

A STUDY OF ELEMENTARY TEACHERS' PERCEPTIONS OF TECHNOLOGY SUPPORT AT PRIVATE TEXAS SCHOOLS DURING THE ONSET OF THE GLOBAL PANDEMIC

Kayla Abshire, Ed.D.

San Marcos Academy

Jodi Pilgrim, Ph.D.

University of Mary Hardin-Baylor

Jared McClure, Ed.D.

University of Mary Hardin-Baylor

Brian Guenther, Ed.D.

San Marcos Academy

Abstract

The pandemic impacted private schools across Central Texas. School closures across the nation required schools to implement remote learning procedures. Framed by the TPACK model, the purpose of this qualitative study is to explore elementary teachers' transitions to remote learning, and their expectations with technology use as the pandemic hit the US in 2020. Private elementary school teachers' transition from face-to-face to online teaching and the use of technology within the classroom during the COVID-19 pandemic provided challenges for teachers as they sought ways to deliver and assess content remotely. Individual, semi-structured interviews were conducted with elementary, private school teachers in the Central Texas region. Data analysis revealed three primary themes. The first primary theme, Resourcefulness, related to ways schools and teachers were innovative in finding technology for students and teachers to use during the quarantine. The second primary theme, communication, related to communication between teachers and administrations, teachers and students, and teachers and parents. The final primary theme, emotional factors, reflected affective experiences that impacted teachers.

Keywords: asynchronous, case study, collective case study, epidemic, pandemic, Private School, Remote, Synchronous, resourcefulness, communication, emotional factors

The onset of the COVID-19 pandemic disrupted public and private schools nationwide. School closures required a change to remote learning. New modes of delivery challenged teachers to practice flexibility in instructional learning styles to meet the student's needs during the changing time. Focusing on private schools, the purpose of this qualitative study is to explore elementary teachers' transitions to remote learning and their expectations with technology use as the pandemic hit the US in 2020. Because technology integration enables teachers to transform learning (Office of Educational Technology, 2017), this study is significant for teacher educators as they consider ways to prepare teachers for technology use in an ever-changing world. The study also informs ways school administrators may support teachers' technology use.

Background

Elementary educators faced challenges during the pandemic with remote learning and teaching in an online environment. By the end of the 2019-2020 school year, projections of COVID related learning loss were 63-68% of learning gains in reading and 37-50% of learning gains in math compared to a normal school year (Irwin et al., 2022). Many school principals lacked plans for prolonged school closures and remote learning (Diliberti and Kaufman, 2020).

As COVID changed instructional delivery from a face-to-face setting to online delivery for many educators, the use of technology tools became essential. McQuirter (2020) stated, “Prior to the pandemic in 2020, 68% of teachers had never tried remote teaching, 66% had never tried online teaching, and 55% had never tried blended teaching” (p. 191); therefore, “The unexpected arrival of COVID-19 and the almost overnight need to move delivery of programs online at every level of schooling has exacerbated an already uneven implementation of digital technology” (McQuirter, 2020, p. 48). Perhaps due to an absence of prior training or experience with online platforms, teachers struggled to adapt to online learning, deliver the techniques needed digitally, and comfortably transition into successful online teaching (McQuirter, 2020). Other struggles included student attendance, student interactions, workload, little collaboration time with other teachers, lack of resources, training online, knowing how to remotely use online learning platforms, and having a clear boundary between home and work (Knott, 2014; De Paepe et al., 2018).

Theoretical Framework

Acknowledging the importance of technology integration during the pandemic and post-pandemic era, this study was framed by the technological, pedagogical, and content knowledge (TPACK) model. The TPACK model, developed by Mishra and Koehler (2006), expands Shulman’s (1986) pedagogical content knowledge model by adding technological knowledge as a component of teaching. TPACK “provides a model for effective technology integration by encouraging teachers to make purposeful decisions about when and why to use technology and within what context” (Linton, 2012, p. 26). The goal of TPACK is to seamlessly overlap each section's technological, pedagogical, and content knowledge to help support effective instructional strategies within the classroom (Figure 1).

The TPACK framework was also developed with the understanding that context, represented by a dotted circle, impacts the integration of technology. According to Koehler and Mishra (2009), “social and contextual factors also complicate the relationships between teaching and technology” (para. 5). School closures changed the context of instructional delivery, as educators sought ways to teach K12 students in remote settings during the pandemic. Even though Koehler and Mishra (2009) maintained that technology knowledge includes being able to continually adapt to changes in information technology, school closures due to the pandemic left many teachers and schools unprepared for unprecedented changes in instructional delivery.

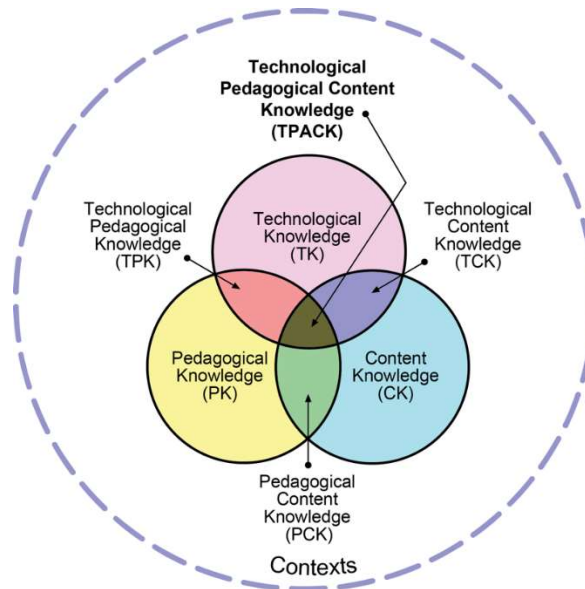


Figure 1. The TPACK framework illustrates the overlapping of the three domains of effective instruction and technological integration. (used by permission from tpack.org)

Literature Review

Before COVID-19 and the pandemic, teaching was a stressful job. Educators in Texas have many pressures and responsibilities to meet the Texas Essential Knowledge and Skills (TEKS) and the Texas Education Agency (TEA) technology standards. According to the article *Teaching and Teacher Education* (2017), stressful elements of teaching led to “40-50% of teachers leaving teaching during the first five years” (Ryan et al., p 2).

Teacher attrition rates since the onset of COVID-19 have increased. Texas, in particular, has experienced 8,600 teachers retiring since the 2021 fiscal year (Lopez, 2022). Remote teaching contributed to teacher stress levels as teachers adjusted delivery methods, and technology integration became a key focus. New lesson delivery increased time spent preparing for each lesson (Plummer et al., 2021). The unexpected arrival of the coronavirus impacted teachers as they had to learn new online programs and implement digital tools for their content to the students while moving from face-to-face to entirely remote. According to Leech (2022), remote lessons “are not necessarily designed for online, but rather reformatted to work in an online format” (p 247). Due to the exacerbated move, according to McQuiter (2020), there was an “absence of prior training, modeling of best practices, or easily accessed technical support” (p. 49). Teachers struggled to adapt to online learning, deliver the techniques needed digitally, and comfortably transition into successful online teaching. Struggles including student attendance, student interactions, workload, little collaboration time with other teachers, lack of resources, training online, knowing how to use online learning platforms remotely, and having a clear boundary between home and work are only a few struggles educators faced (Knott, 2014; De Paepe et al., 2018). Teaching remotely did not only entail teaching solely online but also using online platforms and systems. Educators reported not knowing how to remotely use various online learning platforms for students. The goal of moving forward with technology is for educators to successfully utilize these tools when returning to face-to-face or blended instruction during and after COVID-19.

Technology integration was a national focus prior to the onset of the pandemic. The Department of Education, in conjunction with the Office of Educational Technology, released a National Education

Technology Plan Update in January 2017. The goal for teaching with technology stated, “Educators will be supported by technology that connects them to people, data, content, resources, expertise, and learning experiences that can empower and inspire them to provide more effective teaching for all learners” (Office of Educational Technology, p 28). To allow this goal to happen, schools need to support educators in accessing the required technology and teaching them how it can be used effectively through professional development, mentors, and collaboration with coworkers. According to the Office of Educational Technology (2017), “Roughly half say that lack of training is one of the biggest barriers to incorporating technology into their teaching” (p 29). Technology is designed not only to transform learning but also help “enable transformative learning” (Office of Educational Technology, 2017, p 42). An educator’s ultimate goal is the success of the students. During COVID-19, technology tools were implemented and introduced that were best suited to incorporate into previous face-to-face lessons. Surveys conducted by the Association of Christian Schools International (ACSI) found that “83% of schools had utilized at least one distance learning tool/method before COVID-19, while 17% reported never using any distance learning tools/methods before” (Swaner, 2020, p. 3).

Research Method and Design

This qualitative study employed a case study design. Creswell (2002) states, “A case study is a problem to be studied, which will reveal an in-depth understanding of a ‘case’ or bounded system, which involves understanding an event, activity, process, or one or more individuals” (p 61). Though bounded by teacher experiences with technology during COVID, the collective case study seeks to explore the individual cases about a situation or experience to help answer the questions of “why” and “how” while comparing cases to understand the issue (Schoepf & Klimow, 2022). The purpose of this qualitative case study is to delve into private elementary school teachers' transition from face-to-face to online teaching and the use of technology for instructional delivery during the COVID-19 pandemic. The following research questions guided the research study:

R1: What perceptions do Central Texas private elementary school teachers have of the technology support they received as schools moved to remote learning in the spring of 2020?

R2: What support did teachers desire for remote learning during the onset of the pandemic?

R3: What were the experiences of Central Texas private elementary school teachers in implementing new COVID-era teaching strategies?

Setting & Participants

This qualitative case study is a bounded system in Central Texas private elementary schools. It involved interviews with kindergarten through fifth-grade teachers to gain perspective on their use of technology in the classroom during the COVID-19 pandemic. Interviews were conducted in January and February of 2023. Participants consisted of kindergarten through fifth grade Central Texas private elementary school teachers. To qualify for the study, prospective participants had to have taken part in teaching during the COVID-19 pandemic and virtual learning within a private school setting.

Data Collection

Using snowball sampling, administrators helped distribute the call for study participants. Overall, 11 teachers volunteered to participate in 1:1 interviews. Participants ranged from first-grade to fifth-grade teachers at private schools in Central Texas. Data Collection involved the use of a semi-structured interview protocol, which included questions developed by the researcher and Dr. James Martinez

(Martinez & Broemmel, 2021) (Appendix A). Following each semi-structured interview, recordings were transcribed, and each participant was assigned an interview code. Pseudonyms and demographic information for each participant are noted in Table 1.

Table 1

Participant Demographics

Participant	Years of Teaching Experience	Grades Taught During COVID	Subjects Taught	Availability of Technology at Home	Gender	Age Range	Degree/Level of Education Completed
Teacher 1	6-10	4/5	Mth/Sci/SS/Bible/Tech	Laptop/Internet Access	F	31-45	Master's
Teacher 2	6-10	2	All Subject	Laptop, Chromebook, iPads, air pods	F	15-30	Master's
Teacher 3	16-20	1	All Subject	Computer, iPad	F	46+	Bachelor's
Teacher 4	0-5	5	All Subject	Computer	F	46+	Bachelor's
Teacher 5	21+	2	All Subject	Computer, laptop, High Speed Internet	F	46+	Master's
Teacher 6	11-15	3	ELAR/Bible/PE/Tech	Internet/laptop/iPad	F	31-45	Bachelor's/Alt . Teacher Certification
Teacher 7	16-20	4	All Subject	WIFI, iPad, laptop, smartphone, desktop computer	F	31-45	Bachelor's
Teacher 8	21+	5	ELAR/Mth/Sci/SS/Bible/PE/ Tech	Laptop, Camera, Document Camera, XP Pen Device	F	46+	Bachelor's
Teacher 9	0-5	3	ELAR/Mth/Sci/SS/Bible	Laptop, iPad, iPhone	F	15-30	Master's
Teacher 10	21+	3	Mth/SS/PE	Computer, Printer	F	46+	Bachelor's
Teacher 11	6-10	1	All Subject	Chromebook	F	31-45	Bachelor's

Note. n=10; F=Female; M=Male; Mth=Math; Sci=Science; SS=Social Studies; Tech=Technology/ELAR=English Language Arts; PE=Physical Education; Alt.=Alternative

Data Analysis

Throughout the interview process, memo writing was used by the researcher. Memo writing included initial thoughts on the topics being discussed and helped begin the coding system's development (Clarke, Friese, & Washburn, 2018). In addition to memo writing, data sources include the transcribed interviews. Open coding was used to sort through the data and to categorize events and concepts. Then,

the categories were collapsed into overarching themes: Resourcefulness, Communication, and Emotional Factors. The reliability of the coding methodology was verified through an inter-coder agreement process utilizing a sample of the transcripts and the codes within the document. The inter-coder agreement was held at 100% agreement with another qualitative researcher who agreed that the codes were valid.

Findings

Analysis of teacher experiences led to three primary themes: Resourcefulness, Communication, and Emotional Factors. Theme 1 relates to ways schools and teachers were innovative in finding technology for students and teachers to use during the quarantine. Theme 2 relates to communication between teachers and administration, teachers and students, and teachers and parents. Theme 3 relates to the emotions teachers experienced during the pandemic.

Primary Theme One: Resourcefulness

When asked about their experiences with technology, teachers shared many tools they used. Participants also reflected on the support schools were able to provide for them. This theme emerged as teachers shared ways they located and implemented the use of technology to meet student needs. Some schools allowed students and teachers to stay home an extra week after Spring break to plan for what they thought might be coming. Some held training through Zoom or other online platforms, and some schools provided very little technological support. Schools, teachers, and students were resourceful in their application of technology skills and tools.

In terms of technology use, demographic data indicated that hardware used by teachers included computers/laptops, document cameras, iPads, and other basics that allowed the educator to be successful with online teaching. Even though a requirement of the study was that participants had taught online during the pandemic, that did not mean that the technology used was provided by the schools. Participants were resourceful and used personal computers and iPads. Overall, four out of 11 participants stated that they used their personal computers during the pandemic. Nine out of 11 participants stated that they also used a school laptop or computer. The overlap indicates that while some educators had access to their school's technology tools, they also had access to their personal equipment. Teacher 2 stated, *"I think everyone, really all of our admin really stepped in and got us any technology we thought we might need."* Appendix B presents an overview of the technology hardware available to private school educators from this study. For example, some participants clearly stated that the school provided certain technology to them during remote learning while other participants did not specifically state that it was given to them.

Because private schools do not receive state funding, resourcefulness became a necessity for both participants and the schools for which they worked. Therefore, during the pandemic, participants in this study relied on the resources that were free or readily available to them. Nine out of 11 participants used their own personal technology device. Some teachers had setups with a document camera, laptop, and whiteboard in a home office so that it looked like their classrooms. Some teachers had just a laptop. Technology or instructional technology support was acknowledged by four out of 11 participants, whereas six out of the 11 participants stated that they were on their own, had to do the best they could, or had a lack of training. In this case, participants showed their version of resourcefulness in other ways. For example, Teacher 9 confirmed, *"The second week was spent training the teachers on how to best utilize each resource we needed to make sure we felt supported."* The Center for the Advancement of Christian Education acknowledged the difficult process and stated, "To put people, processes, and products in place

that full support a complete and effective online learning experience is impossible to do well quickly” (CACE, Oaks Christian Online, 2023). Teacher 4 similarly states about administration, *“They just encouraged us to take full advantage of the hour a day to use our tools that were on Canvas and to make videos. You know, don’t underestimate the power of recording yourself doing problems and things like that.”*

In contrast to the support that some teachers received Teacher 10 voiced, *“The only thing they could provide me was my computer from school. I had two computers...one of them was mine. The school didn’t really provide much, technology or anything. They didn’t have it to provide really.”* Teacher 3 agreed, *“For a private school, I just used my own computer at home. I didn’t get any computer or anything like that from school.”* In order for this participant to be able to teach remotely, their resourcefulness came from utilizing the technology they had available at home. Others demonstrated their resourcefulness by relying on each other. This resourcefulness came as a necessity more than a want. One of the teachers gave two examples of this resourcefulness. Teacher 11 stated, *“Everyone kept calling it trauma bonding...it kind of was in a way, like just going through an impossible situation. But we did it... We all just kind of did the best that we could, the kids did the best that they could.”*

While Teacher 9 and 11 felt as though they had to become their own IT person and that they were alone, Teacher 3 followed by stating, *“We got the IT support from people at work.”* Teachers sought technology tools to help them develop lesson plans, create slideshows and forms, read books online, and allow students to record and comment on each other’s videos. Teacher 2 emphasized how much the students enjoyed one of the technology programs, *“We use Flipgrid a good amount, which was fun for interaction with the kids.”*

Appendix C provides insight to the variety of technology applications that were used by the participants in the study. It is important to keep in mind that while many resources were opened up during this unprecedented time, some of these resources were used sparingly as they might not have worked for particular situations the educators were in. Teacher 2 alluded to this fact, *“It was tricky to have change midstream several times and say, Okay, this didn’t work. Let’s do this.”*

Teacher 6 discovered Google Forms within the G-Suite and explained,

They were the best thing in the whole world. . . It would show me how many kids answered this particular question in this way. And when they were done, and that was great, and then I didn’t have to print anything.

Zoom was a popular platform used by all 11 participants that, according to Teacher 9, *“It was a lifesaver of being able to go on and meet with the students, meet with the parents and meet with other faculty members.”*

Primary Theme Two: Communication

As participants were asked about the support they received and successful practices implemented, communication stood out as a predominant theme. Communication was appreciated, desired, and deemed critical during the uncertain times. After spring break, many schools took one to two weeks off to form a plan as announcements were starting to be made of school closures. These plans were made in person and via an online platform. After some schools could form plans, face-to-face communication became a thing of the past due to the severity of what was happening. Schools, administration, teachers, and parents began using platforms such as Zoom, Google Meet, or their phones to communicate. Overall, eight out of

11 participants said that emails and Zoom were their administration's primary forms of communication. Communication with their administration through text or phone calls was represented by seven out of 11 participants, and two out of 11 participants expressed that their administration was always available, would send out messages to their community, and wanted more communication, as shown in Table 4. Teacher 9 emphasized messages to the community, *"Our two principals, elementary and secondary, also would put out recorded messages to the community. I feel like it just kind of helped keep some semblance of a community going."*

Participants were in a situation with no correct answer to the questions of professional and personal support. For example, as teachers discussed support, communication through emails, Zoom, or phone emerged as the type of support that was most helpful. Administrators were receiving information from the Texas Education Agency and the Capitol about the latest CDC updates. Based on this information, administrators made choices and communicated information to their staff and faculty.

Communication was critical during the pandemic and was executed in various ways based on the convenience of the administrators, faculty, and staff. Teacher 7 explained:

Because you're not in touch with everyone since you're at home, he [the principal] would ask us either daily questions, or like, twice a week or three...reply all so we can get to know everybody across our elementary campus.

These recorded messages allowed parents, faculty, staff and students to feel a part of the school and the community even when they were not able to be around each other. Teacher 10 also noted regarding communication at their private school, *"We could ask questions and say, hey, how are you doing this? You know and he would ask what is working? What is not working?, What can we do to make things better?"* Teacher 8 also similarly agreed,

I do think it was helpful. ...an email is something you can choose to open when you want to and read when you want to. And the emails were helpful, because a lot of times they would have information that sometimes you're hit with so much information, that it's nice.

Teachers worked very closely with parents through remote learning. Parents became the teachers at home but depended on the educators to provide the necessary work to be completed. This was relevant to communication because educators and parents worked together for the benefit of the students. Overall, six out of 11 participants expressed that their students' families were positive and appreciative of the time they were putting into their child's education. Parent involvement with their child's education was described by five out of 11 participants. Teacher 3 stated how families were more engaged with their child, *"Parents were with their kids more. And they got to do the assignments with them. ... and they enjoyed it. And they made it fun. And they did the best they could. And I think that parents saw how much you know, teachers do in the classroom."* Teacher 6 explained:

It was their parents because all my parents wonderful, engaged, dedicated people who were remarkably kind and supportive. You know, but they don't know what's going on either. And they are all most of them anyway are working. You know, so some of them would get on and talk to me too. And some of them it was like okay, here's the phone explain to my kid how to do the math because I have to go do this.

Teacher 8's administration told their staff and faculty:

They would tell us the feedback they were getting from parents was positive and appreciative and, and they shared that with us, they made sure we knew that. That the parents were appreciating us

and we got feedback from parents also and making sure we were okay, as well as us making sure they were okay.

While it was not an ideal situation, participants agreed that the families played a significant role in helping the educators, even if they were also working.

Primary Theme Three: Emotional Factors

Participants expressed difficulty in the transition from face-to-face learning to emergency remote learning. The emotional barriers presented during the pandemic brought a unique experience that educators have not forgotten. While some educators had more experience with technology than others, remote learning was a new way of teaching for the students, administration, parents, and educators. Emotional factors that came out during the interviews reflected feelings of stress, inability to accomplish tasks, ineffectiveness, and struggle. During the pandemic, five out of 10 participants expressed that they would rather be in person than have to teach remotely. Other participants expressed that remote teaching was challenging, that they did not want to do it again, and that it took a lot of motivation to get up each day and go online. One participant even alluded to Post Traumatic Stress Disorder (PTSD) when they opened up their Google Classroom. Educators were placed in a situation that caused emotional stress. While it was a situation of many questions and possibilities, emotional factors such as student impact, criticism of their teaching ability, and confusion on how to teach their content were factors that played into this theme.

Teacher 4 expressed the hardest part for them, *“I love the face-to-face. . . I really did feel fairly ineffective a lot of time even though..., you could go back and ask some of the parents, and they’re still like, oh, it was such a great time. And it was so wonderful. In my mind. It’s like, oh, I need eye contact. And yeah, that was hard.”* Teacher 3 expressed, *“The struggle with just getting up every day..., honestly, just finding the motivation to do it again.”* Teacher 4 continued, *“I just, I don’t, I really, really did not enjoy it at all. There was nothing about it that I thought was oh, this is great. Or I’m enjoying this process. I did not. I like being face-to-face with the kids.”* Teacher 7 emphasized, *“It’s just hard to make those connections and as much as you try through a screen, it’s just not, it’s not the same....the personal relationships, I think really suffered between teacher and student and student and student.”* Teacher 5 agreed, *“I just don’t look forward to technology. I’m an in-person, kind of person. That the process, and it’s just not as personal.”*

Frustration rose to the top of emotions for the participants and even presented itself in the form of sadness when speaking about teaching during the pandemic. Teacher 10 stated, *“It was frustrating, quite honestly. We were in a situation, we were told, here’s what we have to do, but don’t have the skills or the people to help us do it. No, it was frustrating.”* Teacher 8 reiterated, *“It’s a part of teaching that I never agreed with that some teachers have. And that’s that, well, I gave it to you. And now it’s your job to regurgitate it back or learn it. I did my part. And I don’t believe that’s what teaching is.”*

Combining both emotions, Teacher 6 commented,

The pandemic was . . . it was unprecedented, unprecedented, unprecedented. And the people that hit the hardest, in a weird way, are the people that are most willing to talk about how hard they got hit are students and teachers and doctors, which I think is weird. That we’re on the same level as doctors, you know, all the stress was on teachers and doctors.

Teacher 8 stated, *“I really feel that the majority of students are more successful in person. I think online only learning is a struggle. It is a struggle to motivate them. It is a I, I’m so grateful to not teach online anymore. Just because that is such a difficult thing.”*

Educators expressed frustration with recording themselves, messing up, and having to record themselves multiple times. Knowing that people were watching these educators was enough to cause emotions and tears. Teacher 6 expressed her frustration experienced during the pandemic, *“Just knowing that people were watching you was just really hard, and nothing happened. Mostly, the kids learn just fine, and everything went fine. But that was hard on me that time.”* The participant continued to share, *“I went in and cried. I said, this is this is hard. Like, I don’t know how to do this. Nobody knows how to do this, I’m doing my best. You know, I was like, ... I can’t make it, you know.”*

Teacher 4 stated, *“I think there were the hindrances all came from me, not outside of me.”* Teacher 6 stated, *“The psychological burden of knowing someone is watching you for six hours a day is, was heavier than I expected.”* Teacher 8 also agreed with watching or replaying the videos you recorded, *“When you’re hearing yourself back as a video, you, you get that feedback from there, I think we’re more critical of ourselves.”* Overall, educators felt emotional stress of never wanting to go through something like this again, *“I’d never want to go through that again,”* stated Teacher 8.

Participants expressed that they struggled with translating classroom reality into virtual because it was exhausting and did not allow them the ability to teach the depth they wanted in subjects. Emergency remote learning is much different from intentional online learning. Educators were in a predicament of trying to figure out emergency remote learning and the most effective ways to communicate with students and families. Seven out of 11 educators expressed that they covered the content as best as possible and that their teaching was often at a surface level. They could only sometimes dive deeper into the curriculum or needed adequate time to teach the subjects. Standards were covered as best as possible, considering the circumstances, and the curriculum was utilized in various ways. Teacher 1 explained, *“I think as far as the content goes, I would say I covered it, I covered all my TEKS that year, but not at the level that I normally insist on, if that makes sense. Okay, so we were able to check all the boxes. But delving deep was very difficult.”* Teacher 8 shared,

So effectively teaching my content was difficult to say. I mean, I can make a video and put the content in there. But I, for me to be effective, I have to see the feedback from the kids. And so, it’s difficult to see what feedback I would get there. It was non-participatory.

Teacher 9 commented, *“I think I was able to do it as effectively as I could.”* In conjunction with educators feeling that they taught as effectively as they were able under the circumstances, they also alluded to the fact that if they had been in class, things would have been very different. Teacher 2 stated, *“I thought we did a good job for what, you know, we were faced with, but nothing like what we could have done if they were still in the classrooms.”* COVID 6 also expressed,

The problem is, I wasn’t actually there. So, you know, what am I going to do? And so, I had to learn to, number one, be organized because I would try and start doing these videos, and I would be like, you know, hey guys, but then, oh shoot, I left my book over there. And well, now we have to start over.

Themes of resourcefulness, communication, and emotional factors overlapped each other throughout this study. As participants expressed how they used technology tools and programs, forms of communication were evident with administration and families. For example, the participants were very critical of themselves, and the emotional stress from using these programs became apparent. The

overlapping themes provided a way to see how technology implementation played a role in each participant's life. This was determined based on experience, use, and other factors within each participant's private school.

Discussion and Implications

Findings indicated that participants in this study became resourceful with technology during remote learning to meet student needs. They desired communication, and they recalled emotions from their online teaching experiences. Participants were able to expand their understanding of tools and programs utilized as well as skills that they learned throughout the school closures.

Research question one asked, "What perceptions do Central Texas private elementary school teachers have of technology support they received as schools moved to remote learning in the spring of 2020?" Theme one encompassed the support participants received in terms of technology support but highlighted ways teachers and schools had to become resourceful in locating and implementing new tools. Examples of resourcefulness included asking their friends for help with technology when they did not know what to do. Participants were also resourceful in finding programs that were free to educators. Platforms such as YouTube or Zoom provided needed communication and support.

Research question two asked, "What support did teachers desire for remote learning during the onset of the pandemic?" Findings indicated in this study that participants relied on and desired communication in order to stay in touch as best as possible. Communication looked different because teachers were not face-to-face. Theme two encompassed the support participants received in terms of communication, parent appreciation, and professional support. Participants spoke about their perceptions of the forms of communication that were utilized at their private schools. An example of forms of communication included administration being available via email, Zoom, or a phone call or parents requesting one-to-one Zoom calls with the educator and their child. These forms of communication gave educators, families, and administration a chance at normalcy in an unprecedented time.

Teachers desired support related to technology and pedagogy (TPK) but not as much content (CK). Teachers' desire for support with technology and communication aligns with the Technology and Pedagogy Knowledge in the TPACK framework in an online environment. According to the study, and due to the themes overlapping, TPACK is relevant in each theme. In order for educators to deliver instruction, they first needed knowledge of their content, which was already in place prior to the pandemic. Then, due to remote learning, the technology component was utilized to implement their curriculum. As noted in the findings, teachers were resourceful in locating devices and tools to use during the quarantine. However, findings indicate that the pedagogy component of online teaching was a concern for teachers. This made sense because teaching online requires different pedagogical skills than teaching face-to-face. Teachers had to figure out how to use new tools to deliver instruction and how to learn these new tools remotely. For example, technology pedagogy knowledge (TPK) component came in. Learning how to teach remotely required participants to figure out a new way of delivering their instruction using unfamiliar technology tools like Zoom.

Communication and selecting tools to communicate also align with the TPACK framework. For educators to effectively communicate their curriculum to their students, they had first to have knowledge of their content and then utilize technology to communicate the curriculum to their families and administrators. Zoom was the most prominent form of communication. Educators would display a

whiteboard or share their screen to teach the curriculum to their classes. While it was not a traditional in-class teaching style, it was still getting information to their students through the resources that they had to use.

Research question three asked, “What were the experiences of Central Texas private elementary school teachers in implementing new COVID-era teaching strategies?” Theme three ties in components of emotional stress mixed with how they were going to continue supporting their students. For example, educators expressed becoming very stressed about recording themselves multiple times for their students because they would mess up, and they knew the parents would see this.

Teachers conveyed many emotions about implementing new COVID-era teaching strategies related to TPK. Because teachers were confronted with new ways of teaching and communicating, they experienced stress. For example, one participant expressed knowing how to teach on the board in class, but on Zoom, it was different, as sometimes it worked, and sometimes it did not. Participants expressed frustration that there was a possibility that students had parental help on most assignments.

Overall, teachers noted that they felt more confident with online teaching after the pandemic. Therefore, the higher level of TPACK educators have, the more confident they are in remote and in-person classes and experience less stress and emotional drain (Stan, 2022). This is significant for educator preparation because, in an era of ubiquitous technology use, it is important that teachers develop these skills regardless of a pandemic, not in spite of it. Educator preparation must integrate technical skill with pedagogical and content knowledge (McClure & Pilgrim, 2020).

Conclusions

Technology integration was difficult for teachers in this study as they delivered instruction in remote settings. However, teachers felt more confident in their abilities after the pandemic. We suggest that this increase in self-efficacy relates to the opportunity to practice teaching with technology. Teachers had to locate tools-- in some cases, the tools they needed were actual devices. However, they extended their resourcefulness and desire to improve communication and used tools like document cameras or applications like Zoom. These tools enabled teachers to deliver content remotely. Where many teachers had not experienced learning with Zoom, the remote teaching allowed them to become more confident with tools that many people now use frequently.

The ability to integrate technology into instruction is key. In Texas, technology standards are already a part of educator preparation programs. Technology integration requires skills beyond knowledge of standards and tools. The pedagogical component of teaching with technology requires practice but is beneficial for teachers and students alike, as technology can alleviate barriers to learning (Lisenbee et al., 2020). As teachers have the opportunity to explore and practice technology implementation in their educator preparation programs, they may continue to build confidence in their ability to teach and communicate effectively with technology. For example, preparation programs with reading clinics can have students tutor virtually, online courses in teacher preparation programs can be intentional about modeling effective pedagogy in virtual setting. Global and national education policies promote technology integration in education as a major factor for future economic success (Office of Educational Technology, 2022; UNESCO, 2017).

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Appendix A

1. How effectively were you able to teach your content?
2. Please share with me some technology skills you had to learn during COVID.
3. Please share with me some pedagogy skills you had to learn or implement during the pandemic.
4. Tell me your feelings about the professional support you received from your administrative team during the COVID-19 pandemic/ Personal support?
5. Do you feel more confident in your technology skills? If so, how do you feel more confident? If not, what are your barriers?
6. How did your administration communicate during the pandemic, and how was this communication helpful or hindering?
7. What type of support would have helped you become a better teacher during COVID?
8. Tell me about your school's technology tools that were accessible by teachers and students and whether they helped you provide instruction successfully.
9. What were the successes and struggles in moving to an online teaching environment?
10. What are the most successful practices your school implemented to support teachers' work amid COVID-19?
11. What resources or applications do you feel worked best to provide quality online instruction during remote learning?

Appendix B
Overview of Technology Hardware

Technology Tool(s)	Total # of Teachers Utilized	Participant's Perception
Personal Computer	5/11	"For a private school, like, I just, I just use my own computer at home. So I didn't get any computer or anything like that from school." "So my computer at school was just there."
Personal iPad	2/11	"I had an iPad. I did all this on an iPad, the one I'm using right now, it was super helpful."
School Computer	4/11	"All we have in the elementary school technology wise is our computers. There is one in the classroom. And most of us use our own personal computers. And then, because most people taught from home, that is it."
Personal Student Computer	1/11	"Yeah, it was great. But we are, I will throw this out there. We are a private school. And I don't know how to say this. But most kids had access to computers. Yeah, that wasn't an issue."
Student Issued School Computer	1/11	"If we had students that did not have any kind of technology at all, then you were you contacted the school and the school worked with you in the school." "If they did not have enough devices, or they did not have what they needed, then they contacted the school and the school made sure that they had what they needed. And we were given early on, they had us do a technology."
No School Technology	2/11	"I didn't have any school technology. I think, that's pretty much everyone. Everyone in our school is not high tech. at all, I mean, we have technology, technology class for third through eighth grade, we only got through eighth grade. Maybe I'll have use much technology on my level."
Personal Speaker/iPad Stand	1/11	"I had to buy online things. I had to buy some kind of special speaker so that so that I forget why I guess so I can hear them better. I had to buy an iPad stand that would stand at a specific angle so they could see me really well."
Document Camera	2/11	"I needed something that I could write on, I took my document camera home."
XP Pen/Pad	2/11	"I had to learn how to use an XP pin, it's it is kind of like a, it's like a writing pad that you can write on, and then they can see it."
External Camera for Computer	2/11	"My computer doesn't have a camera. So I had to the school had to get me an external one that hooks into my laptop, and then that required some other device that would be able to take more than one USB port."

Appendix C
Technology Applications Utilized by Participants

Technology Application	Total # of Teachers Utilized	Participant's Perception
Zoom	1/11	"I had learned to use Zoom, which I'd never used before. I'm learning to use Zoom. I'm glad that I learned to use Zoom." "Zoom just so we can keep in touch with people zoom."
Google	1/11	"Google and YouTube, were probably the best things."
Google Classroom	7/11	"Not just Google Classroom, like the actual application, but the virtual classrooms on Google Slides and we created that for each grade level." "We created a Google Classroom for each of our each of our kids got a Gmail account schoolwide to use on Google Classroom"
Google Forms	1/11	"Thank God, I discovered Google Forms. That was great."
Google Slides	2/11	"I used Google Slides, and pieces of it. And so, I could create a slideshow, especially for social studies, where you would go from, you know, let's talk about this. Let's look at the images. Let me ask you these questions. Let's watch a 30 second clip, and different things like that."
IXL	3/11	"One of the resources that I really started up utilizing and continue using even more is IXL."
RenWeb/ FACTS	1/11	"For communication with parents, it's called RenWeb. It holds our lesson plans, and it has all the things and they all have access to it." "I did recognize part of that was that our all our administrators had access to RenWeb."
BrainPop/ BrainPop Jr.	2/11	"There were some resources that, that were made free to teachers during COVID. One was BrainPOP."
YouTube	5/11	"I feel like they were supportive in that they were supportive in training us how to make our YouTube videos, how to post them, where to post them. Because we did a huge, we didn't have individual YouTube channels, our school had one YouTube channel."
Renaissance/AR	1/11	"Renaissance, which is reading, AR reading"
Big Blue Button	1/11	"There was a program called Big Blue Button that we used for them to be online watching me teach. If they missed it, there would be a recording. They could go back and watch that entire year. I had kind of a love hate relationship with."
Teachers Pay Teachers (TPT)	1/11	"TPT Teachers Pay Teacher's, that was pretty helpful."
SeeSaw	1/11	"They had different online textbooks that are they had their book online that students could complete their homework and submit it to seesaw without having to print it."
Right Now Media	1/11	"Being a Christian school, we had access to an online version website called right now media that had different resources for us to use to talk through Bible lessons."
Blackbaud	1/11	"The Blackboard platform that we use now basically for like attendance and grades and so had that."
Scholastic	1/11	"Scholastic came out with a bunch of lesson plans that were super helpful for social studies science that we used a good amount as well."
FlipGrid	2/11	"I use the quiz part of Canvas, and Flipgrid a ton."
Canvas		
Get EPIC	1/11	"They had accounts for GetEpic.com, which is the little website they can go to and read books online. I could assign a book and in that, that kind of go along with what we were learning and they could take a quiz. They got interactive, the quiz with that."
Bitmoji	1/11	"Bitmoji is just make it entertaining."
Boom Cards	1/11	
Kahoots	1/11	"Pulling in all the different applications like seesaw, or we used boom cards and Kahoots."

Seesaw	1/11	
GoNoodle	1/11	
Fitness & Fluency	1/11	“We used some more fun ones like go noodle and fitness and fluency.”
Other programs Utilized		Quizlet, Prodigy, QuickTime Video, Studies Weekly

Appendix D
Common Forms of Communication Among Participants

Communication Type	Participant	Participant's Perception
		“It was largely by email. That was sort of communicating with one another.”
Emails	8/11	“You can always say there’s always too many emails. But an email is something you can choose to open when you want to. And read when you want to. And the emails were helpful, because a lot of times they would have information that sometimes you’re hit with so much information, that it’s nice.”
Text/Call	7/11	“I knew the other teachers, you know, I was able to text them and call them and things like that.”
Zoom Meetings	8/11	“We did, of course, email we, and then we would have meetings via zoom.” “I’m pretty sure it was a weekly faculty meeting over Zoom. I do feel like because of the amount of teachers we have, across our elementary campus, you know, Zoom meetings can be hard, because, you know, some people aren’t on aren’t muting themselves, and so you’re distracted. And that I think, those types of meetings were hard to communicate, but I, I feel like having that go between with my associate head, and my head of school really helps because she was able to take what we needed.”
Trainings before COVID	1/11	“It was kind of like during in service before the school year started, they kind of laid everything out and said, Look, this is what we’ve decided.”
Always Available	2/11	“Because she was new. She wasn’t super communicative. But she was always available. If I had questions or, and I’m pretty sure that she did deal with the, if I’m remembering correctly, the, like the room moms to find out what was needed or lacking more than with us. Like she will always be available. If you need anything, let me know.”
Messages to Community	2/11	“I remember emails, not a ton of emails, I remember our chapel services, where, you know, a video of our Head of School, talking to the camera that everybody watched, it was recorded. And she would make announcements and stuff.” “Our two principals, elementary and secondary, also would put out recorded messages to the community.”
Wanted more communication	2/11	“I feel like it just kind of helped keep some semblance of a community going.” “We train our people well, and so it was. I mean, we would get updates, but I didn’t feel like it was overbearing. There, I would have liked maybe a little bit more communication towards like parents, but for towards our teachers, they kind of, you know, hired us to do a job and trusted us and asked us how we’re doing and if we needed something they’d get on it.”