason that teachers experienced resistance to change was a lack of knowledge or skills. It is essential for leaders to understand barriers and pursue ways to overcome them.

Hall and Hord (2001) suggested one factor that impedes change is the unclear description and purpose of the change. They stated that when people are uncertain they are less likely to engage in the change process. Hall and Hord (2001) developed a tool to help members of an organization visualize the process called Mapping Innovation Configurations. The map outlines the major components by describing the observable parts of the change process.

Fullan (2001) found that accountability can harm innovation creation and engagement in a change process. Finding a balance among innovation, accountability, amity, and collaboration is crucial for successful change. Teachers need to feel supported by their colleagues and leaders to take the risks necessary to achieve change. Lack of efficacy has a negative influence on

learning outcomes. When teachers feel supported to take risks, which may result in a temporary learning stall, they are more likely to change their instructional strategies. Fullan (2001) referred to this stall as implementation dip. Teachers experience two professional dilemmas during an implementation dip: 1) a fear of change and 2) a deficit of technical skills. Leaders are essential to the capacity-building of their teachers.

Educational change requires many stages of leadership. Change can create opportunities to increase moral purpose, affect school culture, and enhance collaboration. These opportunities can build trust among members of the organization and improve the school climate. To avoid a halt in progress, leaders must anticipate any barriers that may affect the implementation of a process. Change is a process that is nonlinear and will be presented and attempted differently across organizations. Leaders who share leadership responsibilities will be more effective in expanding their teachers' collective efficacy to drive the necessary changes of their organization (Fullan & Quinn, 2015).

History of Technology in Education

Students use technology to entertain, educate, and communicate. For some educators, the use of technology in their instructional design is still fairly new, even though it has been available for more than 50 years. This literature review addresses technology integration in the classroom by looking at the history of technology integration in education, technology standards, barriers to technology integration, student learning, and organizational change. The timeline of policy regarding technology shows challenges schools and educators face when implementing technology in their classrooms.

Technology has changed the responsibilities teachers and learners have in the classroom. In traditional classrooms, teachers are the critical sharers of information and learners are the

receivers. The teacher's role has shifted to allow students to take a more active role in acquiring information with the access technology provides. Educators are redesigning their instruction to create a new way for learning and collaboration to transpire. The goal of technology integration in our classrooms is a more personalized learning curriculum. Technology is a powerful tool that transforms the learning environment. Understanding the historical timeline gives insight into how our federal and local agencies have mandated technology use and understanding in our classrooms; new technological advances present new challenge (Viner et al., 2020).

The launch of Sputnik in 1957 sparked the need for schools to focus their efforts on math and science education while integrating technology. Fleming (1960) said scientists in the United States were concerned that they were inferior to the Soviets after the first man-made satellite launch into space. Both countries participated in a race to send an object into space. After the Soviets' success, Americans began to question the effectiveness of the educational system and used legislation to restructure resources and focus their efforts on math, science, and technology. The legislation was called the National Defense Education Act (NDEA) and was signed into law in 1958. Title III initiated a focus on strengthening instructional practices in mathematics, science, and foreign language. At the same time, Title VII provided funding for research in more effective use of technology for educational purposes (Jolly, 2009). The next significant legislation addressing technology integration was the Elementary and Secondary Education Act of 2001, which required integrating technology in all content areas for K-12 standards (US Department of Education, 2004).

The National Education Technology Plan (NETP) (Office of Educational Technology, 2010) formed a learning model influenced by technology that addressed the educational topics of learning, teaching, infrastructure, and productivity. NETP recognized technology as an

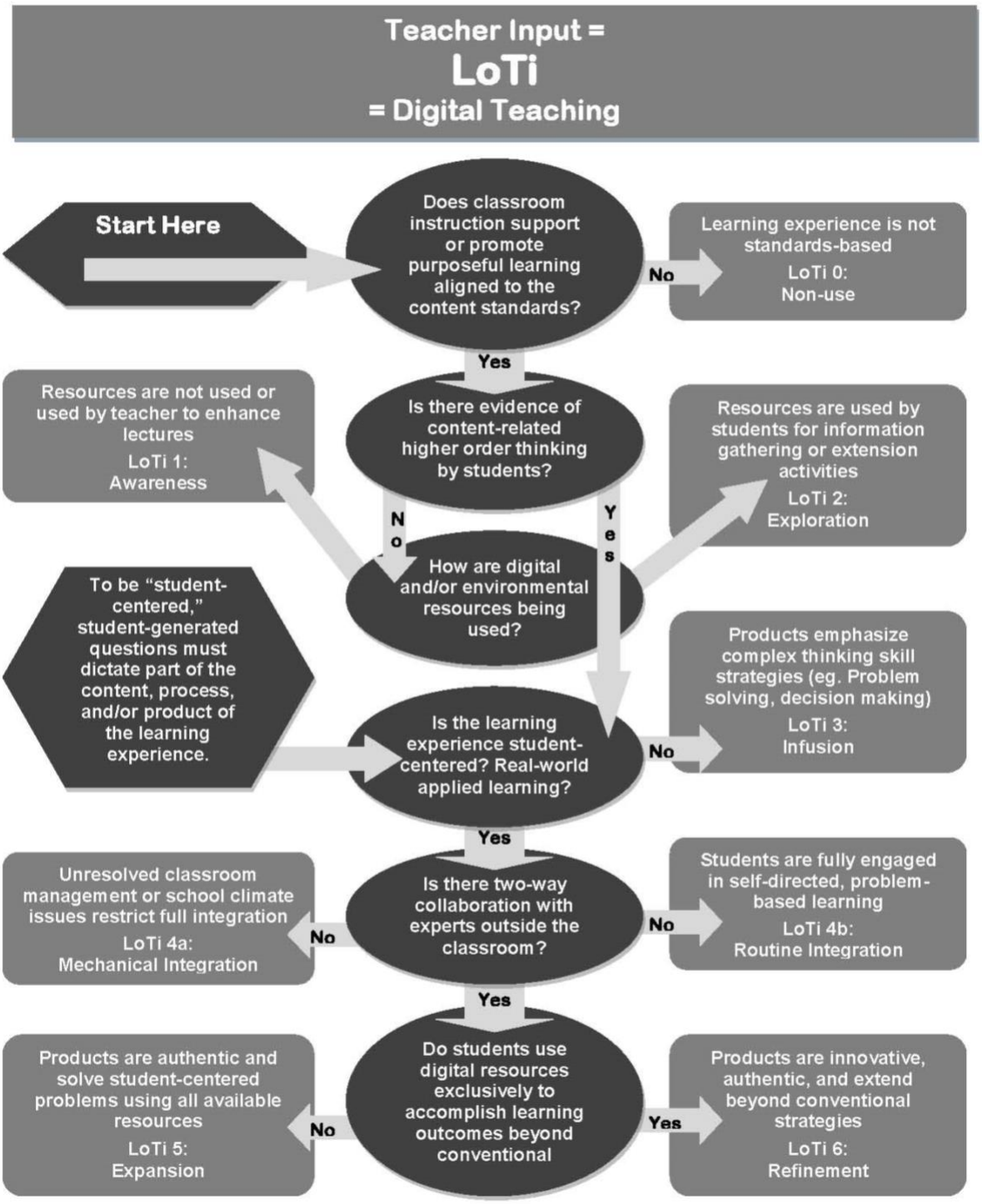
instrumental tool used to enhance learning and improve testing outcomes. The plan outlined standards-based proficiencies to guide learning opportunities, expand access for all learners, engage educators in professional development, and assess continued improvement (Office of Educational Technology, 2010).

A constant evolution of technology will force legislation to continually adapt in order to remain relevant. The needs and skills associated with technology will evolve with new programs and applications surfacing every day, which will force administrators and legislators to continually reassess their standards and goals. Technology can only be an effective instructional tool if educators participate in the decisions to implement technology. Studies have shown increased efficiency and increased learning with technology integration in the classroom (Duncan, 2013).

Moersch (1995) provided a framework that describes the varying levels of technology integration known as the Levels of Teaching Innovation (LoTi) Framework (Figure 2). It measures a teacher's effective use of digital tools to promote higher-order thinking, engaged student learning, and authentic assessment practices in the classroom (Moersch, 1995). The LoTi Framework uses the principles of digital-age literacy established in the National Educational Technology Standards for Teachers (NETS-T) and outlines the different levels of effectiveness a teacher can reach with technology integration.

Figure 2

LoTi Framework



Note. This figure shows how the LoTi framework can be used to measure teachers' effective use of technology.

It is important to consider the steps that schools and educators take to implement technology into their classrooms. Even technology-rich schools struggle to integrate technology in ways that result in meaningful learning opportunities (Shapley et al., 2010).

Barriers to Technology Integration

Many variables contribute to the challenges of successfully integrating technology in a meaningful way (Pittman & Gaines, 2015). Poor infrastructure, access to devices, implementation plans, supports, and adequate training are among the main external barriers. Internal barriers include teachers' beliefs about technology, learning communities, and teacher efficacy (Ertmer & Ottenbreit-Leftwich, 2013). When leaders understand the stages of change, they are better equipped to support their teachers along the way (Fullan, 2009).

Students with strong technical skills increase their chances of gaining employment and advancing in their profession (Harris & Jones, 2019). This solidifies the importance for students to develop technology competencies in their coursework. A strong network infrastructure is essential to successful technology integration (Aruba, 2018). Inadequate infrastructure interrupts Wi-Fi connections; teachers and students rely on a strong Wi-Fi signal to access the tools and sites needed to complete an assignment. Technology is an expensive investment for school systems. Access to technology affects the way it is used and the frequency of use. As schools increase technology access to their students they must ensure the infrastructure can handle the demands of their population. Research on one-to-one programs indicates achievement gains across the curriculum and shows decreases in achievement gaps among groups with different socioeconomic backgrounds and learning abilities (McClanahan et al., 2012). One-to-one programs cannot be successful without a strong infrastructure. Unreliable infrastructures cause teachers to be reluctant to use technology (Davies & West, 2014).

System and school-wide implementation plans also affect the success of technology integration. Leaders who value the process of producing meaningful change provide their teachers with opportunities to collaborate with co-workers, set high expectations, and encourage risk-taking (Richardson et al., 2015). Time allotted for sharing, modeling, and exploring technology builds teacher confidence and capacity for successful technology integration. Providing teachers with opportunities to lead and learn from their colleagues supports and strengthens the change process (Fullan, 2009; Hall & Hord, 2001).

Leaders need to support their teachers throughout the day to troubleshoot technology glitches and malfunctions. Teachers are conscious of time and pace their lessons for maximum learning opportunities; having the support to immediately address any technology-related issues increases teacher confidence to integrate technology (Ertmer & Ottenbreit-Leftwich, 2013).

Adequate training or professional development on how to incorporate technology effectively has been a source of frustration for teachers. Most systems miss the mark on providing adequate training. The TALIS survey indicated that 40% of teachers have not received professional development training with technology; 20% responded that technology training was a high need (Schleicher, 2020). The research shows how professional development trainings using technology do not merely translate into meaningful technology integration. Teachers require professional development linking their knowledge of pedagogy to specific technology platforms and tools. Highly motivated teachers will find learning opportunities in virtual learning communities found on social media platforms (Jones & Dexter, 2018).

When school systems neglect to address external barriers, the internal variables can be negatively affected. Inadequate infrastructure, access, support, and training lead teachers to question the effectiveness of using technology in their daily instruction. Teachers apply proven

and effective strategies to teach their students. Their strategies are rooted in pedagogy and content knowledge. Teachers consider the time they are investing in learning new methods against the learning achieved and question whether or not to change their practices (MacCallum et al., 2014). Technology integration is a process and time is necessary for meaningful change. Fullan (2001) referred to an implementation dip as part of the change process. A dip in achievement or productivity may occur when changing the process in a daily routine. Remaining consistent with the practice will produce results.

Student Learning

Learning theories provide educators and administrators with a foundation to instructionally design the coursework for their students. When educators understand how learning occurs, they can blend that with the knowledge of standards-based content and design lessons that create meaningful learning. Schlechty (2009) found teachers who created meaningful and engaging work could align their instruction design to their students' motivations. Teachers strive to create meaningful learning in their classrooms. Engaged students connect to learning tasks in a more significant way than when they are ritually or intentionally compliant. Teachers motivate students by developing assignments that encourage ownership of learning.

An understanding of learning theories translates to teachers as they engage in professional development. According to the TALIS survey (Schleicher, 2020) professional development for teachers is more effective when it is continuous and content related. Teachers also need practice and feedback with sufficient time provided for follow-up. The survey showed that teachers who rated their job satisfaction and self-efficacy higher are more likely to participate in professional development activities. Learning theories give educators a framework to design instruction for knowledge. Ertmer and Newby (1993) referred to this process as

diagnosing the learning environment to include an analysis of learning limitations or barriers. A complete diagnosis can guide the prescription or instructional plan. When implemented correctly, aligning the instructional design with correlating learning theories provides educators with strategies that yield success. There are three main theories considered when designing the academic instruction of a course that illustrate how learning occurs: 1). behaviorism, 2). cognitivism, and 3). constructivism (Ertmer & Newby, 1993). The goal of each student learning theory is to take a complex process like learning and provide theories to accomplish it.

Behaviorism

Knowledge about student learning is essential to becoming an effective teacher. Of the three main approaches to student learning, behaviorism addresses the basic motivational influences on learning. This theory focuses on the use of repetition and reinforcement to achieve learning goals. A behaviorists' approach to learning includes instruction with opportunities to practice making the desired response. Responses are connected to reinforcement -- positive or negative -- and reinforcement guides the student's response (Schunk, 2020). Behaviorism outlines the progression of learning associated with observable and measurable outcomes. The teacher is central to the learning that transpires in this model. Behaviorism addresses the idea that learning is a product of responses aligned to stimuli, which is the feedback students receive to their answer. Learning goals are achieved through repetition and reinforcement. The level of understanding and meaning is artificial. This type of learning is linear and skills are dependent on mastery of other skills.

Cognitivism

The theory of cognitivism focuses on learning and addresses problem-solving. This learning theory stresses the process of learning over the outcome or response. The activities

include mental planning, goal-setting, and organizational strategies. This approach shifts the responsibility of learning to the student. Teachers move to a role of facilitation, as they provide tools for students to organize their knowledge. The feedback provided through this approach guides the student to form new knowledge. Students relate new concepts to existing ones and build new understandings. The cognitive learning design works best when teachers know their learners and the varied experiences they bring into the classroom (Ertmer & Newby, 1993). In the cognitivism theory, learning is considered a process focused on problem-solving. The process is more valuable than the product in this theory. The teacher transfers responsibility for learning to the student and allows them to build competency in organizing the information they receive to construct some meaning from it. Teachers value their students' different learning experiences and organize the instruction for students to build new understandings (Ertmer & Newby, 1993).

Constructivism

Constructivism is founded on the belief that meaning is created by experiencing and interacting with the world; it connects learning through practice and interactions as the learner combines everything to construct new knowledge. This theory states that knowledge continually evolves as new interactions are experienced. Constructing knowledge places learners in an active role while using the teacher to guide and facilitate the assimilation of knowledge. Teachers can provide cooperative learning opportunities for students to expand their perspectives by sharing with others (Ertmer & Newby, 1993). Constructivism allows environmental factors to contribute to the learning. These experiences can be constructed by collaborating with others who possess different views and perceptions. Instead of focusing on memorizing facts, constructivism focuses on developing student understanding through the world. This learning can occur regardless of prior knowledge because our knowledge is constructed (Ertmer & Newby, 1993).

Technology Integration

Using technology enhances learning in the classroom and students should be developing specific technical skills. However, the presence of technology does not always transfer to the effective or appropriate use of it (Davies & West, 2014). Successful use of technology is dependent on managing technology efficiently and overcoming the barriers most often encountered.

Technology integration has moved from having access to technology to implementing technology and understanding pedagogy and content knowledge. Earle (2002) outlined this change in thought by stating:

> Integrating technology is not about technology -- it is primarily about content and effective instructional practices. Technology involves the tools with which we deliver content and implement practices in better ways. Its focus must be on curriculum and learning. Integration is defined not by the amount or type of technology used, but by how and why it is used. (Earle, 2002, p. 8)

Technology Framework

Koehler and Mishra (2009) sought to identify a framework aligning technology to improve instruction and enhance learning. The foundation of teaching is rooted in the understanding of how learning occurs for students. Technology offers educators a limitless platform of tools with propensities to perform in specific ways. This sounds encouraging but teaching with the integration of technology often complicates the design of instruction.

Educators craft their teaching with extensive knowledge of pedagogy. Understanding how learning occurs, combined with content knowledge, lays the foundation for the planning and pacing of standards in subjects. Shulman's (1986) work outlined a framework supporting the

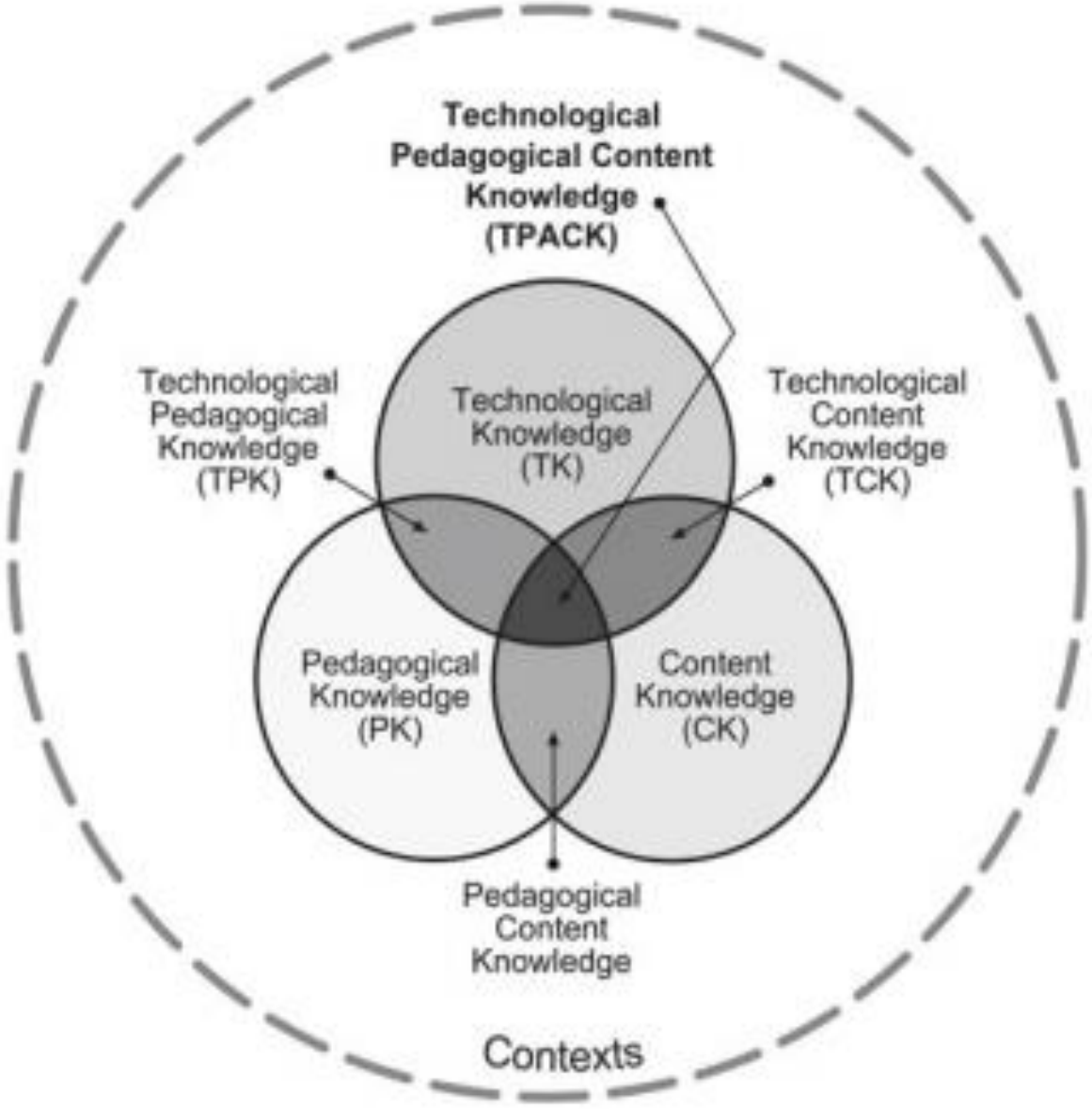
importance of pedagogical content knowledge (PCK) to inform and guide teacher education. He stated that teacher knowledge is the relationship between content knowledge and pedagogical knowledge. Shulman argued how the teaching profession was trivialized, and the intricacies of successfully performing their daily responsibilities were undermined His objection to the saying, "He who can, does. He who cannot, teaches" (Shaw as quoted in Shulman, 1986, p. 4) was countered by saying, "Those who can, do. Those who understand, teach" (p. 14). He outlined numerous categories of teacher knowledge that can be summarized as:

- General pedagogical knowledge, with special reference to the principles and strategies of classroom management and organization that appear to transcend subject matter.
- Knowledge of learners and their characteristics.
- Knowledge of educational contexts (ie. workings of the group or classroom, the governance and financing of school districts, and the character of communities and cultures).
- Knowledge of educational ends, purposes, and values, and their philosophical and historical grounds.
- Content knowledge.
- Curriculum knowledge, with a particular grasp of the materials and programs that serve as *tools of the trade* for teachers.
- Pedagogical content knowledge; the special combination of content and pedagogy that is uniquely the province of teachers -- their special form of professional understanding.

By expanding on Shulman's framework, Koehler and Mishra (2009) integrated technology knowledge to create a new framework of Technology, Pedagogy, and Content Knowledge (TPACK) (Figure 3).

Figure 3

TPACK: The Technological Pedagogical Content Knowledge Framework



This figure identifies the types of knowledge in the TPACK framework.

The TPACK framework blends three types of knowledge educators need for meaningful learning. Each strand of knowledge relates to the other and requires reciprocal actions. The related connections create new knowledge referred to as pedagogical content knowledge. This

framework provides teachers with a guide to use when designing instruction with attention to technology, pedagogy, and content (Koehler & Mishra, 2009).

Koehler and Mishra (2009) incorporated technology knowledge into the TPACK framework to show how the three are critical for technology integration to be meaningful and effective. Without this consideration in the design of instruction, technology would be used as a tool in isolation instead of as a tool that develops and extends the level of understanding. Technology can either inhibit or facilitate learning, depending on the application used for the activity. Teachers need knowledge of the limitations and benefits of various technological devices. They need to be familiar with the applications in order to choose the tool that enhances learning most effectively. Figure 3 is an illustration of the types of knowledge in TPACK and how they amalgamate.

These frameworks provide a plan of action to amalgamate technology, pedagogy, content, and knowledge. Shulman's (1986) research revealed that teachers have extensive knowledge of their students and how they learn. The integration of the two topics is known as pedagogical knowledge. They also have a multifaceted understanding of the content, which includes knowledge of the subject matter, theories, practices, frameworks, and misconceptions. Combining knowledge in these areas gives teachers a deep understanding of how students learn and best practices to develop the knowledge for mastery of the skill or content (Shulman, 1986).

Organizational Change

Although technology has become more prevalent in schools, some teachers are reluctant to integrate it into their instructional practice. This uncertainty is associated with a lack of confidence that the outcome will potentially jeopardizing teaching time and student achievement (Lei, 2010). Teachers are confident of the learning outcome with traditional teaching approaches

and are not willing to risk the loss of instructional time. Darby (2008) indicated a decline in teacher efficacy and motivation when the teaching formats experienced significant changes. Leaders must understand how to achieve organizational change.

The TALIS survey (Schleicher, 2020) indicated self-efficacy was highly predictive of how teachers engage in change processes. Leaders who develop their teachers' self-efficacy will have staff members who demonstrate less resistance to new innovations. The survey noted that self-efficacy was less about the individual and more closely related to the way they collaborate with colleagues.

Fullan (2011) described six secrets leaders use as a guide to empowering change for the organization's betterment. The secrets included love your employees, connect peers with purpose, capacity building prevails, learning is the work, transparency rules, and systems learn. Fullan was focused on achieving organizational change and energizing the members to engage in positive collaborations. He emphasized the role of the leader to prioritize knowledge creation by establishing and reinforcing routines for members to share knowledge. Leaders create purposeful interactions for people to engage in problem solving. Teachers engage in this same process to produce changes in their classroom.

Understanding the theories behind organizational change will help leaders and teachers to be mindful in their practice. Aligning their correspondence and interactions to transform the way they perceive technology begins the process; supporting the change process and encouraging risk-taking will produce more confident and knowledgeable teachers.

Chapter 3. Research Methodology

The purpose of this study was to examine teacher perceptions of changes in the instructional delivery and learning opportunities via technology during and throughout the COVID-19 pandemic from March 2020 until May 2021. The study was designed to investigate changes in the use of technology after a forced response to abruptly move instruction to an online platform. As educators move through this pandemic, they will evaluate past processes to determine what is necessary to preserve and adjustments to be made.

Research Questions

One central research question and five sub-questions guided this study. The questions were used to examine the experiences of teachers presented with a forced change of instructional delivery when schools moved from an in-person learning environment to an online platform. The study included how teachers used technology pre-pandemic and throughout the pandemic to identify themes in approaches to integrating technology.

Overarching Research Question

1. What are teachers' perceptions of the changes in the use of technology for instructional delivery because of the COVID-19 pandemic from March 2020 to May 2021?

Supporting Sub-Questions

1. How did technology use change (transition) across the different instructional platforms from the beginning of the pandemic in March 2020 to May 2021? a) in-person learning, b) hybrid learning, c) virtual learning
2. What internal factors influenced changes in the use of technology for instructional delivery?

3. What external factors influenced changes in the use of technology for instructional delivery?
4. How have the different platforms changed the approach to designing instruction with the use of technology?
5. How has the use of technology for instructional delivery influenced teaching strategies in the different instructional platforms? a) in-person learning, b) hybrid learning, c) virtual learning

Research Design

This research is a phenomenological study designed to examine how the COVID-19 pandemic affected the way teachers used technology to deliver instruction. Phenomenology is a research style designed to inquire about lived experiences in regard to a specific phenomenon using the participants' descriptions (Creswell, 2009).

The German philosopher, Edmund Husserl, is considered a fundamental contributor to phenomenology. He stated that personal realities are considered phenomenon. The goal of phenomenological research is to describe the phenomenon in an accurate way from the perspective of the people who encountered the experience. Moustakas (1994) described phenomenology as the way to find meaning from the shared experiences of a phenomenon. Judgments and biases are avoided during the process of data collection. A process of systematic data collection and analysis yields meaning to participants' experiences and feelings.

Researchers practice epoche before collecting data by describing their own experiences (Patton, 2015). The word epoche means to "refrain from judgment, to abstain from or stay away from the everyday, ordinary way of perceiving things" (Moustakas, 1994, p. 33). This practice identifies the researcher's genuine feelings about a topic. It is essential for the researcher to

relinquish biases. To maintain a clear portrayal, the researcher made journal entries throughout the data collection process describing personal feelings and opinions. This allowed the researcher to disconnect personal opinion of the participants' perceptions of the phenomenon.

Qualitative research is a valuable design for describing a phenomenon by using the voices, perceptions, and experiences of the participants (Austin & Sutton, 2014). This research method was chosen to carefully examine the experiences of teachers in using technology to deliver instruction before and during the pandemic. This method gives researchers an understanding of the phenomenon as others experienced it (Austin & Sutton, 2014). The researcher used a structured interview approach for data collection. The interviews were conducted one-on-one involving the researcher and each participant. The researcher used open-ended questions to direct the interview process. McMillan and Schumacher (2010) revealed the usefulness of in-depth interviews to uncover how participants interpret and view their experiences of a phenomenon. Patton (2015) stated that the purpose of open-ended questions was to help the researcher understand a participant's point of view.

This research describes the lived experiences of teachers using technology to deliver instruction before and during the COVID-19 pandemic. Teachers experienced an imposed change to the way they delivered their instruction when schools moved from an in-person platform to virtual at the end of the 2019-2020 school year. As schools formulated plans to reopen the next year, they were presented with an uncertainty of the format because of the virus spreading within the community. As schools experienced this uncertainty, teachers had to transition the way they delivered instruction across different platforms including virtual, in-person, and hybrid.

Site Selection

The researcher used fifth through eighth grade teachers from school systems in close proximity to one another. The schools shared regional commonalities regarding the number of COVID-19 cases that influenced school system decisions. The participants were drawn from six middle schools within the local school districts. This study used different districts to provide a variety of experiences from participants in different school systems. School leadership affects teacher expectations, autonomy, and support (Fullan, 2001). Teachers in different systems and schools are given diverse professional development aligned to system-wide and school goals. This variety of schools provides the research with diversity in the experiences received for continued education development, collaborative opportunities, and curriculum decisions.

Population and Sample

The research was conducted with teachers at middle schools in grades 6-8 in school systems located within a 30-mile radius. The researcher used four school systems to provide experiences from different systems with the phenomenon being studied. The teachers were core content teachers including language arts, math, science, and social studies. Core content teachers were chosen because of the regularity of meeting with their students throughout the school year. The researcher used a population of teachers that aligned with the purpose of the study (Patton, 2015).

The researcher used snowball sampling where future participants were referred by existing participants. Creswell and Poth (2018) wrote that this type of sampling finds subjects from reliable and willing participants. As part of the interview, participants provided potential participant names and email addresses. The researcher contacted the potential participants via email and informed them of the study. The researcher used this method in each school district.

Data from interviews provided experiences from multiple participants and revealed themes within and across four school districts. The sample consisted of 11 fifth through eighth grade teachers.

Participants

This study used purposeful sampling because phenomenological studies include participants who have experienced the phenomenon. Moustakas (1994) wrote that participants must have experienced the conditions of the phenomenon to qualify to be studied. The researcher used purposeful sampling to identify participants and informed them of the nature of the study.

The teachers in this study experienced a shift in their method of delivering instruction in March 2020 when schools closed to reduce the spread of COVID-19. Every teacher in a school experienced the same phenomenon of transferring their instructional platform. Although they shared this experience, teachers varied in their level of proficiency and efficacy with using technology to deliver instruction (Moser & Korstjens, 2018). Van Manen (2007) described phenomenological research as the practice of living. He said the practice of phenomenology intends to discover formative relations between being and acting.

Purposeful sampling allowed the study to be completed in-depth (Patton, 2015). To determine participants, the researcher identified general education teachers who teach language arts, math, social studies, or science within the different districts. An email was sent to potential participants in each of the systems. Once teachers agreed to participate in the study, they were asked to share the names of other teachers who may be willing to participate; 17 teachers were contacted to participate and 11 teachers agreed to be interviewed. Participants in this study were voluntary and had the ability to terminate their participation in the study at any point.

Data Collection Strategies

The participants received an overview of the research process and were informed about the interview date via email. Each participant signed an informed consent before the interview to ensure confidentiality. The researcher used one-to-one interviews that were conducted via Zoom to ensure the safety of participants in the study. Inductive probing during the interview provided opportunities to inquire about a subject to gain deeper understanding of the experience. The interview was presented as a conversation to build rapport and direct the conversation toward the research goals. The goal of one-to-one interviews is to gather teacher experiences through the phenomenon in their own words (Guest et al., 2013).

Once the interviews were completed, the researcher followed a debriefing procedure to address any issues pertaining to negative concerns for participating in the study. Participants were given an opportunity to make any changes to the transcript of their interview. The researcher used pseudonyms to protect the privacy of all participants. All data were stored electronically with password protection.

Data Analysis Strategies

The intent of this research was to gather data on the lived experiences of teachers when forced to change the instructional delivery of their academic content due to the COVID-19 pandemic. Participating teachers moved instruction to an online platform at the end of the 2019-2020 school year and began the 2020-2021 school year in a virtual setting. The teachers have transitioned across virtual, hybrid, and in-person settings through the 2020-2021 school year, depending on the risk of COVID-19 viral spread in the community. The teachers experienced the uncertainty of transitioning their instruction across platforms throughout the year (König et al., 2020).

The researcher interviewed each participant via Zoom, which allows recordings and provides the host with a transcript of the recording. The researcher read the transcript to ensure accuracy of words; changes were made when necessary. Hammersley (2000) stated that phenomenological researchers cannot separate from their own opinion. It was important for the researcher to ensure accuracy of the transcript and not add to or take away from a participant's wording.

Transcripts were sent to participants for verification and any changes were made. When the transcripts were approved, the researcher imported the transcripts into a qualitative data software program called MAXQDA to code the text from the interviews. The first part of coding text identified words or short phrases that assign an attribute to the language in the interview. The codes provided a description or summarization of the data. The researcher looked for patterns in feelings and behaviors toward change. The patterns identified similarities, differences, frequencies, sequences, and causation. Charmaz (2006) identified initial codes as temporary, relative, and based in the data transcripts. The researcher provided a description of the events and stated the meaning.

The researcher performed multiple rounds of coding to identify categories, themes, and concepts. Open coding involved examination of each line of text to identify more significant themes. The researcher used the constant-comparative method to determine more extensive data analysis (Chun-Tie et al., 2019). This method requires that researchers are meticulous when analyzing the language and refines the codes by relabeling, aligning, or rejecting initial codes.

Assessment of Quality and Rigor

Methods for increasing trustworthiness included triangulation, member checking, and prolonged engagement. Credibility ensures that the participants' experiences are shared and

documented. Through theoretical triangulation the researcher provided participants with copies of interview transcripts to review and approve. The approval safeguards against inaccurate reporting and provides and additional layer of accuracy for the research (Hendricks, 2006). Purposeful sampling provides rich data to describe the effect the pandemic had on teachers with the use of technology to yield new understandings (Patton, 2015).

Transferability suggests that the research is generalizable and there are similarities between situations (Patton, 2015). The findings from this research may guide other research in this topic. This research can identify ways teachers engaged and approached the change process and ways school systems can better prepare teachers for changes in their practice.

Dependability increases trustworthiness with the development of clear, deep descriptions of the data (Moustakas, 1994). An audit trail was left with a collection of data to establish credibility. Triangulation was also used to determine dependability. The researcher established confirmability through careful documentation of the process used in conducting the research. This documentation outlined the steps for the research to be corroborated (Patton, 2015).

Ethical Considerations and Role of the Researcher

Ethical considerations are a priority when conducting human research. Participants reviewed the interview transcripts and made clarifications or modifications to any section they felt misrepresented their beliefs and ideas (Creswell & Poth, 2018). Moustakas (1994) wrote about the importance of outlining clear agreements with participants by maintaining confidentiality and informed consent and outlining clear procedures of the nature, purpose, and requirements of the research. Data were collected after approval from the IRB at East Tennessee State University. Participants and research sites were referred to using pseudonyms.

Chapter Summary

Chapter 3 outlines the methodology used in this phenomenological qualitative research study on COVID-19's affect on how teachers used technology to deliver instruction. With mandated school closures, teachers were confronted with forced changes to the way they delivered instruction at the end of the 2019-2020 school year. As the new school year started, teachers found themselves moving across platforms to teach their students. This study examined the changes teachers experienced in their profession due to COVID-19's influence on school systems. This chapter includes information on the data collection process, data analysis, and assessment of quality. It also addresses the assessment of quality and rigor and the ethical considerations of the research. Chapter 4 presents the results.

Chapter 4. Findings

This study examined teacher perceptions of the changes in the use of technology for instructional delivery because of the COVID-19 pandemic from March 2020 to May 2021. The findings provide descriptions of teacher experiences and perceptions of the use of technology to provide learning instruction and practice during the phenomenon of the pandemic. Teachers were forced to use technology during this pandemic when schools moved to an online platform in March of 2020. As the school year of 2021 started, school systems entered the year with a variety of platforms to serve their students. The researcher interviewed teachers from school systems within close proximity. These school systems were affected in similar ways from COVID-19 regional rates of infection. Infection rates influenced the systems' decisions in determining how to conduct school in the safest way for their populations.

The researcher interviewed teachers from different systems to provide insight into how the different systems made decisions on the platform to instruct students. Moving from in-person instruction to virtual or hybrid changed the way teachers used technology for their instructional delivery. The researcher used a set of open-ended questions to conduct the interviews via Zoom, which provided the researcher with a transcription of the interview. The researcher reviewed the transcription and made changes to ensure accuracy. Participants were provided a copy to review and they were encouraged to amend any part to achieve a correct portrayal of their experience and perception.

This study was guided by a central question: What are teachers' perceptions of the changes in the use of technology for instructional delivery because of the COVID-19 pandemic from March 2020 to May 2021? The open-ended interview questions were created to acquire

descriptions of experiences and perceptions of teachers to answer five sub-questions research questions:

1. How did technology use change (transition) across the different instructional platforms from the beginning of the pandemic in March 2020 to May 2021? a) in-person learning, b) hybrid learning, c) virtual learning
2. What internal factors influenced changes in the use of technology for instructional delivery?
3. What external factors influenced changes in the use of technology for instructional delivery?
4. How have the different platforms changed the approach to designing instruction with the use of technology?
5. How has the use of technology for instructional delivery influenced teaching strategies in the different instructional platforms? a) in-person learning, b) hybrid learning, c) virtual learning

The different instructional platforms include in-person (all students are attending in a school building), hybrid (students are attending in-person and virtually simultaneously), and virtually (students are attending from a different location, typically home).

This study used the framework of Fullan's (2001) Change Theory to identify the stages of change and variables that influenced or hindered changes in the use of technology for instructional delivery. The purpose of this framework is to provide an overview of capacities that influence change. Leaders and teachers know that change is hard and complex. Understanding the process to engage in change provides leaders with a blueprint to tackle the intricacies of the task (Fullan, 2001).

Fullan (2001) indicated the key aspects of change are moral purpose, understanding change, building relationships, knowledge building, and coherence making. These pieces are not linear in relation but interconnected in producing lasting change. Moral purpose encompasses the direction and goals of the organization. Schools align their decision-making process to their vision and mission. Wiggins and McTighe (2007) recognized the importance of a school mission to design and adjust plans according to the identified long-term goal.

Technology integration has been a part of the curriculum since the early 2000's, yet some teachers still have not made the change to integrate technology into their instruction. The COVID-19 pandemic changed that for all teachers. In March of 2020, teachers across the world were forced to use technology as a tool for instructional delivery when schools closed their doors as an attempt to slow the spread of the COVID-19 virus. Teachers took to virtual platforms to meet with students, deliver instruction, organize, and assign learning activities.

Integrating technology in the instructional design of content curriculum involves a deep understanding of more than just technology. Mishra and Koehler (2006) created a framework to outline the categories of teachers' knowledge to integrate technology in a meaningful way. Their Technological, Pedagogical, and Content Knowledge framework is referred to as TPACK and classifies three stages of knowledge to indicate levels of technology integration. The framework considers the teachers combined understanding of technology, pedagogy, and content knowledge. This study collected experiences of teachers when determining what type of technology to use for instructional purposes.

The researcher used Snowball Sampling to identify participants for the study. Teachers were contacted via email with an overview of the study. Teachers who participated were asked to recommend other teachers who may be willing to participate. Emails were sent to those teachers.

There were 17 teachers contacted to participate in the study. 11 agreed to participate in the study. Teachers were assigned a participant number and a letter to represent their school system (A-D).

Fullan (2009) recognized how change in an organization is unavoidable. When organizations use positive forces of change to their advantage, the organization experiences growth and development. The COVID-19 pandemic has forced change on the way teachers use technology to deliver instruction. The themes that emerged from the analysis of data in this study were

1. Forced change.
2. Maintain learning.
3. Necessity.
4. Adaptation.
5. Organize content.
6. Supplement learning.
7. Monitor learning.
8. Resource.
9. Feedback.
10. Engage learners.
11. Moral purpose.
12. Teacher beliefs
13. Learning communities.
14. Teacher efficacy
15. Implementation plans.
16. Training.

Overarching Central Research Question

What are teachers' perceptions of the changes in the use of technology for instructional delivery because of the COVID-19 pandemic from March 2020 to May 2021?

Sub-Question 1. How did technology use change (transition) across the different instructional platforms from the beginning of the pandemic in March 2020 to May 2021? a) in-person learning, b) hybrid learning, c) virtual learning

The COVID-19 pandemic was a driving force to changes in education when it presented teachers with the dilemma of transferring their instruction from an in-person platform to a virtual platform in March of 2020. The instructional delivery transformation teachers experience was immediate and imperative. Fullan (2007) states the change process requires time to achieve goals. Time was not in abundance when teachers were presented with the need to transfer their instructional delivery to a virtual platform. The themes that emerged from the analysis of data were forced change, maintain learning, necessity and adaption, organize content, supplement learning, and monitor learning.

All 11 participants ended the 2020 school year in a virtual platform. Teachers were asked to describe the timeline of instruction from March 2020 until May 2021. Teachers from School Systems A, B, C, and D maintained some level of instruction through online communication applications. Expectations varied among school systems and even across schools within the same school system.

P1A remembered moving virtually quickly and "still just using basically what we wanted and what we were comfortable with when we went through the pandemic." He felt like "no one had an idea of what to do." He used Google Classroom to organize class work and also used Legends of Learning. He has not used Legends of Learning since.

P2A stated her school shut down after spring break. “We had the week after that to prepare everything. So, we switched from fully in person to hundred percent to all right, we’re now using Google Classroom; Google Hangouts, Google Meets, Zoom. That’s when Zoom took off.”

P3A said “basically within a week’s time, we drove straight into teaching online. I was doing daily lessons online and then teaching like one Zoom time a week.”

P5B shared how their school went virtual and asynchronous for the remainder of the year. “We would just put-up assignments for the week and have a couple of team meetings during that week, so it was no formal teaching online.”

P6B stated the transition left teachers “scrambling to learn a new job, new traits, a skill, because you know that’s a whole different career basically.”

P7C said,

> Monday they said you’re not coming back. So, it was a big shock. Last year was my 28th year in the classroom. And ZOOM was a four-letter word, I was terrified of it. We had been introduced a little bit to Canvas. Some of the younger, newer teachers had really taken to it like a duck to water. Some of us older ones we’re kind of saying yeah that’s really not what we need, I just need the kid interaction. So, after spring break, we were told that we needed to use Canvas and Zoom if we were comfortable. I did Zoom a time or two.

P8C remembered feeling like they “were kind of on hold and kind of seeing what was going to happen.” Teaching via Zoom at first was optional for many teachers. Once the school realized they were not returning to school “we got into work. We started doing

the packets and sending things out. I started scheduling for Zooms for my different classes, because they're on such different levels."

P9D shared the shock and uncertainty of school closures. She stated,

> You know from there we're all trying to figure out what to do. There was no real set directive on, you know, do students go to class, do the students have to come to class are they required, not required. Basically, we were given a directive of create some activities, create some instruction that the students can access online in their own time. So, it wasn't a lot of interaction, I guess, between March and May. Luckily, we already had Canvas you know, we were one of the fortunate ones. All of our kids already have Chromebooks. All our kids have access. So, we were full speed ahead, I met students twice a week, did several games with them online through like vocab.com and different activities. So that was getting us through to the end of the 2020 year.

P10D shared that she,

> used Google Classroom in middle school. The kids had kind of already been dabbling in it, because sixth grade had Chromebooks so we were at an advantage, our students were already familiar with it. So, we just assigned things using the Google Apps. We used Google Slides. We used Google Docs. I was using NearPod, so that was also helpful.

P11D said,

> When schools shut down, we moved instruction online. It was a quick shift and there was little guidance from administration about what was expected. There was a disconnect between teachers maintaining instruction and not being able to hold students accountable. Grades could not negatively impact students so we were forced to accept anything from our students. It definitely made entering the new school year challenging.

The themes that emerged from the responses in this section were forced change and maintain. The shift from in-person learning to virtual learning was immediate. There was minimal time and direction for participants to change the way they delivered instruction. P9C stated “we were all shifting. You know from there we’re all trying to figure out what to do. There was no real set directive.” P6B shared how it went “suddenly” and “without any warning.” P1A shared how the teachers at his school did “what we wanted and what we were comfortable with.” P3A maintained “daily lessons online and then teaching like one Zoom time a week.” P7C shared that she only “did Zoom a time or two.” Each of the participants responded with using a communication application to provide instruction. Technology was used as a tool to maintain communication and as a way for some participants to organize their content and assignments.

Each of the school systems held school virtually for the first 3 weeks. After the first 3 weeks, school systems made decisions about their platforms based on the needs of their schools. School system A moved into a hybrid teaching model after the 3rd week. Hybrid in schools from the A system were organized in four groups. Two of the groups attended in-person on Monday and Tuesday while the other two groups attend in-person on Thursday and Friday. The groups not attending in-person would complete assignments entered on their web-based Learning Management System. Teachers were not expected to interact with students via an online communication application while they were holding school virtually. Wednesday was an asynchronous day of learning for all students and it allowed for additional cleaning without students attending in-person. This schedule also allowed schools to adhere to the six-foot social distancing requirements outlined by the CDC.

School system B held school entirely virtually for the first 3 weeks of the school year. From there they also entered a hybrid model for attendance where half the students attended in-

person on Monday and Tuesday while the other half attended in-person on Thursday and Friday. Wednesday was an asynchronous day in which teachers uploaded assignments to the Learning Management System. Some teacher's video recorded instructional lessons with assignments. All students were invited back to school during the second semester. At that time system B required their teachers to deliver instruction to both groups each day. Participants would use Google Meet to include virtual learners while instructing in-person learners.

School system C provided an online school for students who wanted to be virtual learners during the 2020-2021 school year. Schools had assigned teachers for in-person learning and virtual learning. This school system held school virtually for the first 3 weeks and then moved into a hybrid model in which half the students attended in-person on Monday and Tuesday while the other half attended in-person on Thursday and Friday. Wednesday remained an asynchronous day where assignments were uploaded to the Learning Management System and students retrieved them on their own. One of the schools in this system moved back to full in-person learning in October. The other school did not return to full in-person until the middle of the 3rd quarter. Quarantined students were able to access their assignments online while teachers were not expected to include them in the daily instructional delivery via an online communication application. Teachers were expected to post their assignments daily.

School system D held school virtually for the first 9-week grading period and then moved into the hybrid model with half of the students attending on Monday and Tuesday and the other half attending on Thursday and Friday. Wednesday was an asynchronous day in which teachers posted work and video recordings for students to learn from virtually. Participants from this system were expected to teach to both settings, in-person and virtual, simultaneously. This

system moved to full in-person during the 3rd 9-week period, but still allowed students the choice to remain virtual. Participants taught in-person and virtually for the remainder of the school year.

Participants used technology differently across the different platforms during the 2020-2021 school year. As participants adjusted to the platform, their need for technology changed. Participants were asked to describe the timeline of instructional delivery in the school system that occurred from March 2020 until May 2021. They were also asked to describe the circumstances that contributed to the implementation of new technology in your teaching assignment.

In-Person Learning Platform

All 11 participants discussed using technology to post assignments and links to learning websites on their Learning Management System in this platform. Participants indicated having a place to organize their assignments was helpful for students. Eight participants also shared that technology should be used as a supplement to the teacher instruction when students are in-person. The researcher asked the participants to describe the circumstances that contributed to the implementation of new technology in their teaching assignment and to give their professional perception on the relationship between technology and student learning? The themes that emerged from the data were technology used to organize content and as a supplement.

P1A said, “I think technology is great for keeping all the assignments organized. Canvas made it easy to store assignments, access things, you know. It was useful in person and virtually.”

P2A shared how he “maintained everything putting on Canvas.” He said Canvas helped to “simplify things” for students to access. When students were in person, he “got away from

using (technology) as much," but continued to use programs like Quizizz, YouTube, and NearPod as a supplement to his instruction.

P4B discussed using "the same technology when 'she' moved back to in person learning. They were too good not to use." She shared about Canvas being "a great way to keep everything stored." She also stated that technology is "simply another resource for us to use, but we're still dependent on the teachers for high quality instruction." She discussed using technology applications as "purely a resource to help with instruction, not actually give the instruction."

P5B described using Canvas as a way to "build my course and make adjustments." She said she "will use this forever or until they buy a new one we have to learn." When it comes to technology in the classroom, she said "there is definitely a time when there's too much technology." She shared how students "still need the teacher there without a computer."

P7C will also continue to use Canvas as a tool to organize content. She shared how she "could build lesson plans, link videos, link parodies" and have all the resources in one place. Canvas eliminated making "caboodles of copies" and that will be something she continues when she returns.

P8C said that she will use Canvas to adjust her lessons plans in the future. She has used Canvas for many years and will continue to use it as a tool to organize her content. She discussed continuing to use "digital escape rooms" as well as "IXL's and Study Island" to supplement student learning. When teaching in person she will continue to use "paper and pencil" when possible.

P9C shared that it is important "to find that balance" when using technology in the classroom. He said students need have time "away from the technology." When students are in

person, P9C plans to give students “time to question, that time to just sit and chat and sit and discuss.” He plans to let students “sit and write with a pencil and pen.”

> P10D discussed using technology in-person to supplement student learning. She said,
>
> I definitely like the math practice program that I’ve been using with the Aleks program. It’s good skills practice, that’s really all it is. It doesn’t go deep into the math, but it’s good procedural practice. I also like the Google Apps because everything is saved on Google.

P10D also shared how she used technology programs to support learners. She used “programs and things that will read the audio to students and that will allow them to record themselves.”

P11D described how she used technology in person as a way to supplement the learning. She “would show them a video clip” and compare it to the text to find comparisons. She believes “a lot of imagery is needed to show them concepts from different cultures” and technology can supplement those concepts in Social Studies.

Hybrid Learning Platform

The researcher found that participants in system A and C were not expected to maintain live instruction for virtual learners when these participants taught in a hybrid platform. Participants in systems C and D were expected to communicate and present instruction in a live format with students attending in person and virtually. The researcher will highlight the experiences of participants in systems B and D in this section. The themes that emerged from the data include technology was a necessity, it organized content, and it provided a way to monitor learners in two settings.

P5B shared,

> So we were using Microsoft Teams, so they were on a team's meeting and I would just turn my computer so that with the camera they saw the rest of the class and then of course we had everything on Canvas so they followed along on Canvas and then I shared my screen a lot. That's how we did it. Canvas is such a great way to keep everything stored. It allows me to build my course and make adjustments.

She used technology to "get my virtual learners and the ones that were in class to work together at the same time." She used technology to engage her learners. She shared,

> I wanted to find ways to for students to discuss ideas. Flipgrid got my students excited about answering. They acted like it was their social media of the classroom. So, I tried, a lot more of those types thing that I had not done before.

P6B discussed her hybrid teaching setting. She shared,

> But then when we did come back, we were probably at this point, down to maybe about five or six remote students. And that's really how it stayed. By the end of the year, you know, we stayed with the option through the end of the school year and by the very end, we were down to two students remote by choice.

She shared that teaching in this platform

> …definitely made it trickier when you're thinking about your lesson plan for the day because you didn't want to leave either group out. For the ones in person, I also a lot of times I tried to eliminate them being on the laptop constantly so I tried to do some things that they could see from my board, and I could screen share with the ones at home, but one of the best ones, I found was NearPod. Because I could go through a lesson and you

know you can see in real time. It was really hard you know with everybody being on a screen.

P6B used technology to monitor learners. She shared,

> So, when you do NearPods and I delivered my lesson on NearPod, I could see who wasn't participating. I could see who wasn't answering questions; who wasn't going to the next slide. So, I think that was probably one of the most useful tools during this crazy time of doing both. Because you could see, in real time, the digital kids and the kids in person and whether they're following along or not. And that immediate feedback piece, you know you can do the hand raising.

P10D described how she used technology in a virtual setting as a way to monitor learners. She shared that she used Desmos during math instruction so she could "see what kids are doing in real time." She used NearPod "mostly for science, just to try to keep them engaged" and for the "interactive features" that serve as a way to monitor them through the lesson. These technology applications help provide a learning environment that is "equitable for all of the kids."

P11D used technology out of necessity while teaching in a hybrid model. Technology allowed her to "meet some of (her) students' needs that maybe are different types of learners and can benefit from doing things that you can do video, you can do orally." She also described using technology as "an engagement part for kids."

Virtual Learning Platform

Each of the 11 participants discussed using technology as a way to communicate, organize content, and provide instruction. The theme that emerged from this data was technology

use was a necessity to the instructional delivery in a virtual platform. Adaptation was also essential to the use of technology virtually.

P1A said that technology use "just goes back to the pandemic." They were forced to move instruction to a virtual platform, but technology allowed him to "still (be) able to make our own or create our own lessons or this and that, now like what we normally have." He said,

> When students were virtual, I used technology out of necessity. It forced me to find ways to create assignments. Google Apps were great for that. I could turn any worksheet into a virtual assignment. The feedback part of the assessments were great. You got to see how they did quickly if you picked that option when making them.

P2A had experience using technology in his instructional delivery but said,

> We've had a lot of technology training opportunities, but nothing could have prepared us for moving everything to online. The hardest part was trying to teach the kids to use it while we were trying to figure out how to use it.

P2A also discussed the difficulty of starting the school year in a virtual platform. He said,

> And if the technology could be used face to face when you're with them, I think it could be more effective. I don't think it's anything that's going to go away. I think that technology is going to be where it's at.

P3A taught her students in a virtual platform the entire year. She said the forced change in using technology for instructional delivery "made (her) a better teacher" and that was a "positive about this year." Teaching in a virtual platform "was just adapting lessons" and learning "how the heck can I make this virtual. She said,

> Teaching virtually really forced me to narrow my focus. I had to look at the standards closely to see what I was supposed to teach and then I had to be really careful to pick technology that would make that learning happen.

She also shared a challenge with teaching on a virtual platform. She said,

> So that's the problem with using technology virtually. Sometimes you think things are going well, at least you think they are, and then you find out that kids aren't seeing it the way you meant for it to be. Technology is a tricky tool. It can be so helpful to really pull the kids in and it can be so frustrating that kids just give up.

Toward the end of the year her use of technology moved to "more rote learning." She shared,

> I can see now how powerful technology could be when you have the time to show kids how to use it in person. You can be there to troubleshoot anything that went wrong. Being in person could be so powerful. You could just present the instruction, then add videos to dig deeper.

P6B shared about her use of technology when students were virtual. She said,

> And so that's kind of how that transformed, but just by necessity. I had to figure out how to transfer my worksheets into editable ones. Google Apps were great for that. I could take a pic of a worksheet then upload it and add text boxes. They were getting the same thing and I wasn't having to worry about copies. This was good. The assessments I made on Google Forms were great because I didn't have to grade them. It may have taken me a little time on the front end, but long-term it makes my life easier. Virtual notebooks were also so helpful because students could access them from anywhere. There was no reason someone wasn't prepared for the test. Access was always there.

P7C discussed using Canvas. As she became more "efficient and proficient" she was able to build lesson plans in that application.

P8C used technology to "communicate with (her) children with Zooms." She was familiar with Canvas when she taught summer school online. She already had a course set up in Canvas that she could use as a base to build lessons and units.

P9C described how he liked having Canvas as a way for students to "log in and interact with us still and still do the same work, and still have the same expectations." He used Canvas as a technology tool to organize content. Technology provided a way for him to give assessments and both the teacher and student could get "instantaneous feedback."

P10D used technology in this setting as way to maintain instruction and communicate with students. She would "Zoom with students each day" for content instruction. Students were able to access their assignments and resources through Canvas. She discussed how she was expected to transfer learning from paper and pencil to virtual and "Google Apps were helpful" for this process.

P11D used technology in a virtual platform to organize content through Canvas. The content previously used was worksheets. She discussed how she was not allowed to create packets for students so she "would have to convert, put everything into Google Slides."

Sub-Question 2. What internal factors influenced changes in the use of technology for instructional delivery?

There are many obstacles teachers experience when integrating technology in their classroom. Ertmer and Ottenbreit-Leftwich (2013) identified variables that contributed to technology integration in schools. They distinguished between the type of barriers that influence a teachers' use of technology. The barriers include internal and external factors. Internal factors

that influence change within a person are considered to be intrinsic. These factors are within a person's personality, motivation, beliefs, and actions. Teachers shared internal factors that may contribute to their willingness to change the way they use technology in the classroom. The researcher asked teachers to describe professional development opportunities they have experienced. Teachers were also asked to describe circumstances that contributed to the implementation of new technology in their teaching assignment. The themes that emerged from this section were teacher beliefs, moral purpose, learning communities and teacher efficacy.

Teacher Beliefs

Each of the 11 participants spoke about their use of technology in the classroom. Teachers who used more technology shared how technology was an important tool for learning. P4B had been provided tech trainings from her previous school district. She was considered a teacher leader in which she participated in technology trainings and would redeliver that instruction to teachers in her schools. She was confident in using technology and helping others to use it. P10D described her use of technology in the classroom pre-COVID-19 as minimal stating, "I don't really like kids being on screens, because I feel like that's what they do in their free time. So, I really try to use it as little as possible."

Moral Purpose

Moral purpose was found when teachers knew that the daily instructional practices they engaged in before moving to virtual teaching had to be adapted to ensure students were learning. Each of the participants indicated a reflective mindset to find ways to transform the way they instructed in-person to online.

P3A believes this year made her a better teacher. She said,

> I think it really made me a better teacher because it made me get out of my rut, and it made me go: What is that absolute like bare minimum thing? I didn't want to do an activity where a student can get lost.

She shared about how science experiments can appear to be so engaging, but oftentimes students walk away from them without learning anything. She became reflective in her practice to determine if the activity she was designing met the standard's objective. She started analyzing the technology she was using and deciding if it was necessary to teach the standard. She found that the Odysseyware program selected by her system did not align with the standards. As the year progressed she found her students to be "missing a dialog that is so necessary in every content, but especially in science." With a virtual setting, students were not getting to engage in discussions with questioning and debating. This prompted her to design discussion boards for "writing assignments and CER's and at home experiments and data collection." P3A was reflective in her practice. This reflective practice helped her to adapt her instruction with the use of technology.

P6B knew she was going to have to redesign routine tasks such as collecting work. "That's when we started learning how to upload documents, how to upload documents and keep virtual notebooks they could write on and they can see the notes that I gave them in class. And so that's kind of how that transformed, but just by necessity."

P9C referred to himself as a paper-pencil type. He stated, "I've had, we have all had to really adapt how we present and how we give assignments and how things are turned in." He shared that Google Docs was the first technology tool his students learned to use in class. He

adapted his approach to using technology because of the activities students needed be able to create for meaningful learning. He said,

> One thing I really started doing this year that I haven't done before was a virtual journal. So typically, I have a spiral notebook you have to bring and we cut and paste and cut and paste. I'm a Dinah Zike fan. I love all these foldables. Trying to figure out how to do that, when kids are sitting at home, or kids are quarantined at home it was insane. Creating a virtual notebook took some practice, but it turned out to be a beautiful thing.

P10D said when considering technology use in the classroom she included differentiation as a driving factor. She said,

> Probably differentiation, I think that technology has really helped with different differentiation. Like the adaptive program so kids can learn at their own pace, they can accelerate, they can go back if they need to because it keeps assessing their progress. It doesn't let them move on unless it knows they got it so that's something that like early finishers can do.

P11D believes imagery is needed to teach concepts from different cultures. She does this with the use of photos and videos embedded in the learning activities. She started the year using Google Docs and Slides where kids were able to respond and record their learning. This tool was adapted from the beginning because students would alter the original tool, Google Docs or Slides, as they input their responses. She learned to set the background as an image and then provide comment boxes to insert text. Adapting her teaching was important to provide engaging and meaning learning opportunities.

Learning Communities

All 11 participants shared the importance of their informal professional development. They shared examples of learning communities found online through social media platforms and in-person with their own colleagues. The informal professional development was relevant to their daily practice.

P2A shared how he learned a lot of technology on his own. He used groups on Facebook and Instagram when looking for ideas. He enjoyed working with his colleagues because "we know what we're seeing. What's working and what's not working. Whereas other folks, you know district wide, or even from our administration, they had no idea. They didn't understand. They weren't dealing with it day to day."

P4B was motivated to learn new things. She shared how she "did a lot of individual webinars that I sought out myself." She also used social media like Facebook groups. She described one group as "amazing because everyone shared every digital copy they made of something, and that was probably the biggest savior for this whole pandemic." She also spoke about her colleagues and how they shared ideas and resources. The curriculum coach also influenced her decision to use a technology tool called Desmos.

P5B shared how the formal trainings helped her to become better at using the technology tools, but that social media groups "actually helped me better to help my kids." These groups gave her the resources and strategies to design the lessons using technology that her students needed. Colleagues were also helpful in sharing resources and ideas.

P8C stated how her colleagues were helpful with supporting her use of technology. She stated, "There is just a lot of collaboration between each other and reaching out and helping each other."

P10D stated these online groups were the most supportive because the teachers sharing in the groups were knowledgeable of what happens in the classroom and can share resources and tools that have proved to be successful. She took the initiative to find trainings to develop technology skills on her own. She shared,

> (I found) technology training on my own. I've just looked up a lot of videos on YouTube, joined a lot of Facebook groups. Facebook groups for Jamboard for Google Apps. Alice Keeler. I think it's Alice Keeler. She's like this big Google guru for educators. Really that's where all of my training came from was YouTube and Facebook teachers.

P11D shared how "we have to find all the information on our own." The teachers at her schoolwork together to share materials and resources. She said, "It's a lot of our own time spent researching, personal time spent researching." She finds resources online through blogs, Teachers Pay Teachers, and internet searches.

Teacher Efficacy

Teacher efficacy describes their confidence in using technology. Teachers who were more confident with technology use were not resistant to trying new tools. Teachers who were less confident would use tools for management and rote learning.

P1A indicated he was "pretty confident" with his use of technology. This confidence allowed him to try new things. "I guess I'm more tech savvy than I've ever been. I'm still learning every year or every day when I'm in school for sure."

P5B attended the Future of Education Technology Conference in Florida and became a Microsoft educator. She has trained teachers at her school. This knowledge of technology contributed to her willingness to learn new tools for instructional delivery.

P6B stated that she had to move her instruction to online so she "started self-teaching using a lot of YouTube videos." She was motivated to learn the material.

P7C was starting her 28th year in education and she said "ZOOM was a four-letter word. (I) was terrified of it." She indicated that she was not comfortable using technology for her instructional delivery. She shared that new and younger teachers were willing to use technology. She described her use of technology in her instructional design as minimal. She used IXL and Brain Pop in the classroom and she avoided Canvas until this year. Necessity is what contributed to her use of technology.

P8C has served as a technology leader in her district where she attends trainings and serves as a support for teachers in her school. She taught an online summer school course for the past two years. She felt that gave her "an advantage to setting up (her) Canvas course." She explained how that opportunity gave her "the skills to feel comfortable" in creating her units for Canvas.

P10D also shared a reason for not wanting to use technology in the classroom was due to not wanting to use it ineffectively.

P11D used the word moderate to describe her use of technology in the instructional design of her content. Technology was used as a tool to support and engage learning.

Sub-Question 3. What external factors influenced changes in the use of technology for instructional delivery?

Ertmer and Ottenbreit-Leftwich (2013) also addressed the external factors that influenced teachers' use of technology for instructional delivery. External factors are considered things that are out of the teacher's control. They are imposed upon the teacher with little consideration. The teachers were asked to describe the timeline of instructional delivery in the school system that

occurred from March 2020 until May 2021. They were also given an opportunity to describe the circumstances that contributed to the implementation of new technology in your teaching assignment. The emergent themes found in this data were forced change, access to devices, implementation plans, and trainings.

Forced Change

All participants indicated the forced change of moving the instructional delivery from in-person to online greatly influenced the fact that they had to use technology. Technology was a necessity at this point. There was no other way to organize the materials, assignments, and assessments with students being in different platforms. Each of the 11 participants expressed how the use of technology for instructional delivery was influenced by the pandemic and the forced expectation of moving instruction from in-person to virtual.

P1A explained how the time frame of moving instruction from an in-person setting to entirely online happened suddenly. He stated, “The timeframe was very small, as far as adjusting from Odysseyware to Canvas.”

P2A stated, “It wasn’t much of a choice you know, we had to switch gears.”

P3A shared, “If I’m remembering correctly, basically within a week’s time, we drove straight into teaching online.”

P7C specifically remembered, “…the Friday before spring break we took a field trip to Quantum Leap. Everybody had a great time. We went home and on Monday they said you’re not coming back. So, it was a big shock.”

P9C stated that the forced change to move instruction from in-person to virtual left everyone “trying to figure out what to do.”

P11D moved her instruction to online because of the forced change. She said,

> Well the circumstances were the students were remote… In order to interact with student it either had to be verbal or you had to convert anything you wanted them to answer or write about into a Google Doc of some sort.

Access to Devices

When moving to a virtual platform, teachers had to have devices to make this transfer of platforms possible. All participants indicated students had access to a device they could use at home for instructional purposes.

P3A shared, "So, our school system is already one to one, student and laptop, so we were able to transition easier than some others, because they already had access to these laptops."

P5B indicated their students were prepared for moving into a virtual setting.

> I feel like we were already very prepared. All of our kids grades four and up had computers already. We were already using Canvas. The group that I had when we all went virtual March 2020 was the group I had looped with. And so, for over a year and a half we had already been using Canvas and they were using Google Slides to make presentations and they were doing it cooperatively, you know in different houses. I mean they were already working on things live together, so it made it really easy to transition into this last March 2020. I felt like I was already prepared with everything.

P7C felt her students were able to make the transition easily from access to devices and area support with internet access. She stated,

> This school system is amazing, starting with our assistant principal, the principal, central office, we were given every single tool that we could possibly have needed. From the kids having Chromebooks, hotspots, because a lot of the areas don't have Internet. Let

me rephrase that, families didn't have Internet so they were given hotspots. Just every single communication device that you could think of and training as well.

P9C said, "Luckily, we already had Canvas you know we were one of the fortunate ones. All of our kids already have Chromebooks. All our kids have access. So we were full speed ahead."

P10D shared that her students had been using Chromebooks and were familiar with Google Classroom and other applications such as Google Docs, Google Slides, NearPod. She felt that her "students were at an advantage" because they "were already familiar with it."

P11D also shared that her students had one-to-one devices and used Google Classroom as a tool for materials.

Implementation Plans

School districts made decisions about technology, implementation, and supports based on the needs of their schools. Communicating school and system plans influenced teacher changes with the use of technology in their classrooms.

P1A shared about the technology that his school chose to use during this transition. Teachers were given Odysseyware, an online learning program with the curriculum. They were told to follow this program with their students. It was unclear to him why the school was using the program. He said, "I don't know how that came about, how they chose that platform. Maybe they were panicked and I'm sure most school systems were." Not long into the 2020-2021 the system stopped using Odysseyware. He said, "…right before they nixed the Odysseyware platform, we were just then starting to get used to it and then we changed."

P2A felt frustrated with his administration during the transition to virtual instruction and through the year. He received "a lot of I don't know, we'll get back to you."

P3A also felt frustrated with a lack of communication with a plan. She said,

> So I had a few hours to find out what I was going to. I didn't know because I was teaching seventh grade science. Then I also found out that day that I was supposed to maintain an hour of teaching online every week. Like I said I thought it was all going to be on Odysseyware, I was going to learn it as I was grading. Honestly, I was mad about the lack of communication.

P4B indicated frustration with the lack of communication and plan for teachers. She felt it "is kind of expected that we just know how to do everything, which is not the case."

P5B shared that the expectation was to use Canvas to upload all work for students to access. This included in-person and virtual learners the teacher was responsible for instructing simultaneously.

P6B said,

> Prior to the pandemic we did not have a lot of training. We were in our second adoption year of using Canvas as our LMS. Before, that we had Schoology and I had done a lot of training on my own. I was kind of considered like the guru in our building. We used that I think just for about a year and switch to Canvas. So, most of us kind of held out that first year, that would have been the previous year, held out really throwing ourselves into Canvas just because we're like, here we go again. Oh, you know hundreds of hours building these courses in school to then just, you know. So we did not find it user friendly Canvas when switching over from Schoology. Now I feel like I'm really good at it, but, at the beginning, it just for most of us it was just too much work.

P7C said that her system encouraged the use of specific technology. This guidance provided her with the tools that were needed to provide instruction to her students. She used "things that were provided mainly."

P8C shared that the plans evolved through the school year. She said the expectation of putting things on Canvas increased when students needed access to instructional materials from a virtual setting.

P10D shared that her school purchased Canvas as the Learning Management System. The teachers were stressed over the timeline to learn the platform. She said,

> (Canvas) was a really big learning curve for everybody, because we had all been using Google Classroom. And then during this remote period where we weren't around anybody, we had to figure out how to use Canvas on our own. And so, the students had to figure out how to use Canvas on their own too, because there was no training provided.

P11D shared the events,

> Last summer the middle school teachers got together and paid an instructor from another school district to teach us how to use Canvas, which is the Learning Management System our school purchased over the summer. Our school had never had an LMS before and we were transitioning from Google Classroom to this LMS.

She was frustrated in the lack of planning by her administration. The teachers "paid for (training) (them)selves before the school even offered it."

Training

School system A teachers indicated there were formal professional development opportunities, but the teachers reported the opportunities did not necessarily support the change

in the use of technology that was needed to move to a virtual platform. There were 17 coded segments that addressed system training on technology tools and use in the classroom.

P1A said, “It seemed to me that we didn’t have a lot of training or a lot of time.” The Canvas training was “more of like a 30-minue session” and additional support was found “in our time or planning.”

P2A reported that the system has provided “a lot of opportunities” through the years with technology training. He shared how the system’s instructional design specialist “did a whole technology series like every couple of months.” There were pilot programs with technology applications like CanvasCon and NearPod. These programs helped teachers use “some of their more interactive tools.”

P3A believes the school system does “a pretty good job of letting us pick and choose what professional development we want to go to.” She felt she was more inclined to use technology and has picked more social/emotional health trainings recently.

School system B two of the teachers, P5B and P6B, served as technology leaders and trainers in their district. They were comfortable with using technology.

P4B said her “school system has not provided many tech trainings in comparison to where (she) came from.” She even stated she “held out” when her system moved to Canvas because of the teachers were unsure if the amount of work would be worth making the switch due to recently switching to another LMS. She “spent the majority of time on my own learning how to…” create materials.

Participants from school system C spoke highly about the technology trainings available to teachers through the years.

P7C described trainings provided by the systems as days where “we were given a menu of choices in anything that we wanted to learn about” concerning technology. These trainings give teachers a chance to learn new tools or brush up on technology skills. The system also provides trainings after school on a variety of topics about technology through the year. She describes the system as providing “so much support” to teachers. These trainings gave her “more confidence to begin the year.”

P8C said her system “has been pretty good about offering technology.” They give teachers the opportunity to attended trainings based on interest. She attended trainings on Study Island, IXL, and Canvas.

P9C also discussed the technology trainings offered by the system. He was a part of the first tech leader cohort the system created. He shared excitement when reflecting on the growth of the program. The technology leaders started as “trying out different software, different systems. Trying to figure out what works best for the school system.” These discussions led to in-house professional development opportunities for teachers. He said the teachers “don’t feel overwhelmed, they don’t feel intimidated because it’s people they know” presenting the trainings.

Teachers from school system D were frustrated with the lack of professional development provided to them on technology use.

P10D shared how the Canvas training was “the modules that we had to learn on our own.”

P11D shared that she has learned technology through higher education courses she enrolled in. The tech training for Canvas was only offered after the middle school teachers paid an outside instructor to teach them how to navigate the LMS.

Sub-Question 4. How have the different platforms changed the approach to designing instruction with the use of technology?

Teachers require a knowledge of content and pedagogy to design instruction that produces meaningful learning from their students (Shulman, 1986). This knowledge is the foundation of instructional design. As technology use increased in society, the need to include it in the classrooms became apparent. Mishra and Koehler (2006) recognized the need for teachers to also possess a knowledge of technology to use it in a way that produced meaningful learning. The different platforms influenced the way teachers designed their instruction with the use of technology. Participants indicated how the platform changed their approach to designing instruction with the use of technology. Participants discussed goals when deciding on the type of technology to use in the different platforms. The researcher asked the participants three questions to gather data to answer this question. Describe the circumstances that contributed to your implementation of new technology in your teaching assignment. Give your professional perception on the relationship between technology and student learning? What technology tools and related teaching strategies will you continue to use in your teaching assignment? The themes that emerged from the data include maintain learning and technology as a resource. There were five coded segments for in-person learning used technology as a way to maintain learning. Technology as a resource was coded 10 times in the transcripts.

Maintain Learning

P3A said technology "evolved into more rote things at the end of the year because she just needed them to be exposed to the content." Covering standards became the focus when testing drew closer.

P6B would use technology “as a resource” when students were in-person. She felt that technology use “translates a lot easier to other content areas.” Using symbols, geometry, and fractions were more difficult to use in an application when showing work or writing equations.

P10D stated she used a math program for “skills practice.” She said program did not “go deep into the math, but it’s good procedural practice.”

Technology as a Resource

P6B shared that technology was “more as a resource” when teaching in-person. When students were in-person she “tried to eliminate them being on the laptop constantly.”

P8C stated her “students enjoy technology” and it was a way to get them to practice the skills. She used technology such IXL and Study Island to reinforce skills learned during direction instruction.

P9C used technology to transfer learning that typically took place with paper and pencil. Students used “virtual notebooks” to record learning and notes. BrainPop was also used as a way to extend, review, and assess learning from the classroom.

P10D used technology as a resource to supplement her teaching. Programs like Aleks gave students “good skills practice.” Desmos was another technology application found to be helpful in her classroom. It offered a way for students to “share work and receive feedback” without meeting individually with the teacher.

P11D said she used technology as a resource by embedding videos and images. This “imagery” is important to support her students learning of different cultures and areas.

Sub-Question 5. How has the use of technology for instructional delivery influenced teaching strategies in the different instructional platforms? a) in-person learning, b) hybrid learning, c) virtual learning

Knowledge of effective teaching strategies is essential for teachers to reach deeper levels of understanding for their students. Koehler and Mishra (2009) recognized the impact technology integration has on the teaching strategies used to deliver instruction. Their TPACK framework addresses the integration of technology and its influence on the teaching straties. Hattie (2015) also states the effect teaching strategies have on student learning. He rated teaching strategies to include an effect size for educators to see the direct correlation.

A teacher's use of technology for instructional delivery can influence their teaching strategies. Each participant was asked how the use of technology for instructional delivery influenced teaching strategies and what technology tools and related teaching strategies they will continue to use in their teaching assignment? The themes identified were organization, discussion, feedback, and engage learners. Each of the 11 participants indicated they will continue to use the technology for the LMS to organize the content for their class. The researcher found eight coded responses that included the importance of using technology to provide feedback to students about their learning. There were 15 coded responses about technology use to engage students.

Organization

Participants shared that technology helps them with the organization of their materials, assignments, assessments, and communications. Each of the 11 participants shared that they used Canvas as the Learning Management System to store their instructional resources for their course. Each participant will continue to use the LMS to store their content this year.

P1A shared he will “continue using Canvas” and Google Tools.

P2A indicated the videos stored in Canvas were helpful in “having that backup for those students that are absent or even students that forget things, doing a review for something, or catching up on something that happened that semester…” Students have the materials organized in the LMS to refer to as needed.

P5B stated she will continue to use Canvas. It was helpful to refer absent students to the Canvas page to get missed assignments “instead of having to try to get all the papers together.”

P6B also shared she would “definitely keep Canvas” because of the ease of having all assignments together for students to access when they missed a day. She included everything online, “agenda, the opening, the including videos.” This will make it easier to build upon each year.

P7C stated she would “definitely” continue to use Canvas. It made it easier for her to “build (her) lesson plans, link videos, link parodies.” Canvas was used as a guide to “work through” the daily activities.

Feedback

P3A talked about the importance of feedback for her students. She taught science and needed students to “think like scientists.” Part of this process requires them to evaluate with another scientist. She wanted her “students to be able to get immediate, quick feedback.” Another important part was “to have discussions and get feedback from one another.”

P4B used a technology tool, Desmos, that allowed the teacher to “see exactly what’s going on.” She was able to monitor their work, show their work with identifiers, and provide feedback to them in real time.

P6B used NearPod is also an application that allows for students to share work anonymously and get "immediate feedback." She would often "share their responses and talk about the good ones versus the bad ones" without anyone knowing who wrote the response.

P9C shared the use of online assessments as a tool to provide "immediate feedback" to students. Students can see what they miss and start to correct their misunderstandings.

P10D also used Desmos as a tool to share work and provide feedback to students. She liked the anonymity for the students and they could learn without feeling embarrassed.

Engage Learners

P1A shared the importance of using a "variety of tools and strategies" to keep learning fun and engaging. He shared how "kids get burned out on the same ole' same ole" regardless of the activity. He said, "I think variety in everything is great. Just to keep them upbeat and motivated."

P2A emphasize the importance learning new things. This will make designing instruction "a little different" and "get students more engaged." He shared that "finding different engagement pieces" was key to keeping students interested in their learning.

P3A continued to adapt her instruction through the year to find new ways to engage her students. She would pace her curriculum to be a week behind her colleagues so that she could design the science experiments to be meaningful for her students. She noticed the students "who were problem-solvers and very efficient students" were engaged in their learning. They were committed to using technology to share ideas and communicate their findings.

P4B referenced the use of technology to keep students engaged. Finding applications that "held students accountable" for their learning and engagement. Desmos was an application this participant thought did a great job at keeping students engaged with "slides where there's

different questions on them. Students can interact with them with like polls, graphing, writing on the screen as well." This level of engagement allows the teacher to be "actively monitoring" the students through the lesson.

P5B also believed that it was important to "change it up" and use different technology tools to engage learners. She used things like Padlet and FlipGrid so students "weren't doing the same things over and over." This was also a great way to include virtual and in-person learners. Teaching in these different formats "challenged her to try a lot more of those types of things that (she) had not done before."

P6B also considered learners in different formats when designing the instructional content with the use of technology. It was important for her "not to leave either group out." She used applications like NearPod to engage her learners in both learning platforms. She was able to "go through a lesson and see what they were doing in real time."

P10D used a variety of technology applications as a way to engage learners. When she started planning for content instruction using technology she said, "You have to think, is it going to engage them? Are they going to be able to connect with it better through technology?" Other aspects she considered were all the students "tech savvy." This consideration was including if the student needed to learn the technology tool first before the engagement piece could happen. She shared that it was important "to think about how they use technology." If not, the teaching of technology will happen as the teacher is "trying to engage them."

P11D shared that technology "should be used to enhance and maybe kind of elevate delivery of material." She has found that technology allows for "some creative options" that paper and pencil do not allow. Technology allows for "an engagement part for kids" that other learning does not always provide.

Chapter Summary

The researcher interviewed 11 participants via Zoom to gather teacher perceptions of the changes in the use of technology for instructional delivery because the COVID-19 pandemic from March 2020 to May 2021. The participants were core-content teachers in grades 6-8 from four different school systems. The researcher asked open-ended questions (Appendix A) during the interview. Interviews were coded based on the research questions identified by the researcher. Chapter 5 will include the discussion of findings, implications for practice, and recommendations for future research.

Chapter 5. Conclusions

Introduction

The purpose of this phenomenological study was to examine teacher perceptions of the changes in the use of technology for instructional delivery because of the COVID-19 pandemic from March 2020 to May 2021. The research used the Change Theory Framework (Fullan, 2001) and the TPACK Framework (Mishra & Koehler, 2006) to guide the research questions in this study. Each of these frameworks provided the researcher with the knowledge of how change evolves and the knowledge needed to integrate technology within the instructional delivery of content. The researcher created interview questions to examine the experiences of teachers during the phenomenon of the COVID-19 pandemic. COVID-19 forced teachers to change their instructional delivery to a virtual platform in March 2020. Teachers were interviewed to examine their perceptions of the changes.

The researcher used snowball sampling by identifying 6^{th}-8^{th} grade core content teachers in four local school systems. Once the researcher had a participant agree to participate in the study, the researcher asked the participant to recommend other teachers. Each participant experienced changing their instructional delivery from an in-person platform to a virtual and/or hybrid platform through the 2020-2021 school year.

The researcher interviewed each participant via Zoom with open-ended questions. The interviews were transcribed and examined for accuracy. The participants were provided with the transcript and could make any changes with adding to or excluding any words that did not align with their perception or experience. The transcripts were then coded to identify themes that emerged. The themes were recorded when needed. The researchers used the software MAXQDA to code the data for analysis and organization.

Discussion

Central Research Question

The central research question for this study was: What are teachers' perceptions of the changes in the use of technology for instructional delivery because of the COVID-19 pandemic from March 2020 to May 2021?

Sub-Question 1. How did technology use change (transition) across different instructional platforms from the beginning of the pandemic in March 2020 to May 2021? a) in-person learning, b) hybrid learning, c) virtual learning

Participants shared their experiences of using technology and the changes that occurred across the different instructional platforms. Teachers were forced to change from an in-person platform to virtual platform from March 2020 until May 2020. The last quarter of instruction required teachers to place their content online for students to access since they were not allowed to be in-person. All the participants shared how the change was abrupt and unexpected. P3A said the teachers "drove straight into teaching online." P6B described the change as happening "very suddenly" and it felt like she was doing "a whole different career." P7C said the forced change to virtual "was a big shock." She had been in the classroom for 28 years and had never experienced that type of a change.

Initially some of the participants remember the beginning of the change to virtual as a feeling of uncertainty. P9C recalled the first few weeks as "we're all trying to figure out what to do." In her system there was "no real set directive on… do students have to come to class." There only instruction was "create some activities, create some instruction that the students can access online in their own time."

When participants returned to school for the following year, they were all providing instruction from on a virtual platform. The participants were unanimously expected to use technology for instructional delivery. Necessity was the theme that emerged from the analysis of data. Technology was a necessity for participants' instructional delivery. Technology was needed to communicate with students face orally. Zoom and Google Meets were used by the participants. The other theme present in the data was adaption. Technology was used to adapt how students receive and complete assignments, communicate, and assess learning. Participants were learning how to use technology to deliver the instruction for the course via the virtual platform. P6B shared how the virtual platform "made it trickier when you're thinking about your lesson plan." P2A learned how to "make little videos for (her) students and just give them instruction" using Screencastify. P9C stated how she had "been very adventurous with Google Docs and Google Slides" to maintain instructional delivery.

As students moved back into the classroom, three of the systems moved into a hybrid platform. One system created a virtual school with dedicated teachers to provide instruction for students who chose to stay in that platform. Another system did not require their teachers to provide instruction to students when they were on their virtual rotation. This caused some students to treat the virtual platform as "an extended weekend" and often the assignments were not completed. Two of the systems required their teachers to continue to deliver instruction simultaneously to both in-person and virtual platforms. Participants in this setting used technology as a way to engage learners in both platforms. P4B and P10D were both math teachers who shared about Desmos and how effective it was for keeping students engaged, providing feedback, and monitoring learning. P10D liked that she could "see what kids are doing

in real time" while P4B shared that Desmos allowed her to "share (student) work without students knowing whose work it was." This was helpful to address misconceptions in learning.

Two of the systems moved to full in-person learning at the end of the year. As teachers moved back to in-person there was a level of burnout experienced with using technology. P9c said that moving back to in-person "was heaven." He said students "hated the Chromebook some days," which is why he thinks it is important to "find that balance" when using technology in-person.

Teachers in this study shared their experiences specific to their school system. Their use of technology across the different platforms changed for different reasons. The contributing factors in how they engaged in change were both internal and external.

Sub-Question 2. What internal factors influenced changes in the use of technology for instructional delivery?

The participant responses for this question suggested that teacher beliefs, moral purpose, learning communities, and teacher efficacy influenced the changes in the use of technology for instructional delivery. Ertmer and Ottenbreit-Leftwich (2010) identified internal variables as teachers' beliefs on the significance of technology integration, learning communities and teacher efficacy. The themes that emerged from this data were teacher beliefs, moral purpose, learning communities, and teacher efficacy.

Each of the participants revealed their beliefs about technology use for instructional delivery. Six of the 11 participants believe that technology use is important for their students. Valuing technology and the impact it can have on learning is important for teachers to make the necessary changes to implement it. Kieschnick and Casap (2017) addressed the fear of failure

impedes change that is necessary for innovation and progress. Mindset is important to drive the purpose of the goal to a place of reality.

Five of the 11 participants spoke about the importance of having balance when using technology in the classroom. Technology is not intended to override the instruction, but rather to elevate it.

Moral purpose was evident when teachers in the study chose to provide instruction in a way that produced learning even when it was not expected or written in a plan. P9C shared how her system established a baseline for expectations and meeting with students. She recognized that her students needed the instruction every day. She said this lapse of face-to face instruction created "a gap in that learning." She said, "I needed them there. I did require them to attend online when they weren't there." It was challenging and frustrating when her colleagues did not expect the same thing. She exhibited a moral purpose during this situation.

Learning communities were discussed by every participant in this study. Learning communities have expanded to include more than just the group of teachers at the school, but also to include the social media platforms with teachers from across the world. Each teacher expressed the support they felt from these learning communities. P5B shared that her social media groups "helped me better" than the formal professional development trainings to tackle the day-to-day concerns of integrating technology. During this time many teachers relied upon their own resources to advance their use of technology integration. P6B said, "There's probably nothing you couldn't figure out how to do on YouTube." Having a group of teachers was important for each of the participants. P2A shared, "we know what we're seeing, what's working and what's not working" about his learning community.

Ten of the 11 teachers in the study felt confident in using technology in their classroom. Teacher efficacy is important to making changes in the instructional design of your course using technology. Teachers who do not feel confident will be more resistant to making these changes. All of the participants discussed continuing to use technology as a way to organize, share, and access content for their course.

Sub-Question 3. What external factors influenced changes in the use of technology for instructional delivery?

Ertmer and Ottenbreit-Leftwich (2010) referred to the external barriers as institutional. The variables include access to technology devices, system-wide implementation plans, daily supports, and adequate training. The themes that emerged from this data included forced change, access to devices and training.

The closure of schools in March 2020 contributed to the forced change teachers experienced with the use of technology for instructional delivery. The change forced them to rely upon technology for a multitude of reasons including organization of content, communication, adaptation of instructional materials, engagement of learners, and assessment. Teachers shifted their in-person learning to virtual with little notice.

All participants shared their gratitude for working in a system prepared to support students with the use of personal devices. Access to technology devices allowed them to continue learning in a virtual setting.

Technology integration at a system level, school level and classroom level should begin with a plan, as should any change within an organization. Kieschnick and Casap (2017) stated that when plans do not include goals, decisions cannot be measured for effectiveness or success; this is especially true when integrating technology that serves many uses.

Training opportunities provided at a system level was mentioned by eight of the 11 participants. Six of the eight discussed technology training days hosted by their system each year. P2A said his system provided "a whole technology series like every couple of months." P7C said the training "gave (her) more confidence to begin the year." Two participants shared they never received training on technology by their system. The lack of training did not deter these participants from using technology. They shared about the support they experienced within communities of educators in social media, web searches, and colleagues. The online communicates offered resources and trainings specific to their needs. P11D shared that "it's a lot of our own time spent researching, personal time spent researching." Teachers often spend many hours outside of the contracted day to learn more about their profession. This has intensified since the start of the COVID-19 pandemic in March 2020.

Sub-Question 4. How have the different platforms changed the approach to designing instruction with the use of technology?

Kieschnick and Casap (2017) stated that strategic technology decisions include an understanding of pedagogy. Mirsha and Koehler (2006) recognized the need for educators to understand the impact of technology within different disciplines. Content choices restrict the types and use of technology. The themes that emerged from the data were technology as a resource and maintain learning.

According to the TPACK framework, teachers with an understanding of the different knowledge capacities understand how and when technology should be used. The participants also shared their view that technology cannot replace good teaching. When P4B served as a teacher leader at her school, she found through conversations and observations of teachers that they were using technology "to become the teacher." She said, "(technology is) simply another

resource for us to use, but we're still dependent on the teachers for high quality instruction. Purely a resource to help with instruction, not actually give the instruction."

Sub-Question 5. How has the use of technology for instructional delivery influenced teaching strategies in the different instructional platforms? a) in-person learning, b) hybrid learning, c) virtual learning

Hattie and Zierer (2019) researched teaching strategies to determine their influence on student learning. His research indicated teaching strategies like feedback, collective learning, knowledge application, multiple exposures, and engagement with content support student learning. Teachers should consider their teaching strategies when designing lessons to introduce, develop, and review concepts. The themes that emerged from the data were organization, feedback and engage learners.

Teachers have transferred the organization of the content to a virtual platform. The organization of materials, resources, and assessments on a Learning Management System such as Canvas has been one change each participant claimed they will continue. The organization of their content has eliminated some of the stress teachers experience when students are absent or unable to keep up with materials in an online setting. Having the content organized in one place provides consistency and predictability in routine for both the instructor and the students. P2A shared,

> One thing I learned that having that backup for those students that are absent or even students that forget things, doing a review for something, or catching up something that happened that semester, whether it's multiplying exponents and how that is, and you can actually have the examples there, rather than having to answer every question with every student walking around, you can say hey why don't you check out that video I gave you

an example of how to do it. That is key. That'll be something that I'll definitely keep doing.

The instantaneous feedback students receive with assessments or while completing work in an application where teachers can view their progress in real time, provides students support in identifying misconceptions or evoking deeper inquiry through questioning. P4B was able to use technology to "see exactly what's on their screen and what's going on" without standing behind them. P6B shared how Desmos provided a platform to "give feedback on it without calling them out in front of the class." This technique removed the embarrassment students experience when receiving feedback.

Technology provides teachers a variety of tools to design instruction for student engagement. Teachers can use videos and images to support student learning when studying unknown areas or cultures. P6b used technology to differentiate learning in her class. Her students could "participate in regardless of (their) level." P1A emphasized the importance of using different tools because "kids like a variety of tools and strategies." He shared that a variety of engaging strategies "keep(s) them upbeat and motivated." P10A echoed thinking about technology with the mindset "Is it going to engage them?" P11A said that "technology should be used to enhance and elevate delivery of materials."

Teachers use teaching strategies to engage their students in meaningful learning opportunities. Only two participants recognized the need to include types of student learning when choosing technology. Ertmer & Newby (1993) state teachers should know their learners and how the varied experiences they bring to the classroom influences their learning style. Teachers rely on learning theories to identify teaching strategies that produce meaningful learning.

Change Theory

Fullan (2001) identified factors that contribute to successful change in organizations as moral purpose, understanding change, relationship building, knowledge creation and sharing, and coherence making. Any change must begin with a moral purpose or a desire to improve. Fullan described the change process as elusive. Purposeful interactions involved with problem solving develop relationships within an organization. As members of an organization develop, it is essential for opportunities to emerge where ideas and knowledge are shared. This process strengthens members and establishes coherence.

Change is imposed on teachers constantly with curriculum adoptions and new resources. Earle (2002) stated technology integration begins with an understanding of content and effective instructional practices. Teachers use technology to enhance learning and should be able to identify how and why the technology is used. Kieschnick (2017) stated that strategic technology choices begin with knowledge of pedagogy.

TPACK Framework

Koehler and Mishra (2009) designed a framework that provides teachers with a guide to integrating technology into content specific practices. The TPACK framework is a way for teachers to know they are applying best pedagogical practices when using technology to enhance learning. Technology integration has been applied without the consideration of teaching strategies and student learning theories. Combining knowledge from these three areas gives teachers meaningful ways to include technology, not just consume technology.

Implications for Practice

The following recommendations were made by the researcher after considering the experiences of teachers and the frameworks used to guide this study.

1. Teachers need to continue to share their perceptions on technology integration with the school and system level to help create a plan with clear goals and desired academic outcomes.
2. Teachers need to engage in conversations about pedagogy, content knowledge, and technology integration to identify technology tools that support different content areas.
3. Teachers need to engage in a conversation that develops an understanding of how students learn with engaging technology to support learning.
4. Systems need to provide teachers with opportunities to plan and co-teach with technology leaders and coaches to encourage technology use for instructional delivery.

The researcher would like to note that teachers were asked to give their professional perception on the relationship between technology and student learning. Only two teachers in the study responded with addressing different learning styles while connecting that to the technology tool. P10D shared about students who had difficulty writing. She discussed giving those students who "get read aloud and so finding programs and things that will read the audio to students." This type of answer addresses the disparities in student learning and finds technology that places this child on a more equitable playing field.

Implications for Future Research

This research study was conducted during the COVID-19 pandemic forcing teachers to change their use of technology for instructional design because of the expectation to teach in virtual and hybrid settings. The restrictions mandated by state and local agencies forced teachers to make changes for the safety of their students.

1. Research should be conducted to assess teacher understanding of technology, pedagogy, and content knowledge to determine how these areas align with success integration of technology in the classroom.
2. Research should be conducted to determine teachers' use of technology each year after the 2020-2021 school year to determine if changes are being implemented with technology use for the instructional delivery.
3. Research should be conducted to determine teachers' knowledge in how students' learn through their use of technology in the classroom.
4. Research needs to be conducted to determine the barriers of technology integration that are present in specific school systems. From there the data should be collected to determine what supports were effective in overcoming the barriers.

Chapter Summary

The purpose of this study was to examine teacher perceptions of the changes in the use of technology for instructional delivery because of the COVID-19 pandemic from March 2020-May 2021. The researcher interviewed 11 participants who taught core content subjects in grades 6-8 within systems in close proximity. The interviews were conducted via Zoom and transcribed to review and analyze for themes in experiences. The researcher identified ways technology was used across different platforms from March 2020 until May 2021. The researcher also identified factors that influenced changes in the use of technology for instructional delivery. The results of this study indicate the forced change participants experienced when moving instructional delivery to a virtual platform provided them with a variety of ways to use technology.

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APPENDIX: Open-Ended Interview Questions

1. Describe the timeline of instructional delivery in your school system that occurred from March 2020 until May 2021.
2. Describe any formal professional development opportunities you have experienced related to technology.
3. Describe any informal professional development opportunities you have experienced related to technology.
4. Describe the circumstances that contributed to your implementation of new technology in your teaching assignment.
5. Give your professional perception on the relationship between technology and student learning?

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