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Technology Selection in a Rural School District: A Case Study

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This dissertation, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

Doctor of Education in Organizational Leadership

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the College of Graduate and
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School of Educational Leadership

Technology Selection in a Rural School District: A Case Study

A prospectus/dissertation submitted in partial satisfaction

of the requirements for the degree of

Doctor of Education in Organizational Leadership

by

Stephnie J. Helton

June 2024

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Abstract

This study examined the steps taken to select technology devices, applications, and websites to be used in the classroom during the Covid-19 pandemic. As schools shut down around the world and transitioned to alternative methods of educational delivery, there was an increased need to analyze the selection process educators used to select technology devices, applications, and websites. Literature indicates that teachers could be overwhelmed with the many technology hardware and software choices available and end up making less-than-sufficient selections. This case study investigated what the technology director, administrators, and teachers deemed important and necessary in selecting educational applications and devices for classroom and home use of technology to establish a cohesive set of parameters for the selection of applications and devices identified as most beneficial and appropriate. The single-case study was qualitative and looked at how participants selected technology hardware and software during a 3-year period through document analysis and semi structured interviews of 10 educators at a small rural public school in East Texas. After analyzing the interviews and documents, the researcher coded the results of the study. Then the researcher extracted themes and used them to create a tool that the school could use to help in the future selection of technology, starting with teachers and routing to central office administration.

Keywords: Covid-19, technology, asynchronous learning, remote learning, synchronous learning, change management

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Chapter 1: Introduction

The global Covid-19 pandemic forced many people around the world to think differently about how society continues to function in a reality where social distancing and isolation have become the norm. In every transaction of a person's life, technology is involved (Parsons, 2020). In education, technology has become critical to learning and to the future of education. There are seemingly more applications (commonly shortened to *apps*) and websites to choose from than there have ever been before (Papadakis et al., 2020). Brown (2016) acknowledged teachers' attitudes toward technology impacted its use in the classroom, including the decision to use or not use certain types of devices and certain types of apps. It is logical that this way of thinking would also apply to how technology directors and administrators feel about technology, and therefore, what applications and devices they would allow or not allow for use on their campuses. Papadakis et al. (2020) cited a need for a tool for evaluating applications and devices and suggested that some applications that are marketed as educational may not be educational at all.

The current study focused on how teachers, technology directors, and administrators in a rural public school district worked together to select devices and applications for classroom use and educational use at home. The setting of this study was a small rural school located in East Texas. This district served approximately 400 students in grades K-12 on two separate campuses (elementary and secondary) and was largely economically disadvantaged, which qualified the district to be designated as Title I. The students were predominantly White, with less than 20% students of color in the entire district. These demographic details were relevant because there was a need to ensure that teachers, technology directors, and administrators were selecting technology hardware and software for the students to use that would be useful and relevant to the

students but also would be appealing, interesting, and cost-effective. Additionally, many school districts with similar demographics would benefit from the results of this study. The Texas Education Agency (TEA; 2020a) classified approximately 18% of schools as *rural remote*, which was the classification of the district in this study.

Since March 11, 2020, this district, like others in the country, has been dealing with the Covid-19 pandemic (World Health Organization, 2020). This had a tremendous impact on technology use, including devices, applications, and websites and changed the needs of students, teachers, technology directors, and administrators. There was an increased urgency for students to have 1-to-1 technology, meaning that every student in the district needed a device on which they could access the internet and/or lessons teachers delivered, whether at home or in-person. There was an increased need for the use of educational applications that would not only help close the gap created by the Covid-19 pandemic but also be engaging for the students. This increased urgency for devices, connectivity, and applications to help close the gap led to the creation of Operation Connectivity (Office of the Texas Governor, n.d.).

As devices and software continued to evolve and become more prominent in classrooms and homes, there was a need to explore teacher, administrator, and technology director views regarding technology. It was important to analyze how teachers were selecting apps and devices for use in the classroom and what they were recommending for use at home. It was vital there was a cohesive process that the teacher, the technology director, and the campus administrator agreed upon when selecting applications and devices. Without a cohesive selection process, the technology director, administrators, and teachers may continue to be overwhelmed with the choices of applications and devices available for classroom and home use, possibly leading to the

selections of less-than-sufficient applications or devices and harming or hindering educational growth rather than helping.

Statement of the Problem

According to Lubniewski et al. (2018), numerous technology applications and devices available for use in the classroom and at home come with limited guidance to teachers and administrators for selecting the most effective applications or devices, and it was unknown what criteria were being used to select them for use in school and at home. Powell (2014) indicated that analyzing applications for use in the classroom provided justification for the use of iPads in the classroom, supporting the need for an analysis of how teachers select and use apps for classroom use. Likewise, McKenzie et al. (2018) determined there was a need to observe application usage in the classroom to help guide principals and teachers in their selection of both devices and apps for classroom use. As suggested by Powell (2014), without guidance, teachers may continue to be overwhelmed with the choices of applications available for classroom and home use, possibly leading to selecting less-than-sufficient applications.

Neumann and Neumann (2014), Neumann (2016), and Neumann (2018) indicated tablets, other devices, and various applications have been used in early childhood and early-level elementary classrooms. Sergi et al. (2017) found that because tablets and smartphones were used at home by young children, there was a concern among parents about how the devices were used and the amount of time spent on them. Roskos et al. (2017) noted that there was little known about the habits of students using digital technology, though Levine et al. (2019) found marital status, family income, parental educational levels, and parental attitudes toward mobile media device usage for parents and their children were all influencing factors toward home technology use.

Purpose of the Study

In this case study I explored what the technology director, administrators, and teachers deemed important and necessary in selecting educational applications and devices for classroom and home use of technology to establish a cohesive set of parameters for the selection of applications and devices identified as most beneficial and appropriate. The study participants were the technology director, administrators, and teachers from a small rural public school located in East Texas.

Research Questions

RQ1. What criteria are used for the technology director, administrators, and teachers to select and approve devices and hardware for classroom and home use?

RQ2. What criteria are used for the technology director, administrators, and teachers to select and approve technology applications, websites, and/or subscriptions for classroom and home use?

RQ3. How has the Covid-19 pandemic changed the selection and approval of technology for classroom and home use?

Definition of Key Terms

Asynchronous learning. A method of online remote learning in which students may access online material at their own pace rather than in real-time (Strong Start - 2020-21, 2020).

Covid-19 pandemic. This was the global outbreak of the contagious and deadly Covid-19 virus (World Health Organization, 2020).

Hotspot. This is a device which allows internet access when there is not access otherwise (Sergi et al., 2017).

1-to-1 technology. One technology device for each student; every student has a device on which they may access websites, apps, or documents for educational use (Vu et al., 2019).

Remote learning. Learning that does not take place in the traditional setting of a classroom with students and teachers present in-person; learning that takes place virtually (Strong Start - 2020-21, 2020)

Rural remote. The TEA defines rural as a district that does not meet the classification of major urban, major suburban, other central city, other central city suburban, independent town, non-metropolitan: fast-growing, or non-metropolitan: stable. To qualify as rural, a district must also either have less than 300 enrolled students or have between 300 enrolled students and the state median along with less than 20% enrollment growth over the previous five years. Additionally, the National Center for Education Statistics adds the *remote* portion of the designation when the district is more than 25 miles from an urbanized area or 10 miles from an urban cluster (TEA, 2020a).

Smartphone. This is a phone that works similarly to a computer and allows access to the internet as well as apps (Sergi et al., 2017).

Synchronous learning. This is a method of online remote learning in which students access the online material at the same time it is delivered to in-person students in real-time (Strong Start - 2020-21, 2020).

Tablet. This is a portable device such as an iPad that allows students to access the internet and apps (Neumann, 2018).

TEKS. Texas Essential Knowledge and Skills; the educational standards set forth by the state of Texas that define what students should know and be able to do, and what teachers should be teaching in the public education classrooms (TEA, 2023).

Title I school. This is a school district federally designated as low-income and eligible to receive federal funds (Title I, Part A Program, 2018).

Chapter 2: Literature Review

In this case study I proposed exploring what the technology director, administrators, and teachers deemed important and necessary in selecting educational applications and devices for classroom and home use. I then established a cohesive set of parameters for the selection of applications and devices identified as most beneficial and appropriate. Using a change management theoretical framework, the study provided a tool for future teachers, technology directors, and administrators to use when selecting technology for use in education. The literature reviewed supports the need for this study by examining technology hardware and software from several different perspectives, and how the emergence of the Covid-19 virus and the global pandemic that ensued impacted education around the world, specifically in U.S. classrooms and homes.

Literature Search Methods

The search methods I used to find articles for this case study included identifying key words relevant to the topic of technology, finding articles related to technology usage, and then reviewing the bibliographies of works for similar articles. All searches were limited to peer-reviewed articles within approximately the past 5 years. While reviewing the bibliographies, it became evident that there were some researchers who have published multiple articles or studies regarding the topic of technology in education, which establishes them as the experts in this field.

At the time of this study, there was limited research regarding the Covid-19 pandemic's impact in the United States. There were many articles available regarding the pandemic's effect on education in countries around the world, and there were many articles available regarding the impact on specific areas of education rather than general education. As this study progressed

during the Covid-19 pandemic, it became evident that the key words used to search would need to adapt to include terms such as *Covid-19* and *pandemic*, and to look at not only how technology has been used in education but how the pandemic has impacted that use.

The main source for articles was the Abilene Christian University's online library, with many sources coming from ScienceDirect and the *Journal of Education Research*. I found some articles using Google Scholar as a search tool, and other articles with the assistance of the ACU staff librarians.

Theoretical Framework Discussion

I have been assured that this case study will become the basis for future technology selection at the school studied. The teachers will work closely with the technology directors and administrators to select future devices, applications, and websites based on the criteria created from this study.

The theoretical framework driving this research was change management. Benvenuti (2011) indicated change management is one of the most important leadership roles there is, although there is often much resistance when change is presented. Levasseur (2010) summarized the principles of change management to five basic concepts, all of which would be evident in the current case study. First, for change to be effective, it must be systemic in nature rather than implemented in small parts or from a top-down approach. Second, change is more effective when the stakeholders have input into the change itself, thus promoting ownership. Third, two-way communication supports the idea that all stakeholders are important in the change. Fourth, just because people show up does not mean they agree with or support the change. It is essential that those in charge understand that just assigning work to those who show up does not indicate that

their team is on-board with the change. Finally, collaboration is the overarching key that ties change together.

Levasseur (2010) noted that these principles are compatible with a three-step change model presented by Kurt Lewin. The three-step change model consists of unfreezing, moving, and refreezing and explains how change happens in organizations. The first step is unfreezing the way of thinking, followed by the initiation of the desired change, and finally ending with stopping at the new level (Lewin, 1958). The current study is driven by this framework because during the Covid-19 pandemic, there was an immediate and critical need to make drastic changes in the implementation of education delivery. It was essential to understand and follow the five steps of change management and this three-step change model. The need to unfreeze the common way of thinking about in-person learning, move to a new way of thinking about instructional deliver, and then refreeze to a new instructional design was evident. It was essential that all educational stakeholders understood that the changes needed to be systemic with vital communication and the opportunity for input in order to gain buy-in and collaboration, ultimately leading to success.

Two technology frameworks supported this study. One is SAMR, and the other is TPACK. SAMR (Substitution, Augmentation, Modification, Redefinition) applies to how teachers use technology within the realm of their content area; TPACK (Technological Pedagogical Content Knowledge) is the intersection of content knowledge, pedagogy knowledge, and technology knowledge and supports how technology impacts learning (Parsons, 2020). Parsons (2020) also stated that both frameworks “can be used to examine, select, and think about individual technology selections irrespective of the setting” (p. 34) and provide a guide to help “decide whether we’re using a technology because it’s new or trendy or because it adds real

educational value" (p. 36). Both frameworks illustrate the importance of understanding not only the need to know how technology devices and applications are selected but also how it would be used in classrooms. TPACK specifically defines the need to understand how technology fits into a classroom by defining the pedagogical impact (Parsons, 2020). By understanding the TPACK framework, it became clear that there was a need for educators in all roles to effectively understand not only their content and pedagogy but also the technology that they are using. The description of SAMR by Parsons (2020) clearly defines the importance of understanding the changing impact of technology needs, which could be applied in this study during the Covid-19 pandemic and the years that followed. Specifically, educators needed to understand how to substitute, augment, and modify their classroom content and expectations to redefine what education looked like during the pandemic. Both frameworks were critical to understanding the background of this study.

Technology in the Classroom

Lubniewski et al. (2018) used an app checklist for educators to create an evaluation tool for iPad apps to be used in the classroom, and Powell (2014) reviewed the selection process one teacher used for iPads for kindergarten students. Both studies provided a suitable foundation for app selection for use in the classroom, although each study was limited to solely iPad apps. Baxa and Christ (2018) also provided a framework for evaluating apps but went a step further and included websites. Zaldívar-Colado et al. (2017) noted several examples of the various types of apps used in education and several types of technology.

From the perspective of those who are using the apps, Reeves et al. (2017) examined feedback from students in a pre-K classroom and determined students needed guidance in how to effectively navigate apps. Additionally, this study made suggestions for teachers in setting up

devices for student usage, including turning off certain settings like the ability to delete apps. In another study that looked at feedback from app users, Hall (2019) looked specifically at what users of a certain app found useful and what drew them to it. Likewise, Zhan et al. (2018) stated "people's attitude toward devices is influenced by the attributes of devices, such as appearance, functionality and portability, and by users' perceptions" (p. 392).

Hatzigianni and Kalaitzidis (2018) noted a definite connection between educators' personal use of technology and their level of confidence with using technology with infants and toddlers. The researchers in this study noted a significant need to continue studying the attitudes and beliefs of educators. The researchers suggested that such further studies could impact professional development and the policies and regulations regarding technology use. The researchers also noted the importance of looking at home technology use in conjunction with educators' attitudes and beliefs.

Looking at apps from a completely different perspective, McKenzie et al. (2018) explored how a specific early literacy app was created, what made the app effective, and what improvements were suggested for the app. Kara and Cagiltay (2020) identified a need to study the actual design of educational smart toys rather than just how they were being used and indicated that "an investigation is needed on how to best integrate these toys into young children's learning environments" (p. 1). Baker's (2017) study, on the other hand, focused on how apps were used in classrooms and whether their use was effective. The study looked at the use of speech-to-text applications to help young students become better readers and writers.

Falloon's (2013) case study found overall that apps that included actual learning rather than just games were more widely used and effective. The study also noted that apps that clearly communicated the learning purpose and instructions were also more used and effective than

those that did not. Additionally, the study examined the distractors, such as advertisements, pop-ups, and links to external websites, that were most often found in free apps. Gan and Balakrishnan (2018) noted while students already used technology for recreational use, notably in messaging their peers, they did not realize how useful their technology could be for learning purposes.

In one 2019 study looking at how one-to-one initiatives impact education, researchers found that schools that implemented 1-to-1 devices experienced a lack of preparation and follow-through in training for teachers. The researchers acknowledged there was an ongoing question of how effective such devices were but focused the study on the actual implementation of the initiative (Vu et al., 2019). Varier et al. (2017) stated, "Although many features are similar, each device has unique capabilities that may or may not be advantageous for specific environments or instructional goals" when considering the ever-growing options for technology devices in classrooms (p. 970). Varier et al. (2017) used a modified version of Bruce and Levin's taxonomy of uses of educational technology to examine how teachers and students used technology in the classroom, and the authors noted that while there was plenty of information about technology, there was not really any substantial side-by-side comparison of devices to help school leaders make decisions.

As classroom needs have evolved, there have been various classroom setups to meet the changing needs of both students and teachers. There has been much discussion regarding how classroom setup affects instruction and student learning. Byers et al. (2018) sought to demonstrate "different classroom layouts altered the pedagogical uses of technology in a secondary school context" (p. 154) but found there was not enough evidence to support the claim that how a classroom is set up affects the efficiency of classroom technology. This was critically

important as education shifted from in-person to hybrid learning models involving a variety of classroom setups, and especially in the era of post pandemic learning, including at-home learning.

McDermott and Gormley (2016) contended that "the arguments regarding whether to integrate technology into classroom teaching have been largely theoretical, lacking empirical evidence for supporting one position or the other" (p. 122). According to Bates et al. (2017), teachers need to understand their students, understand the text, and understand how features of digital texts impact literacy development. The authors looked closely at several features of e-books and considered the various aspects of different platforms. They noted the importance of e-books in literacy, even mentioning President Obama's 2015 initiative to make e-books readily available. Brown's (2016) study suggested a connection between using e-readers and increased reading levels, but the findings were not significant and indicated a need for further research of the impact of technology on literacy.

Lu et al. (2017) found teachers needed support and gave examples of how to integrate technology into their instruction. The authors noted many benefits of iPads and other technology used in the classroom. There are multiple ways to incorporate technology, and there are multiple options available in selecting technology and the applications or programs used. The authors found evidence that teachers were provided devices, but they were not provided the support necessary to implement the devices successfully, noting a lack of support and/or training for teachers and campuses where devices such as iPads were being used one-to-one with students.

The Emergence of Covid-19

The Covid-19 pandemic forced educators around the globe to implement technology. It had prompted many researchers to be interested in the efficiency of online education throughout

the pandemic and as education moves forward post pandemic (Marshall et al., 2020). Mustapha et al. (2021) noted that while there were beneficial possibilities available to both educators and students who were utilizing digital learning, there were also increased costs and uncertainties regarding the capabilities of the internet infrastructure overall. Additionally, the researchers noted that there were millions of children who continued to learn digitally or virtually when schools closed, and children were forced to learn from home while their parents also worked from home because of the lockdowns imposed around the world.

Nickerson and Sulkowski (2021) identified types of crises that impact individuals, including human-caused and technological. According to the study, the Covid-19 pandemic qualified as a crisis because it negatively impacted people. The study also identified the Covid-19 pandemic as a "long and intense" (p. 272) crisis because it took a toll not only on people's physical and mental well-being globally, but also on infrastructure and industries worldwide, and with no true end in sight or no true understanding of how to move forward. Reasonably, educators were unsure of how to move forward in the wake of the Covid-19 pandemic. Landeros et al. (2021) concluded that schools should reopen using a cohort method to reduce the transmission of the Covid-19 virus, including being prepared to switch to remote learning in the event of high positive infection rates in any given community. Landeros et al. (2021) also noted that each community was different, and differences must be considered when making decisions about schools reopening, moving to remote learning, or closing altogether. This study indicated the need to continue to study how schools handled this as the world emerged from the Covid-19 pandemic and attempted to return to normal.

When looking at strengths and weaknesses of technology as used in the beginning of the Covid-19 pandemic, Ibacache et al. (2021) found one important weakness was that there were

too many tools from which to choose. Although there may have been good resources, the study found a general concern of information overload and connectivity concerns for students who may not have devices or internet service at home. Anderson (2021) suggested that parental involvement, including both the time a parent could commit and the parent's ability to help, was also important to a student's success in distance learning. Champa et al. (2021) emphasized that "distance learning is no longer a trend, but an expected avenue for obtaining an education" (p. 54).

Educators' Experiences

Marshall et al. (2020) surveyed U.S. teachers to understand their experiences with the sudden closure of schools and the subsequent shift to online learning. The survey found that while teachers were faced with the normal, expected difficulties of online learning, there were many concerns that were unexpected. For example, one teacher surveyed noted the personal difficulties faced with teaching online from home while also attempting to accommodate her own children's educational and technological needs. Teachers also noted that they were faced with the unexpected difficulty of district policies regarding grading and accountability. The findings indicated a need for schools to better prepare for emergency situations in which teachers and students may be compelled to shift to fully online learning, with clear policies outlined by school districts regarding grading and accountability.

Heider's (2021) study suggested multiple ways for teachers to help students feel a sense of belonging in the online classroom and ways that teachers could and should use technology to ensure that Maslow's (1943) basic needs of students are met, even in a digital platform. Heider (2021) also suggested that teachers should utilize similar technology resources to further their professional development and expand their networking, regardless of the state of the union. If

teachers cannot be face-to-face, they can complete their tasks online just as students can. According to Heider (2021), teachers could help students avoid isolation and help themselves avoid burnout by utilizing technology tools at their disposal.

Basilaia and Kvavadze (2020) suggested from their study based in the country of Georgia, that countries around the world learned from the Covid-19 pandemic that there was a significant need for teachers and schools to be technologically prepared to teach online. According to the study, the country of Georgia, along with 187 others around the world, where education is usually similar to the traditional American format of in-person, face-to-face classes, was forced to stop this traditional type of education and move to a nontraditional, online educational setting due to the Covid-19 pandemic.

Champa et al.'s (2021) study examined the fallout of the sudden closure of schools in Minnesota and noted that prior to the Covid-19 pandemic, schools had never been required to provide distance education on such a large scale, nor were schools prepared to provide meals or childcare that was suddenly necessary. In a similar study, the Center on Reinventing Public Education (CRPE; 2020) examined the Aurora, Colorado, public school's response to the pandemic and deemed that the district relied on crisis management to help its families. The study noted though the initial response to the pandemic was to close schools, there needed to be a plan in place for the following school year that would allow for online learning and/or possibly a combination of learning methods including online and in-person. The study also emphasized that connectivity continued to be an issue for some throughout the pandemic.

Johnson et al. (2020) noted in their survey of 897 faculty and administrators representing 672 institutions from 47 states that, even at the collegiate level, over half of the faculty members were using methods of teaching they were not necessarily familiar or comfortable with. This

study suggested that the sustainability of the plans put in place in response to the Covid-19 pandemic was not feasible for future years in education and needed to be revised to include support, as this study indicated that less than 3% of administrators reported receiving assistance in making the transition from face-to-face learning to online learning.

Kaden's (2020) single-case study described the experience of a secondary teacher in Alaska's remote teaching at the beginning of the Covid-19 pandemic and highlighted the need to utilize technology to be effective in online learning. This study emphasized the use of breakout rooms in Zoom, using student cellphones to video personal experiences, and screenshots of work to project into Zoom meetings. This study noted there was not a comprehensive single way to implement online learning in a way that was equitable and effective and emphasized the connectivity concerns in rural areas. Ogodo et al. (2021) noted teachers were often left to their own trial and error when planning and delivering instruction at the onset of the Covid-19 pandemic, and even when teachers were confident in their technology skills, the lack of connectivity or devices that students had in their homes created frustrations, as did the overall lack of communication of expectations from administrators.

Connectivity

Coker (2020) also noted the issue of connectivity as a potential hindrance to equity in education. Coker further examined the option of paper-packets that districts chose as an alternative to online learning finding that "policy makers stated that Spring 2020 was a disaster" (p. 79) and sought to examine the policies being structured for the return to school in the following fall, such as the idea of a learning environment that allowed students of multiple grade levels to be serviced by teachers all at the same time, moving up and down as necessary, thus offering a more fluid but targeted online educational experience. Al-Hunaiyyan et al. (2021), on

the other hand, found in Kuwait, where connectivity was also a concern, there was support for the blended learning model "in which e-learning tools are integrated within a traditional classroom environment but can be accessed remotely, 24/7, via an LMS or internet connection" implemented during the beginning of the Covid-19 crisis (p. 174). However, the researchers also conceded that there needed to be more training and a stronger infrastructure for e-learning to be fully successful. This study noted a lack of resources for speakers of the Arabic languages, which brought about an interesting parallel for American students whose primary languages are other than English. Alam (2021) suggested the pandemic had a somewhat positive impact on technology due to the sudden rush for the need to be connected. Students, teachers, and people working remotely all needed to be connected, and smartphones provided hand-held answers to the dilemma at hand.

Padilla Rodriguez et al. (2021) examined the connectivity issues of rural teachers in Mexico and noted that, for rural teachers, connectivity was critical and was also an area of concern before the Covid-19 pandemic and continued to be an area of concern as the world continued to deal with the changes the pandemic caused. The study noted that while rural areas may provide common locations for internet access, the Covid-19 pandemic effectively halted the practice of going to such locations. Likewise, the study noted that there were significant and clear differences between communities in rural and nonrural areas where educational opportunities were concerned. Huck and Zhang (2021) also found a marked need for access, citing a connection between households with lower socioeconomic status, connectivity, and success in remote learning or online education. The pandemic brought these differences to the forefront of the educational dilemma faced by many and brought into question the abilities of teachers to connect with students in rural areas where there is limited connectivity. These

teachers had to be creative in ways to reach students, and as the study noted, it was likely that the gaps between these students and their counterparts in more urban, internet-connected areas would be widened as the pandemic continues.

Learning Gaps

Zviedrite et al. (2021) proposed that the gaps noted in Padilla Rodriguez et al.'s (2021) study were also evident in racial/ethnical minorities and those living in poverty and concurred the lack of access to technology impacted these groups more than their more affluent counterparts during the school closures which took place globally. This study suggested that while the gaps between racial/ethnic minorities, those living in poverty, and those not included in either group were already in place, the pandemic and the changes in delivery of education would need to be further studied.

Lupas et al. (2021) noted students with certain disabilities that would limit attention to tasks would assumedly have trouble completing tasks without the guidance of a teacher, such as in the setting of online asynchronous learning; however, there was not yet enough data to support this conclusion. Looking at two cohorts of students, Lupas et al. found student assessment scores for reading were comparable for online and in-person environments, while math showed a slight negative difference than in-person math scores. Using data from the educational technology Renaissance, which is used for diagnostic data as well as progress monitoring, Wyse et al. (2020) speculated that there would be continued learning gaps. They noted that there was not yet enough data to create a full picture of the impact of Covid-19, though there was a definitive need to take into consideration whether schools move forward in-person or online and create learning opportunities that would help close any gaps.

Similarly, Ansorger (2021) contended that various educational reforms have contributed to the learning gaps, and the arrival of the Covid-19 pandemic simply highlighted what was already evident. Ansorger (2021) maintained that in areas of lower socioeconomic status, students could be found in parking lots attempting to connect to the internet to complete lessons, while this was not necessarily the case in other more affluent places. Also, while there was a continuance of education, the delivery methods were vastly different from one area to another, and there was little guidance from the federal government as to how to proceed. This combination of factors, according to Ansorger (2021), would increase the learning gaps and would need to be closely monitored.

Post-Covid Education

Marshall and Bradley-Dorsey (2020) reviewed the plans each of the 50 states submitted for reopening in the fall of 2020 after the unprecedented closure during the spring of 2020. Their review found while some states had comprehensive and detailed guidelines for how their schools would open, others were less specific, and almost all states allowed local-level decision-making. According to the review, Pennsylvania had the most restrictions as decisions were made by the governor, and Mississippi had the least as the Mississippi Department of Education abstained from authority in the decision-making process. Other states correlated their opening procedures with the number of cases of Covid-19 reported in the area. Most states had similar procedures for steps to follow when a staff member or student tested positive for Covid-19 including quarantine and deep-cleaning processes recommended by local health authorities and the CDC. The review found that regardless of similarities or differences, all states did have a plan in place for reopening schools in the fall of 2020 with various combinations of in-person, online, or hybrid models of learning available.

Herbers et al. (2021) found that while children were resilient, those who live in poverty were less likely to be equipped with coping mechanisms to help them deal with crisis situations, such as the Covid-19 pandemic. Herbers et al. (2021) noted these students relied on having teachers to turn to as they dealt with new schedules and routines. Likewise, parents depended on schools to be open so that they would not need to find childcare in the wake of the Covid-19 pandemic.

Families living in poverty were more likely to struggle to maintain a sense of normalcy throughout the pandemic, and they depended on schools to help with not only education but also food and safe childcare. Jensen (2009), a seminal researcher on the impact of poverty on education, described how children cope with situations differently. Jensen (2009) contended that while children living in poverty did not necessarily make the choice to make poor decisions, they are faced with different life situations and choices than their more affluent peers. Hence, children living in poverty tended to struggle more with both academic success and social success. Jensen (2009) also noted that in homes in which poverty was prevalent, parents were less likely to be educated, and parents were less likely to be involved in their children's education. Additionally, Jensen (2009) found that parents living in poverty were more likely to work long hours and not be home to care for children.

Johnson et al. (2021) suggested reopening schools was essential to the welfare of children, even though doing so may have actually created what was deemed Covid-19 Hotspots, or clusters of infections among students which might then spread among their communities. According to the study, schools should be prepared to close again after reopening due to the spread of Covid-19. Cohen (2021) noted it may be more difficult for some schools to handle the reopening process if there was not a way for the school to easily test for Covid-19, initiate

contact-tracing, and initiate personal-protection measures; however, learning in the classroom was better than online. In a survey of 447 public school teachers, Shaw et al. (2021) found that 67% of teachers felt online students were not receiving the same level of instruction as their in-person classmates, even though the same teacher delivered both formats of instruction to the two different groups of students. Camera (2021) also noted the difficulties school districts faced during the reopening process, citing schools in New York, Chicago, Texas, and Florida as having opened only to close again due to having high numbers of positive Covid-19 rates. It is logical to conclude that schools should also continue to be prepared to offer online learning or a combination of in-person and online learning to students.

Financial Burden

To demonstrate spending on public education in the United States, Chen et al. (2021) noted that "in 2016, the United States spent $13,600 per student on elementary and secondary education" (p. 143), and school districts invested billions of dollars to upgrade Wi-Fi between 2015-2019 (State of the States, 2019). Schools also had the expense of monitoring internet activity to protect students from malicious activity or websites. Chen et al. (2021) also contended that there was a positive correlation between school districts that spend more money on internet connectivity and have a high level of connectivity at students' homes and academic success. These same districts have high levels of parental satisfaction with public education. Additionally, the study noted along with an academic increase, increased internet access could lead to increased disciplinary issues that could cost school districts money due to loss of attendance from suspensions and expulsions, though this was an area that deserved further research.

Shaw et al. (2021) also contended that as schools are reopening and returning to what would be considered the new normal as the Covid-19 pandemic continued, teachers and schools

were spending more money to prepare for the new era of education. Throughout the pandemic, schools bought more computers and hotspots for students and teachers, provided teacher training, and spent additional funds on copies for students without internet connectivity. Shaw et al. (2021) also noted as schools reopened and settled into the new routines and requirements brought about by Covid-19 dealing with social distancing and quarantine procedures, there was a need to not only continue the expense of online learning for some students but also the need to safely provide in-person educational opportunities, which would include hiring more teachers to accommodate smaller class sizes and, in some instances, even adding buildings or transitioning learning spaces to accommodate social distancing. Schools also had to take into consideration the additional cleaning and sanitizing processes that became necessary. Shaw et al. (2021) noted the need for continued research of the impact of the Covid-19 pandemic on both the academic growth of students and the financial impact to school districts.

Summary

The literature I referenced supported the need for a common tool for educators to use to guide them when selecting technology devices, applications, and websites for classroom use. This became more prevalent as the Covid-19 global pandemic created an increased need for varying types of educational tools, both in delivery and in access. The emergence of the Covid-19 global pandemic also highlighted educational concerns, such as both teachers and students being unprepared for a shift from in-person learning to a wholly online learning environment. Additionally, connectivity issues that were present before the pandemic have been brought to the forefront of educational delivery options for teachers in rural or remote areas. It became essential that as more and more students were learning at home or through virtual means, the technology that teachers used or recommend for use at home must be engaging, educational, and relevant.

Chapter 3: Research Method

In the district I investigated, there were numerous technology applications and devices available for use in the classroom and at home with limited guidance for teachers, technology directors, and administrators for selecting the most effective applications or devices. It was unknown what criteria were being used to select educational applications and devices for use in school and at home (Lubniewski et al., 2018).

Gan and Balakrishnan (2018) found when used appropriately, the combination of online learning and mobile technology could transform learning into student-led learning, although there has not been much research regarding the outcome of this combination of technology and learning, supporting the need for an analysis of how teachers selected and used technology for classroom use. Likewise, McKenzie et al. (2018) determined there was a need to observe app usage in the classroom to help guide principals and teachers in their selection of both apps and devices for classroom use. As suggested by Powell (2014), without guidance, teachers may continue to be overwhelmed with the choices of applications available for classroom and home use, possibly leading to selecting less-than-sufficient applications. Powell (2014) indicated analyzing apps for use in the classroom provided justification for the use of iPads in the classroom.

The research questions for this case study included the following:

RQ1. What criteria are used for the technology director, administrators, and teachers to select and approve devices and hardware for classroom and home use?

RQ2. What criteria are used for the technology director, administrators, and teachers to select and approve technology applications, websites, and/or subscriptions for classroom and home use?

RQ3. How has the Covid-19 pandemic changed the selection and approval of technology for classroom and home use?

In this chapter I outline the research design and methods and provide support for the method selected. Next, I describe the population of the case study, the sample size, the materials, the data collection, and analysis procedures I used. Ethical considerations, assumptions, limitations, and delimitations are addressed.

Research Design and Method

In this study, I employed a single-case study method. Stake (1995) defined qualitative case studies by using four characteristics that this study met: holistic, empirical, interpretive, and emphatic. This study is holistic because it considered the connection between the phenomenon observed and the context of public education. This study is empirical because I analyzed information through a document analysis of purchase orders and requisitions from school years 2019-2020, 2020-2021, and 2021-2022. This study is interpretive because I was the main person who analyzed the data and made the interpretations. Finally, this study is emphatic because the results reflect the participants' experiences.

Merriam (1998) provided even more characteristics of a case study. Merriam (1998) distinguished a case study by it being particularistic, descriptive, and heuristic. The current study met all the points given by Merriam (1998), as well. This study focused on the technology program (particularistic), described the process(es) used (descriptive), and helped the district with future selection processes (heuristic).

The single-case case study made the most sense because the problem was observed "within its context" (Baxter & Jack, 2008). I conducted the case study at the school in question, and all documents analyzed and purchase orders and requisitions from school years 2019–2020,

2020–2021, and 2021–2022, pertained specifically to the school in question. According to Yin (2003), case study design is most appropriate when a decision-making process is being observed and analyzed, as with the current study. Through document analysis and interviews (Leavy, 2017), this study examined the process the district had in place for teachers to recommend an application, website, or device for use in the classroom and at home, as well as any trends that emerged regarding technology during the initial stages of the Covid-19 Pandemic or throughout the following two school years.

Population

I conducted this study in a small rural school district in East Texas. The district served a community that was largely economically disadvantaged, which designates the district as a Title I district by federal guidelines. The community was designated as rural remote. In 2020, the TEA classified approximately 18% of schools as rural remote (TEA, 2020b). The demographics of the school were not diverse: The student body consisted of more than 80% White students. There were less than 40 total teachers on two campuses, with one campus administrator on each campus and one technology director for the entire district. There was one superintendent who reported to the board of trustees.

Study Sample

After receiving required permissions from the Institutional Review Board at Abilene Christian University, I conducted semistructured interviews and document analysis of requisitions and purchase orders at the study site (the school district) in person as much as possible (Leavy, 2017). After gaining written permission from the district administrators, I scheduled and individually interviewed the district technology director, one central-office administrator or superintendent, one purchasing manager or business manager, administrators

from both the elementary and secondary campuses, two teachers from the elementary campus, and three teachers from the secondary campus. As a district employee, I assumed a previously established working relationship with all potential study participants, apart from any new employees. I was not in a supervisory position or a position of authority over any of the study participants; therefore, there was no position of power between me and study participants. All study participants were invited to participate using district email and Google Forms approved by administrators. I informed all participants of any risks associated with the study and they were given the opportunity to withdraw at any point in the study.

There was a total of 10 participants in this study: Five participants were classroom teachers; five participants were administrative or central office staff. This was a fair representation of the population in the study. The study represented 100% of the technology directors and campus-level administrators. The technology director is directly in charge of the technology infrastructure of the school, including systems maintenance, vetting all purchase requests regarding devices and software or applications, monitoring the technology use of the entire district, and troubleshooting as necessary. The campus-level administrators are directly responsible for vetting purchase requests for devices and software or applications along with monitoring their use in the classrooms including alignment to TEKS and curriculum standards or pedagogy. I chose to include 100% of the technology directors and campus-level administrators in this sample because in this district, the purchasing decisions were generally approved by program directors and campus-level administrators. The study denoted the views of approximately 12% of classroom teachers in the district.

Materials/Instruments

Three separate interview protocols were included in this study along with a document analysis record. All interviews were semi structured and conducted in a face-to-face setting at the participants' requested location. Appendix A focuses on the interviews with teachers. Appendix B focuses on the interview with the technology director. Appendix C focuses on the interviews with administrators. Appendix D describes the tool I used to record the findings of document analysis of purchase orders and requisitions from school years 2019–2020, 2020–2021, and 2021–2022.

There were nine main questions in each interview. The questions on each of the three surveys were similar, with slight changes aligned to the participants' roles. For example, I asked teachers how he or she decided what technology hardware and software to use in the classroom; I asked the technology director how he or she would decide what to purchase; I asked the administrator how he or she would decide what to approve. There were three distinct roles to observe in this case study. All questions were written in an open-ended manner. This allowed participants to answer the questions openly, without feeling led to a correct response.

Each interview included sub questions to ask for certain questions. If the participant provided an answer that was unclear or ambiguous, I used the follow-up questions to draw more information out. The interviews were not rigid in structure with yes/no questions. I designed all questions with the intent to allow interviewees the opportunity to expand upon their answers based on their personal and professional experiences. If responses led to additional questions, those questions were addressed and added to the interview.

Appendix D describes the tool I used for document analysis. This protocol allowed me to examine purchasing trends by reviewing requisitions and purchase orders over a three-year

period, beginning with the school year 2019–2020, when the Covid-19 pandemic began, and ending with the initial purchases for the school year 2021–2022, which is one full school year after the emergence of the Covid-19 pandemic and two years post pandemic. The school years were identified as Year 0: 2019–2020, Year 1: 2020–2021, and Year 2: 2021–2022. This allowed me to identify any significant spending trends regarding technology, including both devices and subscriptions to online learning tools utilized by teachers individually, as grade levels, as campuses, or as an entire district. It is important to note that there were several options when making purchases, and these options were analyzed for any recurring trends. This was beneficial when creating the tool for guidance of future purchases, especially as schools continued to deal with the pandemic and faced the continued need for online learning options.

When combined, the interviews and document analysis of requisitions and purchase orders were designed to answer the research questions of this case study:

RQ1. What criteria are used for the technology director, administrators, and teachers to select and approve devices and hardware for classroom and home use?

RQ2. What criteria are used for the technology director, administrators, and teachers to select and approve technology applications, websites, and/or subscriptions for classroom and home use?

RQ3. How has the Covid-19 pandemic changed the selection and approval of technology for classroom and home use?

The interview questions aligned with the characteristics set forth by Baxter and Jack (2008), Merriam (1998), Stake (1995), and Yin (2003) regarding case study research. The interview protocol and document analysis aligned with Leavy (2018). Table 1 demonstrates how the interview questions aligned with the research questions, as well as how the document

analysis aligned with all research questions. Question 10 on all interview protocols was specifically, and solely aligned with Research Question 3, as both were designed to examine the specific impact of the Covid-19 pandemic.

Table 1

Data Collection Plan Alignment

Data collection tool	RQ1	RQ2	RQ3
Document Analysis	All	All	All
Teacher Interview Protocol	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 9	10
Technology Director Interview Protocol	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 9	10
Administrator Interview Protocol	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4, 9	10

Data Collection and Analysis Procedures

After IRB approval was obtained from Abilene Christian University (see Appendix F), I conducted semi structured interviews with 10 district employees regarding their views about technology and how it was selected and used in their current educational setting. The staff members were current employees of the school district studied. The 10 staff members consisted of two campus principals, one elementary and one secondary, one district-level technology director, one central-office administrator or superintendent, one purchasing manager or business manager, and five classroom teachers, three at the secondary level and two at elementary.

With explicit written permission from the participants, after discussing informed consent and ensuring that participants were aware that they could end the interview at any point, I

recorded interviews. I began recording using the voice recorder on a cell phone and took notes. Once all interviews were completed, I personally transcribed them and printed each transcription. I then manually coded the interview transcript and notes using in vivo coding and looked for common categories and then themes within and between the interviews with the hopes of identifying necessities that all participants identified when selecting devices or applications for educational use in the classroom and at home.

With explicit permission from the district's superintendent and with coordination with the purchasing manager or business office manager, I analyzed requisitions and purchase orders that demonstrated purchasing trends related to technology. I looked for purchases related to both hardware (devices) and software, as well as subscriptions to educational websites. Documents were from school year 2019–2020, which represented the beginning of the Covid-19 pandemic (Year 0), school year 2020–2021, which represented the year after (Year 1), and school year 2021–2022, which represented one full school year after the emergence of Covid-19 and two years post pandemic (Year 2). I also sought to identify any trends regarding specific teacher purchases versus grade level, campus, or district purchases.

Ethical Considerations

There was minimal risk in this study, and all guidelines of the Belmont report were followed. The Belmont report outlines the steps a researcher must take to ensure that the research process is ethical and moral and does not take advantage of any participants of the study (Office for Human Research Protections, 1979). All stakeholders in the case study will benefit from the findings of this study. The risk involved in this study was that a participant or the case site may be identified. This was a minimal risk that did not cause harm for anyone involved in the study. I maintained the anonymity of the school throughout the study and removed all identifiers from

any data collected. Pseudonyms were used for participant names. I gave participants the opportunity to provide their own pseudonym, though all declined and were instead given anonymous identifiers, such as Participant 1, to protect participant identities.

I manually transcribed the interviews, listening to the recordings and pausing to rewind and relisten multiple times to ensure accurate transcriptions, thus providing an in-depth amount of time spent with the data, and establishing trustworthiness. The transcriptions were printed and then, along with the interview notes, the data were manually coded using in vivo coding and analyzed to find common categories and finally themes. I manually analyzed common themes by looking for similar terms throughout the interview transcriptions and the notes I took during the interviews. Then, using color-coded tally marks on a hand-written chart, I typed the common terms into the search feature of Microsoft Word to verify the accuracy of the hand-written tally marks and to identify any possible errors. Likewise, I analyzed data on requisitions and purchase orders from school years 2019–2020, 2020–2021, and 2021–2022. I noted any emerging trends regarding purchasing data in the year of the beginning of the Covid-19 pandemic and the two years immediately following. Data were stored following IRB guidelines. I did not conduct any interviews or document analysis or collect any data until the study received full IRB approval.

Trustworthiness

Ethical guidelines set forth by the IRB were followed in this study. This single-case study took place in an educational setting. The study did not involve any children. Abilene Christian University's guideline for informed consent was followed closely. I invited all participants in the study to participate with a full explanation of any risks associated with the study and their ability to withdraw at any point, both in writing on the informed consent and verbally at the beginning of interviews. I shared the results of the study with all participants upon completion of the study.

I manually transcribed and coded interviews and document analysis of requisitions and purchase orders.

Assumptions

The main assumption of this case study was that there was a lack of connectivity in rural areas that impacted the use of technology. I addressed this assumption in interviews and document analysis of requisitions and purchase orders. There was also an assumption that the participants I sought to interview would participate. If participants had chosen not to participate, I would have adjusted the study sample, but this did not happen. Finally, there was the assumption that participants would answer truthfully.

Limitations

This study was limited to the views of educators in a small rural area, which limits generalizability. It was important to note that while the educational needs of students across the state were similar, the technological needs may be vastly different due to location and specifically concerning connectivity. The results of this study were likely similar to studies of similar school districts with similar demographics in similar locations, but the results were not similar to studies of districts in large, urban areas.

Delimitations

This study specifically looked at how teachers, the technology director, and administrators selected devices and applications for educational use in the classroom and at home. The study did not examine how parents or students selected supplementary applications or devices to be used at their homes. The study considered but did not include how teachers use supplementary applications or websites that are free or that the teacher purchased as an individual subscription. While there were some types of applications or websites that an

individual teacher chose to use, if they were not purchased by the school or there was not an expectation of use by the entire staff, this type was not relevant to the study and was acknowledged, but the data were excluded. Likewise, the study considered but did not include applications or websites that were used in the classroom only for entertainment purposes rather than for educational use.

Summary

After full IRB approval, the study answered the stated research questions through semi structured interviews and document analysis of requisitions and purchase orders over a period of three school years, which included the initial impact of the Covid-19 pandemic and the immediate fallout. This study had transferability to other districts with similar census data and demographics, such as the 220 school districts labeled rural remote by the TEA. In the next chapter, I outline the categories and then the themes that became evident from the interviews and the document analysis.

Chapter 4: Results

This case study focused on how teachers, the technology director, and administrators at a small rural, largely socioeconomically disadvantaged school district in East Texas select devices and apps for their students to use in both the classroom setting, and when applicable, at students' homes. The study focused specifically on the three years during which the world was dealing with the initial stages of the impact of the Covid-19 pandemic in schools in the United States (Figure 1). This includes the first year when the trend was for schools to shut down worldwide, the second year during which schools adapted a variety of in-person, hybrid, synchronous and asynchronous approaches to educational delivery, and the third year when most schools returned to normal, with full-time, face-to-face learning in the classroom.

The research questions for this case study included the following:

RQ1. What criteria are used for the technology director, administrators, and teachers to select and approve devices and hardware for classroom and home use?

RQ2. What criteria are used for the technology director, administrators, and teachers to select and approve technology applications, websites, and/or subscriptions for classroom and home use?

RQ3. How has the Covid-19 pandemic changed the selection and approval of technology for classroom and home use?

I invited participants to the study using their school district email with prior approval from the school district superintendent. All 10 participants agreed to participate and were interviewed at their requested times and locations. The 10 staff members consisted of a variety of staff members that included both teachers and administrators. I conducted all interviews in-person, recorded them, and then transcribed and analyzed them. There was an overwhelmingly

common theme among all participants regarding how technology hardware and software were selected. There was also a common theme among administrators and the technology director regarding how technology purchases were approved or denied.

This chapter reviews the themes found in the interviews and presents the results. The results are divided into three categories that are directly aligned with the research questions: devices and hardware, apps and websites, and the specific impact of the Covid-19 pandemic Within those three categories, I demonstrate how the themes noted below became evident. I present the results both comprehensively and broken down by teacher views and administrator views, as these are remarkably similar but not the same. The themes derived were substantiated by anecdotal evidence from participant interviews and verbatim excerpts.

Categories

Devices and Hardware

This district was a 1-to-1 district in the wake of the Covid-19 pandemic, and because of the need to facilitate that, there was no room for anyone other than administrators and the technology director to make decisions regarding hardware and devices. During Year 0, the administrators and the technology director worked together to decide how to best serve their students and staff in the face of the school shutdown. This district was forced to consider connectivity issues that would hinder their students' ability to stay atop classwork assigned by their teachers. During Year 0 (2019–2020), the district purchased a considerable number of devices and hardware (Table 1). In Year 1 (2020–2021) and Year 2 (2021–2022), the district simply sought to maintain and upgrade the devices already purchased, according to the technology director.

Table 2

Document Analysis - Purchases

Year	Items	Amount
0 – 2019-2020	Hardware	$32,027.50
1 – 2020-2021	Program Subscription (ICEV)	$6,000.00
2 – 2021-2022	Application Subscription (KAMI)	$2,700.00

All five teachers interviewed resoundingly responded that they did not feel that they had any input in the purchase of devices during Year 0 because it was such a sudden and emergent need. One teacher, P5, did state that if the teachers "were adamant about something, then they let us keep it and use it." Though teachers feel their input would be heard and in fact welcomed, they currently have no need to request new devices or hardware because by Year 2, every classroom has a Chromebook cart, and every student has a device available at any given time. Teacher respondents also noted that they do have access to smart TVs in their classrooms and peripheral accessories such as headphones for students who have accommodations.

Applications and Websites

I found that there was a common theme regarding how all participants select technology apps and websites for use in their classroom. This theme directly aligned with the need for an understanding of pedagogy content as described in the TPACK framework. All participants noted that technology must add to or enhance their lesson, thus reinforcing pedagogy and content, rather than detracting from the lessons. P1 stated the following:

> Is it a hindrance for teachers to use the technology inside the classroom? Because technology is tool that should not be a hindrance, it should elevate the classroom teacher

> and learning for the students, so if it's not elevating what you're trying to do with your students, we won't go into that pathway.

Participants overwhelmingly noted that technology software or apps and websites should be TEKS-based and aligned with the curriculum being taught in the classroom, which supported the pedagogy beliefs of all participants. Teachers also noted that technology, both hardware and software, should be easy to use and ideally would lack distractors, such as pop-up ads and overstimulating colors, flashes or strobing effects, or numerous and complicated steps to achieve the end goal. Finally, participants noted that a big factor in whether they would even consider an app or website to use in their classroom or to suggest their administration purchase was the integration of single sign-on (SSO) using either Google or Clever, both of which the district currently utilizes. The simple fact that these are tools that allow large-batch rostering of students that takes away a step a teacher must perform is highly attractive to educators. Administrators and the technology director agreed on all points.

Administrators went a step further and explicitly stated that if technology software, apps, and websites were not directly aligned with the TEKS and the approved curriculum, then it would not be approved for classroom use and would be denied if there was a purchase request, which also demonstrated the understanding to the connection between technological, pedagogical, and content knowledge, or the TPACK framework. One administrator expressed mixed emotions regarding teacher-material sharing sites, such as the popular Teachers Pay Teachers:

> You can't monitor the rigor, now you're putting it all to the teacher aspect, and then you don't have that communication between the teacher and the administrator on what is actually being taught, so therefore I don't like Teachers Pay Teachers because I'd rather

> go with a standards-based curriculum, technology curriculum . . . because now the teacher and the students or the teacher and the administration aspect have all the same common language versus the teacher trying to pull from one aspect and the administration trying to pull from another.

One participant further explained that, while it was not a hard requirement, the SSO factor was a big point for approval or denial of technology requests for both hardware and software.

The Impact of Covid-19

I found that there was a common theme regarding how all participants responded to the impact of the Covid-19 pandemic on their educational experience. Most respondents expressed the need to be prepared for the possibility of similar experiences in the future. A common idea expressed was the need to spend time at the beginning of every school year preparing students for the possibility of being out of school for an extended period and how they would proceed. Teachers noted that they spend time showing students how to use Google Classroom, how to access assignments, complete work using Kami, and how to turn in assignments through Google Classroom, both to prepare for possible shutdowns and to utilize it as a classroom tool to enhance instruction. Administrators noted the need for teachers to take the time to prepare students, and even prepare parents for the possibility of remote learning if there is another shutdown due to Covid-19 or any other adverse event.

One thing that all participants noted was that there is a significant lack of connectivity for the students in this district. Administrators described their creative ways of attempting to overcome this obstacle during Year 0, although they admitted they did not have much success in their efforts. P1 reflected upon this issue:

> I got all these hotspots from TEA. I tried to use it. Didn't work. Hotspot is not the answer, for sure. I've even went and purchased where the bus has the capability, was going to be a hotspot. Didn't get it up and running…I would outsource different things as far as just trying to do it ourselves.

Administrators noted that they purchased hotspots during Year 0 and issued every student a Chromebook (Table 2). Teachers noted that while every student had a Chromebook and hotspots were available, not all students knew how to use the devices and parents were not knowledgeable either. Many participants noted this as something they learned from their experience in the pandemic and something that they would change moving forward. Three out of five teachers interviewed noted the need to spend time at the beginning of every year teaching their students how to use the hardware and software they have and will use. All the campus principals interviewed agreed with the necessity of preparing students for using online tools. P7 described the following:

> The technology in the classroom, so that the kids are familiar with like our system, is the Clever login system. They are familiar with that. They understand what Google Classroom. They know how to go to their assignments, just having them trained and knowing hey if something ever does happen and your teacher sends you an assignment through Google Classroom, you know exactly what she's talking about. So that's why it's important to incorporate it into the classrooms. I think that's going to be here from now on out.

The expectation is that in the event of another shutdown for any reason, students would be better prepared. All participants surmised that the lack of connectivity created a disconnect between school and home, and ultimately, the school resorted to paper packets for most

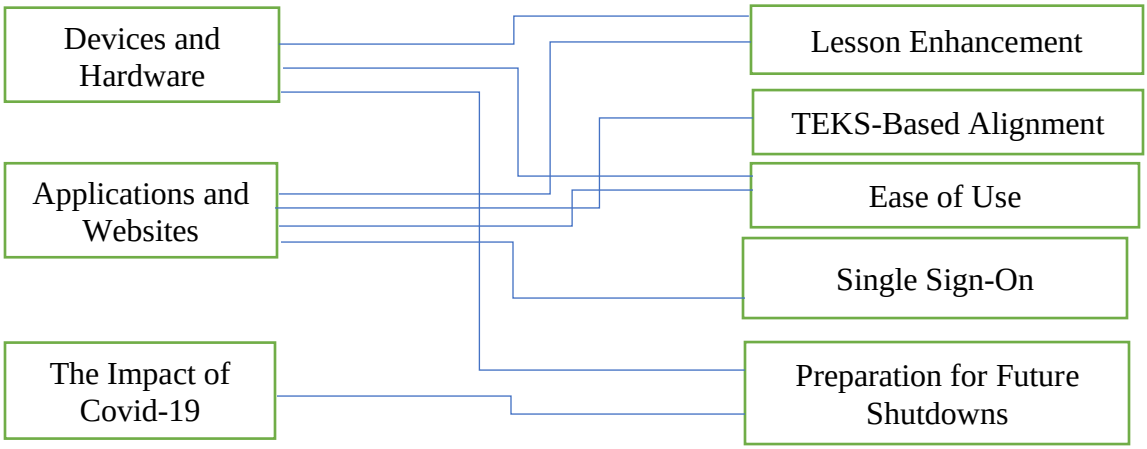
instructional purposes during Year 0. The technology director and administrators agreed that, though this was a tough time to deal with, one silver lining for the district was the completion of the goal to fully become a 1-to-1 district earlier than originally planned.

Themes

There were five themes that continued to appear in the interviews. The five themes were Lesson Enhancement, TEKS-Based Alignment, Ease of Use, Single Sign-On, and Preparation for Future Shutdowns (Figure 1).

Figure 1

Categories to Themes



Lesson Enhancement

Interview participants repeatedly noted that technology, both hardware and software, needed to add to or enhance their lessons rather than detracting from them (Theme 1). While this theme was common in both teacher and administrator interviews, the teachers felt more strongly about this as an important aspect. For example, P2 noted that students could appear to be working but be off task:

> The Chromebooks are basic, and so they don't have a lot of room for error. When you don't give them so many options, you don't have many distractions, whereas a phone

> could be used to, well yes, I want to use my phone for Kahoot, when they're actually texting Johnny across the room about something Sally said; therefore, having a simple device would be better class management.

P2 went on to note that students using their cell phones rather than school-issued devices also opens them to many distractions because of the many applications that can be downloaded on a student's phone. P9 also stated that students benefit from technology hardware and software that enhances the lessons:

> My experience is almost every teacher that wants something technology-based is trying to add something to supplement the classroom. And adding any sort of supplements in my opinion is significantly important to the students as it gives them another route of receiving the information in a different way, which could help the smarter students, or students who are already doing good with the current method see a different light and just reinforce it, and the students who aren't getting it with whatever is currently being done, it may make it click for them.

Similarly, P4 stated that technology software, apps, and websites should be "kid-friendly, in where it's colorful and catches their attention, but I don't want it to be just playing games either; I want it to be more of an educational reason for it."

TEKS-Based Alignment

Likewise, technology software, apps, and websites needed to be TEKS-based and TEKS-aligned appropriately (Theme 2). Though Themes 1 and 2 are similar, I felt that they were different enough to be two separate themes rather than combined as one because technology software, applications, and websites could add to a lesson but not necessarily be TEKS-based or TEKS-aligned, and vice-versa. This theme was mostly noted in administrator interviews. P7, an

administrator, noted that while every decision made was based on what was best for the students, TEKS-alignment was important:

> If it's something that we just want because it's fancy and you know, it's fun for the kids of course if it's fun and you know engaging, but is it following the TEKS, and is it what's best for the child? I guess is it a TEKS-based curriculum or a TEKS-based technology or program or whatever? But if it's what's best for kids, that's where I always go first.

From an administrator's standpoint, P8 noted that though there is a plethora of technology software, apps, and websites available, they must be TEKS-based, TEKS-aligned, and prescriptive:

> If technology is prescriptive, they're not just basic and uniform and everyone gets the same cookie . . . this child is not performing on this skill; this appears to be the reason, so I need it to have the ability to back off by grade level and go catch them where the gap begins or where the problem started.

Ease of Use

The third theme that became evident was that technology hardware and software needed to be easy to use. This was described differently by different participants, but essentially, students needed to be able to navigate devices and apps or websites with minimal assistance from teachers and with minimal distractors like pop-up advertising or too many flashing lights. Some participants also noted that too many options could be distracting for students, thus making the technology more of a hindrance than an addition to the learning process. P6 gave examples:

> If the graphics on it, are you now just popping or flashing, maybe? I know that's an actual good thing if you're teaching, but it's just not. I don't tend to look at them if they're steady buzzing around. Umm…if it loads well, if it is easier to read, I mean I

> don't do it if it's got like 50 different buttons on it. Give me basic three to five buttons, and I'm ok with that website. Too many options for me is not my thing.

Single Sign-On

SSO was identified as another distinct theme. Participants agreed that being able to click one button and login was important, especially for younger students. P4 noted that students could access everything easily once they were logged in. Administrators and the technology director also noted that SSO allowed for easier rostering of students and turnover from year to year, thus allowing programs to be more time efficient to the teachers using them. They noted that having to roster in students or having to roll over students from year to year could be seen as a negative characteristic of a program, app, or website, and could lead to teachers not using the program, app, or website. While Ese of Use could be a sub theme of Theme 3, there was enough uniqueness to the SSO factor that this stood alone as a theme. P1 noted that because the district is "Google everything, we want to make sure [everything] is compatible with Google," and that "you want to make sure your technology marries with your curriculum in order that you're not fighting with technology." P1 went on to note that being Google everything, including SSO, provided familiarity for students and parents using technology hardware and software at home, and allowed better communication between all stakeholders during Years 0 and 1 because Google automatically saves work. Likewise, P10 noted that SSO was one factor that would influence approval or denial of technology requests, while P2 and P8 specifically noted SSO as something that makes a device user-friendly. P5 stated the following:

> Our devices now have Clever, which logs in every password for the kids, and they don't have to remember all that stuff, and so they can't say, "Hey, I couldn't log on at school, or I can't log on at home," because it does it for them now.

Preparation for Future Shutdowns

The fifth and final theme that was evident was that technology, in whatever form or fashion being used, including both hardware and software, needed to prepare students and staff for future shutdowns. In the wake of the unprecedented shutdowns that happened during the Covid-19 pandemic, educators realized that they were unprepared for such events. The participants of this study stated that they have since spent considerable time at the beginning of school years (after Year 2) frontloading skills needed to effectively use devices, software, apps, and websites, so that students would be prepared and knowledgeable if the school needed to shut down and transition to remote learning. Study participants noted that when they looked for technology to use in their classrooms, to the extent that they had input, they sought out tools that would be helpful if the district needed to move to such a situation again.

It is worth noting that districts have used this ability to move to remote learning to their benefit in situations much different than the original intention, with some districts across the nation no longer using bad-weather days and transitioning to remote learning instead. It is critical that technology keeps up with the ever-changing needs of education. P3 noted that during Year 1, technology was essential to student learning while the teacher was out of school for an extended maternity leave. According to P3, “students were doing everything on Google Classroom at that time, and so I could be at home and really still monitor what my kids were doing, the work they were doing.”

Theme Frequency Analysis

Participants were mostly concerned that technology hardware and software was an enhancement to the lessons being taught rather than any type of distraction. This was the primary concern, displayed in Table 3. Surprisingly, the second most common concern was ease of use.

TEKS-based alignment, while very important to some interview participants, was the third most mentioned theme, and single sign-on was fourth. Another surprising discovery was that preparation for future shutdowns was the least commonly mentioned theme, though for administrators, it was very important. It is possible that the interview participants, overall, felt comfortable with their use of technology and their abilities to prepare students as technology becomes more seamlessly integrated into the day-to-day classroom operations.

Table 3

Theme Frequency

Participant	Theme 1 lesson enhancement	Theme 2 TEKS-based alignment	Theme 3 ease of use	Theme 4 single sign-on	Theme 5 preparation for future shutdowns
P1	6	9	4	2	1
P2	7	1	4	1	3
P3	5	0	5	3	1
P4	4	2	5	1	2
P5	6	1	2	2	0
P6	4	2	5	2	3
P7	4	2	2	3	4
P8	4	5	2	4	3
P9	3	1	2	2	0
P10	3	1	1	1	1
Total	46	24	32	21	18

Summary

P8 summed up the findings of this study: “It’s the world that our kids are going to live in…we have to do what’s best for our kids as far as what is needed in technology and not be afraid of it,” an attitude which is evident in the interviews and the literature. The Covid-19 pandemic simply brought what has been evolving into the forefront of the educational world.

In the next chapter, the discussion will focus on limitations and delimitations of the study, suggestions for future research, and final conclusions and recommendations drawn from the research and results. I will present a suggested tool that districts may use to help vet technology hardware and software purchases and the integration of technology hardware and software in the classrooms.

Chapter 5: Discussions, Implications, and Recommendations

The final chapter of this case study includes a discussion of the study results as well as limitations and delimitations. I discuss recommendations for future research, and finally there is a tool included that school districts could use to properly vet technology hardware and software based on the findings of this study.

Discussion of the Study

This case study was a qualitative single-case study seeking to answer the following research questions through interviews and document analysis:

RQ1. What criteria are used for the technology director, administrators, and teachers to select and approve devices and hardware for classroom and home use?

RQ2. What criteria are used for the technology director, administrators, and teachers to select and approve technology applications, websites, and/or subscriptions for classroom and home use?

RQ3. How has the Covid-19 pandemic changed the selection and approval of technology for classroom and home use?

The study focused on a small rural school district with a high percentage of socioeconomically disadvantaged students and community members. The study focused on the impact of the Covid-19 pandemic and its impact on the district's use and purchases of technology, including hardware/devices and software/apps and websites. The study was narrowed down to three specific years starting with the emergence of the Covid-19, and ending with the year that students were back in school full-time.

After interviewing 10 staff members, including the technology director, administrators, and teachers, I transcribed the interviews and then thematically coded the interviews into five

themes: Lesson Enhancement, TEKS-Based Alignment, Ease of Use, Single Sign-On, and Preparation for Future Shutdowns.

Limitations

This study was limited to the views of educators in a single small rural area, which limited generalizability. Though educational needs of students across the state are similar and aligned by the TEKS, throughout the course of this study, it became evident that technology hardware and software needs in rural areas like the one in this study are likely much different than more affluent and urban or suburban areas where there are not as many connectivity issues. It is likely that similar school districts with similar demographics in similar locations would have similar findings as this study, but the results of this study were limited because they would not be applicable to larger, urban or suburban school districts.

Likewise, because the school district is small and rural, the sample population was small. I set out to interview an equal and fair representation of staff members, but this was also limited by the small number of employees. I ensured participant anonymity by assigning pseudonyms in the form of participant numbers.

I noted after analyzing the interviews that there was a missed opportunity to discuss the connectivity issues in much greater detail, and that should have been a sub question. This will be included in the recommendation for future research.

Delimitations

This study specifically looked at how the technology director, administrators, and teachers selected devices and applications for educational use in the classroom and at home during the Covid-19 pandemic. The study did not examine how parents or students selected technology hardware and software to be used in their homes. The study considered but did not

include how teachers used supplementary applications or websites that are free or that the teacher purchased as an individual subscription, though this was mentioned by study participants. I did not seek to detail participants' views on free or teacher-purchased technology hardware and software, though these types of technology were noted and acknowledged in interviews. The study intentionally focused on district-approved technology hardware and software. The study also did not include applications or websites that were used in the classroom for entertainment purposes only rather than for educational use.

Recommendations for Future Research

This case study focused solely on the three school years immediately involved in the Covid-19 pandemic, 2019-2021.The investigator found through this study that there were concerns related to pedagogical beliefs and how technology enhances pedagogy in small rural areas that should be further investigated that extended beyond the global pandemic. The Covid-19 pandemic simply brought the issues to the forefront of the educational world as schools worked with unprecedented urgency to continue to educate their students.

This study uncovered the fact that connectivity was a problem during this time, and that the lack of connectivity hindered the possibility of delivering instant educational opportunities that students may have had in areas with better connectivity. Teachers and administrators alike noted that the lack of connectivity made teaching during the pandemic nearly impossible. Participants pointed out that there was very little connectivity, and in the areas where there was connectivity, there were few devices in the homes anyway, which made distance education less accessible for their students in the rural areas.

Another factor that became apparent throughout this case study and needs further research was that while some applications and websites may be excellent for use in education,

they are not cost effective for smaller schools. This was particularly true when the application or website charged a flat rate rather than per-student license or per-teacher license. While the flat rate may be a benefit for larger schools with more students and teachers, thus less cost per student or teacher, small schools end up paying high fees for fewer students or teachers. For example, a website that charged a flat rate of $1,500 for a single campus would be very cost effective for a campus of 1,500 students as the cost averages $1 per student. On the other hand, at a school with only 200 students, the same cost would be $7.50 per student.

Conclusions and Tool for Technology Selection

The many types of technology hardware and software available can be overwhelming for anyone to sort through. When a teacher is looking for the best tool to use for the classroom or to recommend for a student to use at home, there needs to be some type of structure in the way they select what to use. This will also help to ensure that a teacher's requests are approved by the technology director and administrators. This case study found that the most important features considered when selecting technology hardware and software at this small rural school included how the technology enhanced the lesson, whether the technology software, apps, and websites were TEKS-based and TEKS-aligned, how simple the technology was to use, whether the technology incorporated a single sign-on such as Google or Clever, and finally whether the technology would help students and teachers be prepared for the possibility of school shutdowns in the future.

Using the data from the study and based on the primary needs identified as most important for this study site, the I created an evaluation tool, found in Appendix E, that small rural schools can use when selecting technology hardware and software for use in the classroom or for students to use at home. I used the five themes identified in the study as the headings for

simple questions that teachers can answer as they are evaluating technology, and then the technology director and administrators can quickly view to see that the technology meets the identified needs of the district. The questions are simple and direct but can easily help a teacher see if technology will or will not meet the necessary needs. I sought to create a simple, easy to use tool that would benefit all study participants as they vet technology devices and software or application purchases for the district.

While this tool can be adjusted to fit the needs of any school, it was created based solely on the results of this case study, and it best suits the needs of small rural schools with demographics like the district in this study.

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Appendix A: Teacher Interview Protocol

During this interview, we will be focusing on the school years 2019-2020, 2020-2021, and 2021-2022 specifically, to understand any impact of the Covid-19 pandemic on the technology decision-making process.

1. Tell me about your teaching experience.
    a. How long have you been a teacher? How long have you been with your current district?
    b. How do you define your teaching style? Can you provide two-three examples of daily practices that exemplify your teaching style?
2. What are your pedagogical beliefs?
    a. How does pedagogy influence your decision-making when it comes to technology?
3. Do you believe there should be technology in schools? Please explain.
4. How do you feel about technology in your classroom?
5. How do you decide what technology devices you will use in your classroom?
6. If you have any control over it, how do you decide what technology devices you will have your students use at home?
    a. How much does connectivity (or the lack of connectivity) impact your decisions regarding technology use at home for your students?
7. What makes a device user-friendly in your opinion?
8. Are there any characteristics that would make you refuse to use a certain device?
9. How comfortable are you with evaluating apps or websites for your district to purchase?

a. Would you evaluate or suggest apps/websites for purchase for use in subjects other than your own?

b. What typically draws you to (or away from) an app or website?

10. Describe how the Covid-19 Pandemic impacted your teaching experience.

a. How much input did you have regarding what devices would be used?

b. How much input did you have regarding what apps and websites would be used by

i. Everyone?

ii. You?

c. What will you continue to do and what will you change, technology-wise, 'post-Covid?'

Appendix B: Technology Director Interview Protocol

During this interview, we will be focusing on the school years 2019-2020, 2020-2021, and 2021-2022 specifically, to understand any impact of the Covid-19 pandemic on the technology decision-making process.

1. Tell me about your experience as a technology director.
    a. How long have you been an expert in technology?
    b. How long have you been with your current district?
2. What are your pedagogical beliefs?
    a. How does pedagogy fit into teacher requests and your approval/denial?
3. Do you believe there should be technology in schools? Please explain.
4. How do you feel about technology in the classrooms in your district?
5. How do you decide what technology devices you will purchase for the district?
    a. How do you vet teacher requests?
    b. How do you vet administrator requests?
6. If you have any control over it, how do you decide what technology devices you will have your students use at home?
    a. How much does connectivity (or the lack of connectivity) impact your decisions regarding technology use at home for your students?
7. What makes a device user-friendly in your opinion?
8. Are there any characteristics that would make you refuse to use a certain device?
9. How comfortable are you with evaluating apps or websites for your district to purchase?
    a. Would you evaluate or suggest apps/websites for purchase for use in subjects individually or as a whole?

b. What typically draws you to (or away from) an app or website?

10. Describe how the Covid-19 Pandemic impacted your district.

a. How much input did you have regarding what devices would be used?

b. How much input did you have regarding what apps and websites would be used?

c. What will you continue to do and what will you change, technology-wise, ‘post-Covid?’

Appendix C: Administrator Interview Protocol

During this interview, we will be focusing on the school years 2019-2020, 2020-2021, and 2021-2022 specifically, to understand any impact of the Covid-19 pandemic on the technology decision-making process.

1. Tell me about your experience in administration.
    a. How long have you been an administrator?
    b. How long have you been with your current district?
2. What are your pedagogical beliefs?
    a. How does pedagogy impact your decision to approve or deny requests for technology purchases from teachers and the technology director?
3. Do you believe there should be technology in schools? Please explain.
4. How do you feel about technology in your teachers' classrooms?
5. How do you decide what technology devices you will approve for purchase?
6. If you have any control over it, how do you decide what technology devices you will have your students use at home?
    a. How much does connectivity (or the lack of connectivity) impact your decisions regarding technology use at home for your students?
7. What makes a device user-friendly in your opinion?
8. Are there any characteristics that would make you refuse to approve a certain device for use?
9. How comfortable are you with evaluating apps or websites for your district to purchase?
    a. What typically draws you to (or away from) an app or website?
    b. When making decisions, how much do you rely on input from your

i. Teachers?

ii. Technology director?

10. Describe how the Covid-19 Pandemic impacted your educational experience.

    a. How much input did you have regarding what devices would be used?

    b. How much input did you have regarding what apps and websites would be used?

    c. What will you continue to do and what will you change, technology-wise, ‘post-Covid?’

Appendix D: Document Analysis Record

Document Title	Date of Document	Information Observed	Trend Noted

Appendix E: Technology Evaluation Tool

When submitting requests for subscriptions, application access, and/or hardware, please complete the following evaluation tool before submitting to your principal for approval:

1. Lesson Enhancement:
    1. Does this technology contribute to your lesson? Yes____ No____
    2. Does this technology distract from your lesson? Yes____ No____
2. TEKS-based Alignment:
    1. Does this technology meet your TEKS? Yes____ No____
    2. Document TEKS that you can meet: _____
3. Ease of Use
    1. Is this technology easy to use for all users? Yes____ No____
    2. Will students be able to use this without assistance from the teacher? Yes____ No____
4. Single Sign-On
    1. Does this technology include single sign-on? Yes____ No____
    2. If yes, is it the same as what our district uses? Yes____ No____
5. Preparation for Future Shutdowns
    1. Does this technology prepare students for distance education? Yes____ No____
    2. Please briefly explain *how* the technology will be beneficial in the event of a school closure:

       _____

       _____.

Appendix F: IRB Approval

Date: September 15, 2022
PI: Stephnie Helton
Department: ONL-Online Student
Re: Initial - IRB-2022-31
Technology Selection in a Rural School District: A Case Study

The Abilene Christian University Institutional Review Board has rendered the decision below for Technology Selection in a Rural School District: A Case Study. The administrative check-in date is --.

Decision: Exempt
Category: Category 2.(ii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation.

Research Notes:
Additional Approvals/Instructions:

If at any time the details of this project change, please resubmit to the IRB so the committee can determine whether or not the exempt status is still applicable. All approval letters and study documents are located within the Study Details in Cayuse IRB.
The following are all responsibilities of the Primary Investigator (PI). Violation of these responsibilities may result in suspension or termination of research by the Institutional Review Board. If the Primary Investigator is a student and fails to fulfil any of these responsibilities, the Faculty Advisor then becomes responsible for completing or upholding any and all of the following:

- When the research is completed, inform the Office of Research and Sponsored Programs. If your study is Exempt, Non-Research, or Non-Human Research, email orsp@acu.edu to indicate that the research has finished.
- According to ACU policy, research data must be stored on ACU campus (or electronically) for 3 years from inactivation of the study, in a manner that is secure but accessible should the IRB request access.

- It is the Investigator's responsibility to maintain a general environment of safety for all research participants and all members of the research team. All risks to physical, mental, and emotional well-being as well as any risks to confidentiality should be minimized.

For additional information on the policies and procedures above, please visit the IRB website http://www.acu.edu/community/offices/academic/orsp... or email orsp@acu.edu with your questions.

Sincerely,

Abilene Christian University Institutional Review Board