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Experiences of Classroom Teachers' Technology Use During and After a Pandemic

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Walden University

College of Education and Human Sciences

This is to certify that the doctoral study by

William John Primrose

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University

2026

Abstract

Experiences of Classroom Teachers' Technology Use During and After a Pandemic

by

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MA, Walden University, 2014

BA, Muskingum College, 2007

Project Study Submitted in Partial Fulfillment
of the Requirements for the Degree of Educational Technology

Doctor of Education

Walden University

May 2026

Abstract

The problem explored in this study was that during the COVID-19 pandemic, teachers began using new or existing technology for which they were unprepared. Framed by Davis' technology acceptance model (TAM), the purpose of this basic qualitative study was to examine the experiences of middle school teachers' technology use during and after the pandemic, including their perceived usefulness of the technology in their classrooms, their intended use of the technology moving forward, and what support they may need from administration to continue using technology consistently. Data was collected through interviews with 10 teachers who taught during and after the COVID-19 pandemic in a midwestern middle school. Inductive coding was used to reveal patterns and themes, which were that teachers: used specific technologies to engage students and address learning challenges; faced challenges using technology to meet student and family needs during virtual learning; struggled with mandated technology during the pandemic; many adapted it afterward and, would like technology-focused professional development and clear administrative support. Based on these findings, a white paper was developed to address teachers' needs for better integrating technology into their classrooms because effective technology use in classrooms can increase student engagement. The findings may promote positive social change at the local level if school administrators use the recommendations to support teachers in using classroom technology to engage all students in learning, which, in turn, might increase learning, student engagement and academic outcomes.

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Dedication

I dedicate this study to my Lord and Savior, Jesus Christ.

Acknowledgments

I owe my deepest thanks to my wonderful wife, Kelly, who has encouraged me throughout this process from the start to the finish. To my kids, Nora, Jack, and Maddie, I cannot express in words how proud I am of all of you, and your love and support mean the world to me. I would also like to thank my mom and dad for their help and guidance throughout my life. I could not have gotten this far without either of them. My sincere appreciation to Dr. Heather Caldwell and Dr. Amy White for their guidance and mentorship throughout this entire process. I would also like to thank my good friend James Bingham for his encouragement over the last few years, which helped me finish this study. Finally, I thank Karen Schmidt, whose inspiration guided me toward a career in education, and who stands as the greatest teacher of all time.

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Section 1: The Problem

The COVID-19 pandemic affected many sectors and businesses worldwide. Although the most affected industry was healthcare, issues have spilled over to other sectors, such as education (Kaden, 2020). Over 1.6 billion students across 190 countries worldwide were affected by the COVID-19 pandemic (UNESCO, 2020). This pandemic affected not only students but also parents, teachers, and administrators throughout the pandemic, and it still has lasting effects today.

In the current K-12 classroom, an increasing emphasis has been placed on integrating and using technology. Technology is no longer a privilege but a necessity in today's educational setting, given the technology we use daily (Yilmaz, 2021). Since one of the goals of the educational system is to prepare students to solve real-world problems, schools and teachers must have students use and interact with technology regularly (Lesseig et al., 2023).

On Thursday, March 12, 2020, Governor Mike DeWine announced that all K-12 schools would close on Monday, March 16, and remain closed until April 3, 2020, due to the COVID-19 pandemic (DeWine, 2020). This closure was implemented to help stop the spread of the virus by keeping as many people at home as possible (Rahmadi, 2021). This closure forced teachers to teach virtually for the rest of the 2019-2020 school year. This quick closure forced the school district where this study takes place to offer only one day of professional development training on teaching virtually and one day to prepare their online classrooms. This was the first time this school required its teachers to teach 100% online or virtually. The quick closure and lack of PD due to the haste closure caused most

teachers to struggle while teaching virtually (Assistant Principal, personal communication, September 8, 2020).

The Local Problem

The problem this study addresses is that teachers began using technology for which they were unprepared during a global pandemic. Administrators are still determining whether teachers will continue to use the technology in the future and want to ensure they provide sufficient support for teachers to use it in their classrooms. Before online teaching started, teachers were given 2 total days to prepare: 1 day of PD and 1 day on their own to switch from face-to-face to virtual instruction. This forced teachers to use various technologies to teach their students, but not all were ready to do so.

Teaching online during the pandemic was difficult because teachers had to teach complex concepts virtually via webcam while students were at home (7th-grade math teacher, personal communication, August 25, 2021). There were other disadvantages of teaching online. Other disadvantages of teaching online included a lack of student participation, limited use of critical thinking skills on discussion boards, and limited collaboration skills within the online classroom, which may deter teachers from using technology (Aloni & Harrington, 2018). These disadvantages of online learning cause students to struggle academically and emotionally (Guidance Counselor, personal communication, August 23, 2021).

Despite many disadvantages, teaching virtually has some advantages. The shift to virtual teaching forced teachers to adapt and adopt innovative technology and to revise their teaching methodologies. This transition acted as a catalyst, encouraging teachers

who might never have changed their technology methodologies to embrace and explore new tools and how to use them in their own classrooms. Some teachers who used these technologies would have never attempted to use new technology in their classrooms before the pandemic (Assistant Principal, personal communication, September 8, 2020).

The setting of this study was a middle school that uses the teaming concept and houses grades seven and eight. The school is in a suburb of a large city in Ohio and has 47 teachers (Assistant Principal, personal communication, October 22, 2020). The administration of this school district wants to know what supports they can put into place to encourage teachers to continue using technology (Assistant Superintendent, personal communication, June 18, 2021). Administrators can struggle to provide the appropriate support for teachers because there are many barriers such as limited training, time, and resources can deter technology integration in schools (Francom, 2020). Therefore, when the administration implements applicable support constructs, enabling the continued usage of technology becomes necessary. Hence, when administrators at this middle school implement proper support for technology integration, it is anticipated that teachers will maintain a propensity for integrating technologies into their classrooms as they progress in their pedagogy.

In Ohio, most schools returned to face-to-face learning in the spring of 2021. When returning to a regular classroom, there was concern that some teachers would not continue using the technology they had used during the pandemic. Some teachers dislike teaching virtually, and, consequently, there is a legitimate concern that these teachers may revert to their pre-COVID-19 practices of refraining from integrating technology

into their classrooms (Pryor et al., 2020). Teachers may revert to how they taught before COVID-19 because ongoing barriers and challenges with technology use persist, as many reported difficulties in implementing traditional instruction (An et al., 2021). Some examples of these barriers are having enough support for their staff and keeping students on task while using technology (Milman, 2020). Teachers will need ongoing PD and other technology support to effectively integrate and sustain the usage of technology in their classrooms (Francom, 2020).

It is essential to better understand teachers' technology integration during distance learning is essential following the sudden implementation of work-from-home policies during the COVID-19 pandemic (An et al., 2021). A total of 165 counties had their teachers teach from home, affecting about 1.5 billion students (Rahmadi, 2021). This was the first time a large group of teachers had to work from home and use technology to teach remotely. In the past, it has been challenging to effect educational change by introducing new technology in the classroom, and the results of implementing it have been mixed (McQuirter, 2020). Since it has been challenging to have educators adopt new technology in their classrooms, it is essential to look at the experiences of middle school teachers' technology use during the pandemic and in the future, including their perceived usefulness of the technology in their classrooms, and their intended use of the technology moving forward.

Many school districts and teachers thought that during the early stages of the pandemic, the transition stage would be a slow and steady move from face-to-face learning to other teaching methods; however, the transition happened fast and was

multifaceted (Fullan, 2020). This caused many issues for teachers, as they needed more training to transition from a face-to-face classroom to a digital one (Yang et al., 2021). These issues across Ohio and the United States show that the COVID-19 problem has affected how teachers use and will continue to use technology in their classrooms.

Rationale

Before the COVID-19 pandemic, a notable proportion of educators at the middle school where this study takes place encountered challenges in incorporating technology into their instructional practices and in their self-efficacy with technology (Assistant Principal, personal communication, June 9th, 2023). Nevertheless, after the pandemic, some advancements have been observed in integrating technology and increasing teacher self-efficacy with technology integration.

It is important to note that this middle school continues to grapple with issues related to the effective use and integration of technology (Middle School Administrator, personal communication, June 5th, 2023). However, in the aftermath of the COVID-19 pandemic, there has been a significant increase in the integration of technology within teachers' classrooms (Machusky & Herbert-Berger, 2022). The administration within the study district also wants to know how they can continue to support teachers with the necessary tools to use technology in their classrooms (assistant principal, personal communication, January 18th, 2022). Since the pandemic, the school in this study has incorporated new technology into its curriculum. Some of the latest technologies the district has moved to are going one-to-one and ensuring all teachers use Google Classroom and all its applications. The administration wants more technology integration

since the proper usage of technology in a classroom can enhance student learning and student engagement (Williams-Britton, 2021). Thus, the purpose of this basic qualitative study was to examine the experiences of middle school teachers' technology use during the pandemic and in the future, including their perceived usefulness of the technology in their classrooms, their intended use of the technology moving forward, and what support they may need from administration to continue using technology consistently.

Evidence from Literature

A combination of research supports that the COVID-19 pandemic has caused many different issues in education. Herman et al. (2021) stated that the COVID-19 pandemic caused unprecedented challenges not just for teachers but also for students and families when schools moved classes online during the spring of 2020. Edyburn (2021) stated that students, families, and teachers were wholly unprepared for the level of independent learning required during the pandemic remote instruction. Independent learning during the pandemic gave students a new level of freedom that caused many concerns for parents and students. Parents were concerned that their children were required to sit in front of a computer for an extended period, their children had too many freedoms, and the lack of face-to-face time they were getting from their teacher(s) (Edyburn, 2021). Ewing and Cooper (2021) stated that students felt teachers were predominantly online facilitators, with an expectation that students work independently. Students also felt that virtual learning had no boundaries; they could do whatever they wanted while it was in session (Ewing & Cooper, 2021). Lastly, students felt virtual

learning held a different when it comes to engagement and overall experience (Kaden, 2020).

Teachers faced many issues during the COVID-19 pandemic. Champa et al. (2021) stated that teachers nationwide were given a fraction of the time to transform their familiar in-person teaching pedagogy to reimagine and redesign their practice. The rapid shift from a face-to-face classroom to a digital classroom required diverse training that teachers could not obtain within the given time (Sari & Nayır, 2020). Part of the reason why teachers struggle to teach virtually is that few institutions are preparing teachers to teach in an online setting (Champa et al., 2021). Regardless of the teachers' abilities to teach virtually or their willingness to change their pedagogical approach, teachers were forced to move to online teaching almost immediately (Champa et al., 2021). If teachers did not have a high level of technical knowledge before the pandemic, they would face difficulties. Overall, they seemed less willing to use these technologies and were willing to teach virtually (Sari & Nayır, 2020). This became an issue for these teachers since there was no solid infrastructure to help or guide teachers during the COVID-19 pandemic (Sari & Nayır, 2020). The findings of this study could help other teachers within our area with running a digital classroom or integrating different types of technology into their classrooms.

School administrators faced many issues when schools transitioned from face-to-face to virtual learning. During the school closures, school administrators now better understand the importance of technology to the learning process in schools (Altun & Bulut, 2021). One of these issues was that administrators realized that teachers did not

have the proper training for virtual learning, so these administrators had to assist teachers in using technology (Abukhalil et al., 2021). This required the administrators to learn about new technology and instruct the teachers on how to use these technologies.

Administrators also ran into other problems during the pandemic.

COVID-19 affected educational systems worldwide, not just in the Cleveland area or Ohio (UNESCO, 2020). COVID-19 made most schools transition from face-to-face learning to virtual learning. This pandemic caused teachers to learn and implement new technology in their classrooms. The new technology was used while these students learned virtually. They can be used in many ways, as seen during the pandemic, and teachers should continue to use them when applicable to student learning and school situations that warrant the use of technology. Administrators want teachers to continue using technology in their classrooms since it has been shown to increase learning (Williams-Britton, 2021). Administrators want to see the continued use of technology in classrooms because it helps motivate students.

The COVID-19 pandemic also affected the education of communities that typically have lower incomes and minorities. Research has shown a learning gap between higher-income and lower-income communities (Bailey et al., 2021). However, the COVID-19 pandemic widened this gap due to virtual learning (Bailey et al., 2021). One reason this gap has increased is that minorities and low-income communities tend to be disadvantaged in accessing the software and hardware required for learning (Gandolfi et al., 2021). These students needed more funds for this software or hardware, or their schools could not offer it. Another reason low-income communities typically struggled

during virtual learning is that parents in these communities were often essential workers and could not be home with their children to support them during virtual learning (Gandolfi et al., 2021). These two issues need to be addressed as these gaps in their education will be challenging to fill (Gandolfi et al., 2021). Also, understanding how to fix these gaps in their education can help these communities and minorities fill their educational gap.

Evidence from the Local Setting

On Thursday, March 12, 2020, Governor Mike DeWine announced that all K-12 schools would close on Monday, March 16, and remain closed until April 3, 2020, due to the COVID-19 pandemic (DeWine, 2020). To prepare for this closer the school scheduled 2 days to help the teachers prepare for making and using an online classroom and the first day focused on setting up and running a Google Classroom and setting expectations for running an online classroom. The second day was given to the teachers to work together to create a classroom and content.

The closure of this school due to the COVID-19 pandemic posed a significant challenge for the teachers who taught there during and after the pandemic. The sudden shift to an online classroom caused these teachers' rapid adaptation and the use of new technology skills. Despite the initial struggles, the teachers at this school demonstrated improvement in their ability to create and run an online classroom. However, upon returning in the following fall, they caused problems with continued technology usage in their classrooms. These issues show the importance of ongoing support from administrators and PD to help enhance teachers' ability to integrate technology into their

classrooms. Therefore, the purpose of this qualitative study was to examine the experiences of middle school teachers' technology use during the pandemic and in the future, including their perceived usefulness of the technology in their classrooms, their intended use of the technology moving forward, and what support they may need from administration to continue using technology consistently.

Definition of Terms

Recently, the use of technology in educational settings has grown rapidly, transforming instructional practices and improving student learning (Feng et al., 2023). In the past twenty years, teachers have gone from overhead projectors to each student in their classroom having their own device. For these reasons, it is essential to define these terms for people unfamiliar with the terminology used in education technology in schools today.

Technology self-efficacy: This term refers to teachers' beliefs that shape their abilities regarding their confidence level in using and applying modern technologies in their classrooms (Gomez et al., 2022).

One-to-one device: Classrooms that have one device per student, such as a laptop, are considered one-to-one since each student has access to a device (Osimani et al., 2019).

Technology integration: The creation, use, and management of technology in one's classroom (Wilson et al., 2020).

Virtual classroom: An online, learning environment where instruction occurs through digital technologies without a physical presence (Webster & Geron, 2025).

Intention to use technology: The degree to which the user would like to use technology in the future (Joo et al., 2018).

Technology leaders: Set an example and encourage teachers to use or integrate technology in their classrooms (Akcil et al., 2019).

Significance of the Study

The study's findings may be significant in that they may help local teachers use more technology in the future and guide administrators in supporting teachers in their use of technology. Administrators want teachers to continue using technology in classroom instruction and are invested in better understanding teachers' needs in using technology more consistently in the future. Technology integration can improve student engagement and learning and support a deeper understanding of the content (Solsona-Puig, 2026).

One instance in which this could happen is when a school is closed due to a "snow day." A snow day is when a school is closed because it is too difficult to transport students to school due to the weather, which often happens in the Midwest. However, snow days might become a thing of the past as teachers can teach virtually through a digital classroom (DeSantis, n.d.). Ohio schools introduced "blizzard bags" in 2011, and many schools across the country have allowed "e-learning days" to make up for lost school time due to closures (Milman, 2021). This shows that snow days have been replaced before COVID-19 and can be done again. Also, the COVID-19 pandemic has familiarized teachers and students with virtual learning; therefore, there might not be a need for snow days in the future (Byck, 2020).

The COVID-19 pandemic forced teachers out of classrooms and made them teach digitally. These digital classrooms made teachers adopt and use technologies that they had not used before (Machusky & Herbert-Berger, 2022). However, not all teachers have continued to use new technology upon returning to the classroom. This study will help understand which technologies teachers used during and after the pandemic. Knowing what technologies teachers still find useful could help teachers choose the right technology for their classrooms across the school district.

This pandemic has made teachers more comfortable with a broader range of technology, and administrators want to see this use of technology continue (Hash, 2021). Understanding teachers' experiences with their current use and intended use of the technology in their classrooms in the future can help the administration plan to support technology in classrooms. In addition, if teachers continue to use technology in their classrooms and are better supported, they will teach children the skills needed to succeed in a technologically advanced society.

Research Questions

The purpose of this basic qualitative study was to examine the experiences of middle school teachers' technology use during the pandemic and in the future, including their perceived usefulness of the technology in their classrooms, their intended use of the technology moving forward, and what support they may need from administration to continue using technology consistently.

RQ1: How do middle school teachers use technology after the pandemic, and how are they planning on using it in the future?

RQ2: What are the middle school teachers' experiences during and after the COVID-19 pandemic, and how did these experiences affect their perceptions of technology's effectiveness in the classroom?

RQ3: What support do middle school teachers need from administration and staff to use technology well in their classrooms?

Review of the Literature

The phenomenon of interest is how middle school teachers' experiences with technology changed during and after the pandemic, and how the administration could help integrate technology into teachers' classrooms. The technology acceptance model (TAM) framework will serve as a lens to help interpret teachers' answers and explain why they chose certain types of technology before and after the COVID-19 pandemic. TAM will be applied to this study to evaluate the teachers' experiences with new technology. The self-efficacy concept will be used to understand the extent of their confidence in using the latest technology and their motivation to do so. TAM and self-efficacy will allow this study to examine why these teachers use certain technologies and how administrators can support teachers in using new technology in their classrooms.

Conceptual Framework

Using TAM as a conceptual framework should provide a vigorous theoretical lens through which to explore the adoption and usage of technology in a classroom. TAM indicates that people use technology due to behavioral intention and are influenced by

two main factors: perceived usefulness and perceived ease of use (Granić & Marangunić, 2019). Incorporating TAM into research allows the researcher to investigate how these two variables influence a person's attitudes and behaviors toward technology usage. Furthermore, TAM offers a structured framework for analyzing and interpreting observed findings, enabling the researcher to identify key factors in technology adoption and use.

The Technology Acceptance Model (TAM)

For this study, the technology acceptance model (TAM) served as the framework. It served as a lens for examining teachers' experiences with teaching during and after the COVID-19 pandemic, and how administrators can support staff in using and integrating technology in the classroom. TAM was introduced by Davis (1989) and has been widely used to explain why diverse groups of people choose to use technology (Granić & Marangunić, 2019). The TAM model was among the first to include cognitive factors affecting technology acceptance across various contexts (Lee et al., 2025). TAM has become a useful model for researchers exploring technology's use in numerous contexts (Cobo-Rendon et al., 2021).

TAM is based on the theory of reasoned action (TRA) proposed by Fishbein and Ajzen (1975) and is used to explain a person's attitudes and behavior toward a particular technology in a specific context (McKee et al., 2021). The TRA is similar to the TAM model because the level of technology use depends on users' perceptions of the ease of use of innovative technology for the completion of a particular task (Cobo-Rendon et al., 2021). However, the TAM focuses on perceived usefulness and perceived ease of use as key predictors of intentions toward technology acceptance or rejection (Lee et al., 2025).

TAM has two main variables: perceived ease of use and perceived usefulness (Granić & Marangunić, 2019). Perceived ease of use and perceived usefulness, the two main variables of TAM help predict a person's intention to use a specific technology (Cobo-Rendon et al., 2021). The first variable stated that perceived ease of use describes how user-friendly and easy it is to operate and understand the technology (Henderson & Milman, 2020). The second variable, perceived usefulness, represents an individual's assessment of how helpful technology's design is (Henderson & Milman, 2020). These two variables make up the TAM model and are used to predict if a person or group will use and continue to use a particular piece of technology.

Teachers' technology integration into a classroom can be considered a complex construct. It is determined not only by the conditions schools provide to help teachers use technology but also by their own motivation, self-belief, and beliefs about technology and its use (Scherer et al., 2019). Therefore, delving deeper into the TAM model is essential to understand how these constructs affect teachers' willingness to use, or continue using, technology in their classrooms. In conclusion, using the TAM model to explore the intricacies of teachers' technology integration will shed light on the internal and external conditions they face that ultimately influence their decision to use technology in their classrooms.

As technology evolves and integration in classrooms increases, the expectation of using technology has grown (Joo et al., 2018). Research has shown that using technology in schools can increase student's achievement and support effective teaching methods (Feng et al., 2023; Sung et al., 2024)). Hence, teachers need to use technology in their

classrooms since most classrooms already have technology in place, and technology usage has been shown to increase student learning.

Digital teaching uses electronic applications such as computers, the internet, and digital applications to support learning, so what is taught is fully conveyed to students (Sholikhah & Sutirman, 2020). In comparison, digital learning uses technology for teaching and the learning processes (Cobo-Rendon et al., 2021). TAM is one of the dominating models explaining why people adopt new technology or decide not to (Sholikhah & Sutirman, 2020). TAM aims to predict and explain the use of intentions and technology (Scherer et al., 2019). Due to TAM's ability to gain insight into why certain groups of people find certain technologies useful, it will be the best fit for this study. Using the technology acceptance model as a framework will further dissect the subtleties of a teacher's technological willingness and ability to adopt certain technologies in their classroom.

TAM has traditionally been applied across many research domains, and recently its use has become increasingly significant in education (Wang et al., 2023). In the past, researchers successfully used TAM to examine teachers' perceptions of the usefulness and ease of use of technology in their classrooms (Carl, 2021). A unique feature of TAM is the ability to predict if teachers will integrate new technology into their classrooms. Therefore, TAM helps explain why some teachers choose to integrate new technology while others do not. Since the TAM model has been used to explain why a diverse group of people chose a particular technology, it is the appropriate choice for this study.

Review of the Broader Problem

To acquire the current literature on the broader problem, I used the following databases through the Walden University Library: Education Source, ERIC, SAGE journals, ScienceDirect, Taylor & Francis Online, and Academic Search Complete. Many different terms were used to identify recent, relevant literature: *COVID-19 and education, effects of COVID-19 on technology integration, the impact of COVID-19 on student learning, struggles with teaching virtually during the pandemic, issues with students while teaching during the COVID-19 pandemic, and COVID-19 effects on professional development integration*. These articles and journals were all peer-reviewed literature for this literature review. From using these databases and keywords, specific topics started to emerge. The topics that emerged will be described in more detail in this section: teaching with technology in middle school and technology during the pandemic.

Teaching with Technology in Middle School

The growing role of technology in classrooms is transforming education, especially in middle school. As technology continues to advance, its integration is becoming increasingly necessary. Today, technology has increased one's ability to address everyday problems and changes (Aydoğan & Çakıroğlu, 2022). Also, technology is constantly evolving, and it is essential to use and teach technology in school. The reason is that, compared with traditional teaching, technology makes a classroom more flexible and convenient. The general use of technology in the classroom effectively establishes a broad teaching platform that can advance student learning and subject interest (Deng, 2022). Technology integration is also crucial in middle schools because

the current generation needs a wide range of technology skills to thrive in today's job market (Hacioglu & Gulhan, 2021). Even though technology usage in a middle school positively affects learning, some teachers need help incorporating technology into their classrooms. Some of the issues middle school teachers face include gaining the knowledge to integrate, budget constraints, and a need for more PD to use new technology (You et al., 2021). Sung et al. (2024) found that teachers often lack the experience and confidence that is needed to properly integrate technology into their classrooms, largely due to the lack of training and support. These challenges highlight the need to better understand how teachers use technology in their classrooms and what supports they need to improve their technology use.

Many positive effects of middle school teachers integrating technology into their classrooms exist. One way is that it is beneficial for middle school teachers to implement technology in their classrooms, as it has been shown to increase students' positive attitudes toward technology, thereby increasing the likelihood that students will use technology in the future (Lin et al., 2020). The integration of technology and internet access has increased students' motivation and interest in their daily lives (Dúo-Terrón et al., 2022). In some cases, technology has been used to give students access to classroom materials at any time of day with internet access, which can increase students' academic performance and achievement when used correctly (Spitzer & Musslick, 2021). Another positive effect of technology integration is that, when paired with appropriate content delivery, it can be a powerful and effective tool for increasing student learning and knowledge (Cain et al., 2021). One of the many goals of a teacher is to raise a student's

abilities and knowledge, thus making it essential for middle school teachers to integrate technology into their classrooms. Thus, the authors agree that if teachers strive to foster students' skills and knowledge, they must continue integrating technology into their classrooms, given its positive effects on students.

Using technological tools has been shown to increase student learning in a middle school classroom. Feng et al. (2023) conducted a quantitative study across 63 schools in North Carolina. In this study, schools were either assigned the ASSISTments technology platform or continued using their regular teaching methods in their math classrooms. The groups using ASSISTments were given math assignments that provided immediate, data-driven feedback, which the teachers could use to support students. The authors found that students on the ASSISTment platform improved their math scores faster than students in schools that did not use it. These findings show that integrating technology in a middle school math classroom can improve student learning.

There tends to be a disparity between teachers' abilities to use technology and students' abilities to use technology. Students tend to exhibit a quicker understanding of new technology than their teachers, who are older than they are (Monteiro et al., 2020). The students' quicker understanding of the newer technology can cause an issue to become pronounced when teachers teach virtually, because the students understand how to use technology better and can adapt to it faster than the teacher. Age also emerged as another factor that affected the usage and ability to use or integrate technology. Age can influence individuals' perceived ease of use and usefulness of technology. This factor became particularly relevant during online learning because teachers are typically older

than school-aged students, and these teachers ran their classrooms virtually during the pandemic.

Teachers do not integrate technology into their middle school classrooms for many reasons. Some of these factors are resources, the support of the school district or administration, subject culture, teachers' attitudes and beliefs, knowledge, and skills of the teachers (Liao et al., 2021). However, one of the significant reasons middle school teachers do not integrate technology into their classrooms is their pedagogy (Liao et al., 2021). This is an issue because if the teachers are uncomfortable using the technology due to their fear of it not working, they will not even try to use it. Other issues teachers may encounter in technology integration include students' ability to use technology effectively, which can influence their learning outcomes. (Spitzer & Musslick, 2021). This can cause problems for teachers if a student has a negative view of technology or cannot use it; technology usage can become difficult for the teacher to have the student use it in an educational setting. Nevertheless, these authors agree that middle school teachers face many obstacles when integrating technology into their classrooms. Despite these obstacles, middle school teachers need to embrace incorporating technology into their classrooms because it increases students' knowledge, abilities, and motivation in a classroom environment.

Teaching During the Pandemic

The sudden shutdown of schools at the start of the COVID-19 pandemic dramatically changed how teachers taught in a short period of time (An et al., 2021). Teachers felt that a lack of training caused many teachers in the United States to struggle

to deliver quality online instruction during the COVID-19 pandemic forcing teachers to teach virtually (Francom et al., 2021). Barton and Dexter (2020) interviewed ten math teachers about their experiences teaching virtually during the COVID-19 pandemic. The authors discovered that teachers felt insufficient to achieve the educational objects effectively and efficiently. These teachers pointed this issue to their lack of knowledge and skills to use online learning applications during while teaching virtually. When schools shut down, teachers only had a short amount of time to get the proper training to prepare for teaching virtually, and students had little or no training on how to take online classes (An et al., 2021). These two factors made it difficult for teachers to teach since they lacked training and had little time to prepare for teaching virtually. Parents noticed some challenges during the pandemic, including limited access to technology in students' homes and a lack of training and resources to support virtual learning (Machusky & Herbert-Berger, 2022). The first time that most teachers had to teach virtually added stress because these teachers were not adequately prepared to teach virtually (Francom et al., 2021a). Nevertheless, these authors showcase the issues that everyone, teachers, students, and parents, faced during the rapid shutdown of schools due to the COVID-19 pandemic.

At the start of the COVID-19 pandemic, there was a break in face-to-face teaching, which caused numerous problems, especially in students' academic and development (Kuhfeld et al., 2022). This added another layer of difficulties for teachers since students needed an outlet for their creative expression and skill development in the artistic area. Teachers stated that students lost some of their creative outlets and this

caused students to struggle academically (Grossie et al., 2020). This lack of an outlet could also negatively affect students' social and emotional development, as they need regular social interactions with peers (Kuhfeld et al., 2022). The disruption of face-to-face learning during the COVID-19 pandemic created problems for teachers and students due to the obstacles in the student's social-emotional development, artistic development, and peer interactions during online teaching. Middle school teachers' challenges while teaching online were student engagement, attendance, and technical difficulties (An et al., 2021). These findings by the authors are similar in that the shift to remote learning led to many challenges, such as student academic struggles, weakened artistic expression, and compromised social-emotional development among students, complicating educators' efforts to facilitate student learning while teaching virtually during the COVID-19 pandemic.

The rapid shift to teaching virtually due to the pandemic affected both students and teachers alike. This abrupt shift caused teachers and students to move to teaching virtually. There was a lack of training for teachers on using and teaching virtually. Students lack the training to learn and interact in a virtual classroom (Dorji, 2021). Most students were expected to know how to use the technology, interact, and use an online classroom (Dorji, 2021). These authors' findings suggest that if students face these challenges in their usage of technology effectively, it can impede their ability to participate in a virtual classroom actively. The overall outcome was a substantial gap in the readiness of both teachers and students in the demands of virtual education during this rapid and unforeseeable transition from face-to-face teaching to virtual teaching.

The COVID-19 pandemic helped expand the technology that allows teachers and people to communicate. The pandemic also forced these teachers to use new technology to teach lessons virtually. Some of these teachers struggled while teaching from home during the pandemic, while some teachers thrived (Arnove, 2020). Yet, teachers need to use technology in their classrooms since the usage of technology has been shown to increase learning and student engagement (Williams-Britton, 2021). However, research has shown that less than 50% of teachers do not use technology in their classrooms even if they have access (Backfisch et al., 2021). Therefore, it is essential to understand the collective experiences of teachers integrating technology in their classrooms during the pandemic. Teachers of different groups tend to have different experiences while they integrate technology and have different views of technology integration. One of these groups is pre-service teachers, and the other is veteran teachers. Many factors determine why teachers will not integrate technology into their classrooms; however, the elements between a veteran teacher and a pre-service are different. This literature shows the importance and difficulties of teaching with technology in a middle school. It stresses the need for further investigation into teachers' experiences using technology in their middle school classrooms.

As teachers returned from the COVID-19 pandemic, they needed an increased understanding of integrating and using technology in their classrooms. Using mixed methods across the United States, An et al. (2021) found that the rapid shift to virtual teaching increased the use of technology. This rapid shift in the use of new technology also increased the expectations for technology integration in classrooms. However, the

authors also found that many teachers still struggled with learning new technology when they returned to the classroom. These teachers also struggled with student engagement and finding proper resources for learning new technology. These challenges show that teachers need continued support as they return to integrating technology into their classrooms (An et al., 2021). Teachers felt they needed help integrating technology into their classrooms because they need more training, and technology available to them (Menon et al., 2020). These studies by An et al. (2021) and Menon et al. (2020) both show the necessity for teachers to integrate technology into their own classrooms, in which caused of the COVID-19 pandemic that in turn accelerated technology integration in classrooms.

Teachers also had their issues while teaching during the COVID-19 pandemic. One of these issues was that some teachers felt emotional exhaustion while teaching virtually during the pandemic. This emotional exhaustion that teachers experienced was fears of getting the virus, new teaching challenges, increasing workloads, and burnout (Soncini et al., 2021). These fears they experienced added to the stress of changing from face-to-face teaching to teaching virtually. This added stress made their job of teaching more difficult during the pandemic. Although teachers were teaching virtually, most students lost motivation and had added stress. This lack of motivation and added pressure on students caused teachers to work harder and caused added stress to their jobs (Merga et al., 2021). These factors which these authors described caused burnout and hardships for teachers while they taught virtually during the COVID-19 pandemic. Soncini et al. (2021) and Merga et al. (2021) stated that teachers faced new challenges, such as fears

about getting COVID-19, managing an increased workload, and doing their best to combat burnout. This was caused by moving from a traditional brick-and-mortar school or classroom to a virtual classroom. Concurrently, the decline in student motivation also increased stress levels and workloads for teachers, contributing to teacher burnout, which shows a need for support to lessen the negative impact teachers faced during the pandemic.

Not all teachers welcomed the change from face-to-face teaching to teaching virtually. Most of the veteran teachers tended to resist this shift holding to the belief that their established practices have been successful, and they were now in uncharted territory of new instruction which they were now struggling in (Mullen & Badger, 2023). One of the reasons why these veteran teachers tended to resist this shift was because these teachers never really embraced new technology and therefore struggled when they needed to incorporate newer technology such as distant learning. This hindered their own ability to transform their own classrooms into a virtual one. As a whole teachers were not given proper support when transitioning to a virtual classroom (Machusky & Herbert-Berger 2022). In essence, the struggles of many veteran teachers to transition from a traditional classroom to a virtual one shows the critical need for support and training to ensure a successful adaptation of new integration of technology into classrooms.

Teachers at the school where the research is conducted experienced similar experiences with disruptions to their daily school routines and the need to move to a virtual classroom. Edyburn (2021) states that teachers should have been better prepared to move from a brick-and-mortar school to a virtual one. This movement to a virtual

school forced teachers to adopt modern technologies and new methods for teaching their classes virtually. The sudden shift to virtual teaching required teachers to adapt to their teaching and become more creative with limited support (Machusky & Herbert-Berger, 2022). In a study by Jimoyiannis and Koukis (2023) which surveyed 694 teachers in May 2020, readiness and beliefs regarding emergency virtual teaching during the COVID-19 pandemic were explored. Jimoyiannis and Koukis (2023) revealed many challenges teachers faced. However, the two that had the highest number of frequencies were teachers' ability to design effective online instruction, with a Cronbach alpha score of .83, and addressing PD needs or a lack thereof, with a Cronbach alpha score of .81. These scores show the reliability of the study's findings along with the struggles that teachers faced during the COVID-19 pandemic. The findings from both studies show the difficulties teachers faced in designing practical virtual lessons and instruction, along with addressing the PD needs teachers needed to have a successful virtual classroom.

Teachers were just one group that needed access to technology or proper training. Some students needed access to technology, a suitable learning environment, or access to parents for help while learning virtually (Machusky & Herbert-Berger, 2022). Some students needed access to the internet or other technology that would allow them to know virtually (An et al., 2021). With a lack of access to the necessary technology, students could not attend class. Student attendance is an essential measure of the quality of education and a predictor of student success (Tunjera & Chigona, 2022). Therefore, if students cannot attend a class due to a lack of technology, they will most likely not get the education they need or deserve. This made it difficult for teachers to teach students

who did not have internet access since most of the virtual teaching was happening online. Another issue students ran into was needing access to parents for help. Some parents during the pandemic were labeled as essential and had to work full time. Some parents had the correct technology but needed to learn how to use it correctly (An et al., 2021). This made it difficult for teachers to contact these students since they needed help properly utilizing the technology. An et al. (2021) emphasized the sudden shift from face-to-face teaching to virtual teaching; Jimoyiannis and Koukis (2023) study accentuates the challenges faced by teachers in the way of the actual teaching and PD needs of teachers which shows the struggles that teachers had during the COVID-19 pandemic. Overall, these studies emphasize the difficulties teachers experienced during the COVID-19 pandemic.

Technology Integration in Classrooms After the Pandemic

The COVID-19 pandemic has compelled the usage of technology because students have become used to online learning at an unprecedented rate due to home-based online learning (Labonté & Smith, 2022). Also, integrating technology into a classroom has been shown to help improve student engagement and motivation (Wali & Popal, 2020). However, before the COVID-19 pandemic and even after returning to in-person learning, there were still teacher-centered, lecture-based classrooms that lacked integrated technology (Wali & Popal, 2020). During the pandemic, teachers did not have a choice because they were forced to teach virtually (Teo et al., 2021). Currently, teachers are coming back into the classroom and teaching face-to-face, but they are returning to their old ways of teaching, which do not include technology usage. There are many different

reasons why teachers choose not to integrate technology into their classrooms. Common barriers that teachers experience with technology integration include a lack of PD, low teacher self-efficacy, and a lack of administrator support; all these factors play a role in the teacher's ability to integrate technology in their classrooms. (Sung et al., 2024).

However, research has shown that when teachers get proper training or PD with new technology, it increases the quality of integration with technology in their classrooms (Barton & Dexter, 2020). Therefore, administrators need to help guide PD for both used and new technologies.

After the pandemic, some teachers reverted to their old ways of teaching. This old way of teaching utilized a different technology than what was available to them. Teachers must continue to use technology in their classrooms, as sustained usage is vital for ongoing technology integration (Sung et al., 2024). It is important for teachers to continue to use technology in their classrooms because effective integration can enhance student learning and engagement (Cowart & Jin, 2024). Therefore, teachers need to continue to use these technologies, or they might not use them again in their classrooms.

Before the pandemic, teachers integrated technology less frequently compared to after the pandemic. Ward et al. (2023) used mixed methods to explore the changes in technology integration during and after the pandemic. The authors distributed questionnaires to 255 teachers with different levels of education and found that teachers' technology use increased during the pandemic, and these teachers were planning on continuing to use technology going forward. Kesterson et al. (2023) used focus groups with nine teachers to explain educators' learning experiences regarding implementing

virtual learning technologies to provide instruction during the COVID-19 pandemic and how they planned to use technology after the pandemic. Kesterson et al. (2023) showed that teachers' proficiency in utilizing and integrating technology increased due to the COVID-19 pandemic. Furthermore, the findings highlighted that teachers are eager to continue using new technology in their classrooms since they see the potential to help increase learning. In conclusion, the studies by Ward et al. (2023) and Kesterson et al. (2023) show a notable shift in teachers' attitudes towards technology integration during and after the COVID-19 pandemic. The author's findings also suggest the potential for teachers to integrate more technology and other tools in a post-pandemic landscape.

Administrators also want teachers to continue to use technology in their classrooms. The reason is that integrating technology and proper use tends to lead to increased learning and support instructional practices (Feng et al., 2023; Sung et al., 2024). Technology leaders can be teachers or administrators who encourage teachers to use technology in their classrooms (Akcil et al., 2019). Effective educational leadership requires ongoing support and encouragement to ensure teachers continue integrating technology rather than abandoning it. In addition, when teachers are given time to collaborate and receive strong administrative support, they are more likely to integrate technology into their classrooms (Nguyen, 2021). Therefore, building a culture of technology integration into classrooms led by administrators will lead to the enhancement of learning outcomes and student engagement. Also, sustained technology integration through proper leadership and decision making will lead to teacher ownership of technology integration and will result in long term adoption. Lastly, having

administrators foster a culture of technology integration is essential for enhancing the learning outcomes for students. Also, it is important to involve teachers in decision-making processes regarding technology integration since it can help create ownership for teachers and ultimately lead to higher cases of technology integration.

Implications

The findings of this study will have positive social change within the middle school where the study takes place and possibly throughout Ohio. It could help teachers better understand how to use technology and improve their use of technology in their classrooms. Technology will be used after the pandemic, and teachers may quickly need to adapt their face-to-face teaching back to online education. One instance in which this could happen is when a school is closed due to a “snow day.” A snow day is when a school is closed because it is too difficult to transport the students to school due to the weather. The COVID-19 pandemic has made teachers and students familiar with virtual learning; therefore, there might not be a need for snow days in the future (Byck, 2020). Teaching virtually is possible today due to many learning platforms like Google Classroom. Teachers can also meet with students virtually via Google Meet and Zoom. The usage of new technology will continue to be integrated and help teachers communicate effectively from home.

Summary

The central theme shown in this proposal included documentation of the problem that this study addressed. To break down this problem, first, there needed to be more time that allowed administrators to give teachers proper training to prepare them to move from

face-to-face teaching to virtual teaching. This led to teachers having to change their pedagogy and learn new ways of teaching quickly. This change caused stress and heartache for most teachers during this virtual teaching. However, this change forced the teachers to learn and implement new technology. Now that teachers are returning to the classroom, some are reverting to their old ways of teaching, and administrators want to know how they can help support these teachers to continue integrating new technology in their classrooms.

Next, there was evidence of the problem. Local data indicated that some teachers had difficulties teaching virtually during the pandemic through inquiries on how to use certain technologies during the pandemic. Also, the school in this study had just transitioned to a one-to-one device approach for their students, and some teachers should use them more often. There has also been discussion within the administrative team on how to support the staff using technology in their classrooms. Serving as a framework and guide for the study I used a conceptual framework that brought together the pieces of technology. Finally, this information will be described to the technology department and building administrators to help guide their PD and training with technology in classrooms.

Section 2: The Methodology

In this section, I describe the qualitative study design, which was used throughout the study. In this section, I will discuss the relationship between the questions and the problem. Also, this section contains a roadmap of the implementation of the study and an overview of the nature of the selection of participants and how the participants were treated to ensure ethical treatment. Lastly, in this section, there will be a discussion of how the data were collected and analyzed.

Qualitative Research Design and Approach

The approach for this study qualitative . A basic qualitative is used to focus on a phenomenon by examining a group of participants' experiences, with participants aware of an issue or problem; however, there is no deep understanding of the event itself (Leigh-Osroosh & Goodman-Scott, 2025). A basic qualitative study was the best choice for this study because it focused on teachers' experiences during and after the COVID-19. Three research questions (RQs) guided the study.

RQ1: What are the experiences of middle school teachers using technology during and after the pandemic?

RQ2: What is the perceived usefulness of technology in the middle school classroom?

RQ3: What support may teachers need to use technology in their classrooms consistently?

The participants in this study were teachers at a middle school that houses grades 7 and 8. Data collection was comprised of one-on-one interviews. Data from the interviews were analyzed and coded. The results from this information helped explore the above questions and understand teachers' experiences with technology use in their classrooms during and after the COVID-19 pandemic. This data analysis helped teachers and school administrators effectively integrate technology into their classrooms.

Selection of Basic Qualitative Study Design.

The most appropriate qualitative method for this study was a basic qualitative study. Using a basic qualitative study helps to focus on understanding a phenomenon that people are aware of but do not fully understand and requires a deeper understanding (Leigh-Osroosh & Goodman-Scott, 2025). A basic qualitative study was the appropriate choice for this study because the purpose was to gain an intimate understanding of participants' worlds and their unique experiences (Morrigan et al., 2022). This approach was appropriate for this study because the purpose of this basic qualitative study was to examine the experiences of middle school teachers' technology use during the pandemic and in the future, including their perceived usefulness of the technology in their classrooms, their intended use of the technology moving forward, and what support they may need from administration to continue using technology consistently..

This study took place at a middle school serving grades 7 and 8, located in the Midwest. The teachers who participated in this study had similar experiences with the same amount of training and time to prepare for virtual learning. In this study I used interviews to provide insight into how teachers adapted during the pandemic. These

interviews were semistructured, giving insight into the teachers' experiences during and after the pandemic. The interview questions were structured to prompt teachers to discuss their experiences related to the study's research questions.

The purpose of this study was to gain insight into teachers' experiences during and after the COVID-19 pandemic and to help school administrators understand the supports they need to put in place for teachers. Because this study will involve understanding the experiences of teachers who taught during and after the pandemic, it was necessary to have a few data points to fully understand the problem this study addressed. Therefore, all the information presented in this study was collected through interviews.

Consideration of Alternative Designs

Hess (2021) defines interaction as the social element of experience, while continuity accounts for how a person moves forward from past experiences to present and future experiences temporality. This type of research tends to happen in real time and continuously. Since the school where the research is taking place has returned to in-person teaching and has ended most COVID-19 protocols, this type of research was not the best fit for this study.

The primary objective of qualitative research methods is to explore and understand personal experiences, beliefs, and perspectives in order to examine how they relate to specific phenomena (Bazen et al., 2021). The purpose of this study was not to understand what it was like for teachers who taught during the pandemic. Instead, this

study focused on why they chose to continue using technology integration in their classrooms or not to continue using certain technologies.

Ethnography is a qualitative research method that explains and examines a particular culture or social group, often requiring the researcher to immerse themselves in the field or location for an extended period (Dobbins et al., 2021). This study did not fit the criteria for ethnography research. The purpose of this study was not to understand the culture of the teachers, but rather why they have chosen to continue to use certain technologies or not to continue to use certain technologies in their classrooms.

Grounded theory involves the researcher collecting and analyzing the data to develop an idea or theory from the data (Bowers & Creamer, 2021). Data were collected and studied in this study; however, no new theories were derived from the gathered information after the data were analyzed. Since no new theories were derived from this study, grounded theory was not the best choice.

Quantitative methods are a type of research that investigates social phenomena through statistical analysis of numerically measured data. These methods focus on identifying patterns, relationships, and potential cause-and-effect interactions with the variables. For this study, I did not use quantitative methods because they use numbers and often involve large groups of people and therefore are not a good choice for this study.

Many teachers were not required to take technology integration courses or training in school while obtaining their teaching certificates. Program evaluation is a systemic process of collecting and analyzing data to make judgements about a certain

program's effectiveness based on predetermined goals and standards (Welch, 2021). The purpose of this study was not to evaluate any other programs. Therefore, there were better choices for study.

Participants

Criteria for Selecting Participants

This study focused on a group of teachers at a Midwest middle school. All the teachers at the school went through the same process of moving from a face-to-face classroom to a digital classroom during the COVID-19 pandemic. Yet, all these teachers had different experiences with teaching virtually. Upon returning to the classroom, some teachers have not continued using technology, while others have.

The purpose of this basic qualitative study was to examine the experiences of middle school teachers' technology use during the pandemic and in the future, including their perceived usefulness of the technology in their classrooms, their intended use of the technology moving forward, and what support they may need from administration to continue using technology consistently. This information will help administrators train teachers to integrate and use technology in their classrooms in the future.

I selected the teachers who participated in this study through purposive sampling due to their ability to answer RQs about the use of technology in their classrooms during and after the pandemic. There were 47 full-time teachers at the middle school, but the goal was to collect data from 8-10 of them. The teachers who were selected worked within the school during and after the COVID-19 pandemic and had the same training opportunities as all the other teachers within the school. While I did not use a stratified

sample, where possible I intended to recruit an even number of teachers from seventh, eighth, and special grades (art, physical education, technology, music, etc.).

Participants had to meet two criteria to participate in this study. First, they must have worked at the middle school and taught virtually during the COVID-19 pandemic. The second criterion is that participants must have used technology while teaching virtually and currently use some technology in their classroom. Ensuring that participants were at the school during the pandemic and that they are currently using technology in their classrooms helped ensure the collected data were accurate.

Justification for the Number of Participants

I had 10 participants who participated in this study. Having at least 10 participants is a guiding principle to ensure that qualitative researchers have enough participants to achieve saturation (Hennink & Kaiser, 2022). Saturation in qualitative research occurs when no new data are revealed during further data collection (Hennink & Kaiser, 2022). In this study I used a purposive sample over probability sampling. I chose purposive sampling because it allows me to select the participants who would best answer the questions of this study. If more than 10-12 people wanted to participate, the first 10 people who responded would be selected. The remaining teachers would have acted as alternates for the study if another teacher could not participate. The number of 10 participants was picked to make sure data saturation was accomplished because Hennink and Kaiser (2022) stated that data saturation occurs in interviews between nine and seventeen participants.

If any teachers were not initially selected for this study, they served as alternates. These alternates received an email stating they were not among the first 12 teachers to reply to the original email. This e-mail requested them to remain as alternates in case any of the selected participants withdraw from the study for any reason. The e-mail explained that if someone cannot participate, the next participant would be chosen in the order of their response to the original e-mail asking teachers to participate. Also, this e-mail expressed appreciation for their willingness to participate in this study and thanked them for their time. Once all the data had been collected and confirmed, and no further interviews were needed, a final e-mail was sent to the alternates, letting them know that enough data had been collected and that they were no longer needed. Once again, the e-mail thanked them for their time and willingness to participate in this study.

For this study, I used a qualitative approach. My goal was to gain an in-depth understanding of these participants' experiences during and after the COVID-19 pandemic. Data saturation was reached when no new data were collected. Typically, in qualitative research with around 10 participants (Hennink & Kaiser, 2022). Therefore, ten participants for this qualitative study were appropriate.

Procedure for Gaining Access to the Participants

The first step in gaining access to participants was to ensure that the school's administration would approve this study to take place within the school. Therefore, I talked to the principal and then the school district superintendent. I asked for written consent. Once I received written consent, I submitted it to Walden University's Institutional Review Board (IRB). Once IRB approved this study (# 05-10-24-0248508),

I began the data collection. After the administration approved this study, an e-mail was sent to gauge the interest of potential participants for this study. This e-mail described the study, the purpose, and what was needed and expected from the participants. A copy of the consent form was sent along with the e-mail so the potential participants can access the form and read it independently. The e-mail had my contact information if the participants had any questions and wanted to discuss it through text, a phone call, or in person. This e-mail was one of my modes of communication with the participants since they work in the same building. I kept track of the order of the participants' replied to emails stating that they are willing to participate. I saved a copy of the email to a USB drive and responded to the email indicating whether they had been selected. After a few days, I gave each participant a hard copy of the consent form. I asked them to return the signed form within 2 days to review the consent form. I asked if they had any questions about the form before asking for their consent to the study by signing the document and returning it to me. If they signed it, they were considered part of the study. The participants must have signed the document to verify they were willing to participate. These documents are secured in a locked filing cabinet. This will be done to help ensure that no identifying information can be divulged about the teachers who participated in this study.

Establishing a Researcher-Participant Relationship

Proper qualitative research must be objective and not let personal experiences or views interfere with the study. Therefore, this study must be credible, confirmable, transferable, and dependable(Quintão et al., 2020). By filling in these standards, it can be

assured that the study's approach was planned logically, where all these standards correlate with each other (Quintão et al., 2020). Throughout the interview process, the participants were reminded that their identity, age, or what they teach will not be revealed or mentioned in the study. This helped encouraged the participants to answer all questions honestly and thoroughly throughout the interview. The questions throughout this process were designed to have the teachers reflect upon their own experiences throughout the COVID-19 pandemic. These open-ended questions guided the participants to answer the research questions.

Protection of Participants

I took measures to protect participant rights, including confidentiality, informed consent, and protection from harm. There were many different steps to ensure that the participants' identities were protected. In this study, I kept the school's location and name masked to keep the school and participants confidential. Along with masking the name and the school's location, defining factors of the teachers were not used. Some of these defining factors that would not be used in this mentioned in this study are their names, grade they teach and subject. These steps helped protect the individuals participating in this study.

Confidentiality

One of the biggest concerns for the participants was ensuring they had their privacy and were protected throughout the study process. I assigned alphanumeric codes (T1, T2) to each participant to protect their identity. These numbers were assigned chronologically when they consented to the study. Since this school only has two grades

and uses the teaming model for these grades, this study did not mention the grade or subject that the participants teach. This helped keep the identity of these teachers confidential. Even though many different middle schools house only seventh and eighth grades, keeping the school and teachers' names confidential was essential. This confidentiality was accomplished using the number system for the participants, not the grade or subject they teach. When the interviews started, the participants were given another copy of the consent form and asked to reread it. Also, all signed consent forms will be put under lock and key.

Informed Consent

To ensure that all participants were willing to participate in this study, an e-mail was sent out to all the teachers and administrators within the building. The email outlined the goals of the study and what a participant could expect if they were willing to participate. Once they were willing to participate, they were e-mailed a consent form from Google Docs outlining what would be published and how their identity would be kept secret. When the interviews start, I reminded the participants of the consent form, and asked the participant if they have any questions about the consent form or the processes of the study. If they had any questions I answered them before the interview started.

Protection from Harm

There are a few different ways that I helped ensure that the study participants were protected from harm. First, the name of the school where the research took place was masked, and there are hundreds of middle schools throughout the Midwest. Second,

the participants were given an alphanumeric code instead of using their names. This kept the identity of these participants confidential. The questions that were asked were open-ended and written to help guide the participants in answering the questions related to this study. These questions were also written to ensure that the participants did not feel talked down to or written to offend anyone. Lastly, the numbers that were assigned to the teachers and all the consent forms were placed in a locked filing cabinet within my home. The data collected during this study was saved on a password-protected USB, and the computer that was used is a personal computer at my home, which is also password-protected. The USB is also secured at my home.

Data Collection

The primary source of data that was collected for this study consisted of individual interviews with teachers who agreed to participate in this study. The questions that were asked in these interviews were open-ended, which allowed the participants to explain their experiences with teaching during and after the COVID-19 pandemic. These questions were written to guide the participants to answer the necessary research questions to the fullest. The questions allowed the participants to discuss the struggles they had and the victories they had during the COVID-19 pandemic. These questions allowed for flexibility in their self-reporting throughout the interview. Triangulation helped improve validity by converging data from different sources (Lemon & Hayes, 2020). Translation in qualitative research uses multiple methodological strategies, such as interpreter use and follow-up translation, to ensure the accuracy, validity, and integrity of

the collected data. (Egilsson et al., 2022). Since triangulation allows a researcher to ensure that their research is unbiased, accurate, and valid, it was used in this study.

Data Collection Instrument

I used a researcher-produced interview protocol to collect data for this study. Because the data being collected is through interviews, specific protocols were needed to ensure that these interviews did not have any biases and that no harm was brought to these participants. To ensure this happened, all interview records were numbered in the order that they were received, and they had only a number of the participants interviewed. Audio recordings were used to make transcripts for each interview, thus making coding these interviews much more manageable. Each interview was recorded with a recording device, and the data were saved on a USB, password-protected, and locked at my house while not in use. The grade level that these teachers taught was not mentioned in the data since this school only houses two grades, which are seventh and eighth.

Source for Data Collection

The data source for this study came from interviews that I conducted. I selected interviews as the data source because they provide deep, rich, and individualized that is important to qualitative research (Ravitch & Carl, 2016). The questions in the interview protocol that were asked were designed to ensure the questions aligned with the purpose and framework of the study, a peer reviewer validated the content and alignment.

The sole source of data for this study were the individual interviews I conducted with participants. The experiences of the participants were the primary data source as they were the best source for the information focusing on teachers' experiences during

and after the COVID-19 pandemic. A well-designed interview protocol guided the interview process with open-ended questions. The interview remained neutral and objective throughout the entire data collection process. This interview process and the interviews themselves ensured that the data collected did capture the richness, complexity, and diversity of the experiences that the teachers experienced during the COVID-19 pandemic.

The interview protocol and design can help the study achieve credibility and ensure the researcher gathers enough relevant information while maintaining a structured and organized approach (Ravitch & Carl, 2016). In creating questions for this study, I took several steps to ensure that questions aligned with the framework. The first step taken was a comprehensive investigation of the technology acceptance model (TAM) to understand its goals and purpose in research. Next, numerous qualitative peer-reviewed articles that used TAM for their study were analyzed, and questions the researchers came up with were noted. In addition, I used the Walden Library and reviewed other project studies and capstone projects that used TAM to see the type of questions they asked and the data the researchers collected. Following this, a thorough review of my problem statement, the purpose of the study, and research questions were reflected upon. From this reflection and rewriting process, 11 questions were developed to help effectively guide participants to their experiences within the framework of TAM and the challenges and benefits they experienced with technology during and after the COVID-19 pandemic.

To ensure that the interviews themselves captured the richness, complexity, and diversity of the experiences that the teachers experienced during and after the COVID-19

pandemic, I developed well-structured interview questions. I formulated these interview questions with a focus on the effects that the COVID-19 school closures had on technology usage by teachers. These questions were open-ended, which allowed the participants to share their own experiences during this time period. It is also important to be ready to think on your feet, as it allowed you to dig deeper and get better explanations (Lambert, 2013). The first attempt at writing interview questions started after looking at these research projects, reviewing the framework and discussions with administrators. After reading and reflecting upon the questions and reviewing the framework again, I rewrote and refined the question multiple times to ensure that these interview questions will guide the participants to answer the research questions and that they align with the framework. Specifically, teachers were asked questions that address their perceived usefulness and intended use of the technology in their classrooms. These questions have gone through a rigorous review from two researchers that work in this field. I have been given feedback on clarity, relevance, and alignment within the current educational research paradigms.

Sufficiency for Data Collection Instruments

To establish the sufficiency of data collection instruments, the researcher must demonstrate that the devices are appropriate for the research and can capture the participants' complex and nuanced perspectives. The tools that were used in this study were valid for the study, reliable, appropriate, comprehensive, and adequate. One tool this qualitative study used is interviews with open questions written by the researcher, which can be seen in Appendix B. These questions focused on the experiences that the

participants had during and after the pandemic with the usage of technology. These interviews did occur before or after school in a location where the participant felt comfortable. The teachers were notified by email that they will be recorded by a device designed to make audio recordings. The recording device protocol is outlined in the e-mail that the teachers read and replied that they consent to be recorded. Another tool that the researcher used is an audio recorder. This recording device was one of the tools used in the interview process that will allow the researcher to go back and listen to the interview again. The recorder was accessed through a USB and will be password-protected.

Process for How Data Were Generated, Gathered, and Recorded

I set up a time and a place to conduct these interviews with the participants and continued to set up a time and place as more participants agreed to this study. I made sure that I am early and set up before the interview. The interview involved me introducing myself and reviewing the consent form. Next, I explained the purpose and the study and see if they have any questions accordingly. Following this introduction to the interview and the process, I let them know that I am starting the recording and explain why I am recording this interview. From here, I began with the questions in Appendix B. These open-ended questions were written to allow the participants to express their thoughts, feelings, and experiences about using technology before and after the COVID-19 pandemic. Follow-up questions were asked if they needed to expand on a specific topic or if there is a need to expand on an idea that they had. I took notes of the participant's body language throughout the interview to ensure I got all the necessary data. After all

the questions were asked, I thanked them for their time and let them know that I segmented this interview into the main points and have them check the main points so they could adjust or add more information for this study.

These initial audio recordings were kept and referred to through the data analysis process to help since the transcriptions are just a version of the data (Ravitch & Carl, 2016). Next, these transcripts were broken down into interpretations. These interpretations and summaries were checked by the participants to ensure they can validate that these interpretations are correct and this is called member-checking (Ravitch & Carl, 2016). Another tool in this study was a notebook that was used during the interview process to take note of the participant's responses, along with notes on their body language during each question. These notes were saved on a Word document that were held on the same USB that is password protected. A log was kept in an Excel file, which will also be stored on the same USB that is password protected. The log will indicate the participant number, the time and place of the interview, and the duration. Lastly, the USB housed a reflection Word document where I described my thoughts about the process and what was learned for later reflection in this study.

Systems for Keeping Track of Data

The interviews recordings were downloaded on my personal computer at home, allowing me to go back at any time and hear precisely what was said during the interview (Lambert, 2013). To keep track of data and the developing insights into this study, I did a few things to ensure the data were organized. I kept all the collected data in one location and organized is essential for any research project. Therefore, I kept all information and

data on a password-protected USB drive that included research logs, excel files with the participants' numbers, and the time and place where these interviews will take place.

These files helped keep the researcher organized and help recognize patterns' formation, which will help in the coding process.

Procedures for Gaining Access to Participants

Gaining access to teachers within the middle school where this qualitative study required a few steps to ensure this project was done ethically and correctly. Once IRB approval was given through Walden University, the first step was to notify the district office and the school principal of the research project timeline. After the administration gave consent to proceed, an email was sent to the teachers teaching in the school district during the COVID-19 pandemic, asking them if they would like to participate. The participants were chosen in the order in which they replied to the email. I started the interview process as soon as I had enough participants.

These interviews occurred in the conference room or the teacher's classroom before or after the school day's contract time. If the participant did not feel comfortable using the conference room or their classroom or does not have time before or after school an off-site location would have been offered. This off-site location would have been the local library which has a six conference rooms. Participants could have also be able to suggest other locations if the local library did not work for them. This would ensure no distractions from students, teachers, or administrators and was recommended by the administration. This is important because interviews should not interfere with instructional time or disrupt a teacher's planning time (Lambert, 2013). Having the

interviews occur within the building had a few advantages. Some of these advantages are that the participants had a direct connection to the location being studied, and the school has relevant resources that helped remind the teachers of their experiences, such as access to school computers that could have information on them regarding their experiences during this time. The school location was also comfortable and familiar to the participants, which could have helped put their nerves at ease, and being in the building itself can be more convenient for the participants as it aligns with their work schedule.

Role of the Researcher

This study took place in a middle school located in the Midwest. I have been an employee there for over sixteen years as a teacher. While working in this school over the past sixteen years, I have taught seventh-grade social studies and science and am currently the STEM teacher in the building. Over the past sixteen years, I have built rapport with the administrators, fellow teachers, and support staff through many interactions. I am not an administrator and do not hold any other position within the school or district that would give me any power over the participants. This did not make the participants feel like they must participate or feel uneasy during the interviews since I did not have an administrator position within the school district. This method suited the participant recruitment and created a contented atmosphere during the interview process.

Data Analysis

The research questions of this study were addressed through semistructured interviews with classroom teachers, allowing a two-way dialogue where the participants can ask questions for clarity. The interviews were recorded electronically with a Sony PX

digital voice recorder. The interviews were digitally transcribed by me and placed on a password-protected device. These interviews were transcribed within twenty-four hours of the interview, and the time and dates of the interviews will be recorded. This will help organize the interviews and keep track of the participants. To ensure the findings and transcripts are correct, I listened to the interviews multiple times to check for accuracy and confirm that the transcriptions are accurate. After the interviews were transcribed and checked by me, I summarized the main points of the interview and shared them with the participant. The goal of this process was to facilitate errors and potential supplementation of omitted information by the participants. Furthermore, this process gave the participants an opportunity for the participants to validate the accuracy of my interpretation of the interviews. As the researcher, I reflected upon what was said by the participants and listened to the recordings of the interviews. Once the recordings were clear, I started to code the data. I sent the participants my interpretation of the interview to make sure it was adequately interpreted and that they agreed with the interpretation. This is called member checking. Member checking is when the interpretations taken from the interviews are shared with the participants (Ravitch & Carl, 2016). This helped add credibility to this study and allowed the researcher to go back and ask questions to ensure participants double-check for accuracy.

Coding Procedures

Three research questions guide the study and try to explain middle school teachers' experiences of using technology during and after the COVID-19 pandemic. I collected data from 10-12 teachers from interviews to understand their experiences of the

use of technology during and after the pandemic. The coding process and analysis will be facilitated by NVivo software which is a computer software program used by academic researchers to help them organize their data.

The first step in using NVivo is to upload the transcripts into the software program. The interviews will be reread, and certain themes will start to emerge and noted within the NVivo program. These themes from the interviews will be dissected into data into discrete codes or nodes within the NVivo program. This process involves segmenting the interviews or qualitative data into meaningful segments, facilitating the classification of repeating themes and significant perceptions that have emerged from the participants' interviews.

As more and more codes are identified through dissecting, the ten interview patterns or connections will be identified. Through this process of identifying the different codes, themes and patterns will gradually surface, providing a structured framework for deeper data analysis and interpretation. The nature of coding with NVivo allows a comprehensive understanding and identification of the codes and themes. Thus, I made connections that underline the participants' experiences while teaching during the COVID-19 pandemic. This approach and usage of NVivo served as a foundation for organizing and analyzing the data in alignment with the research questions and, therefore, adding insights from the collected data and answering the research questions.

The codes were created from answers given from research questions. Those codes were then grouped into categories, and from there, four themes were created.

Table 1*Themes from Data Analysis*

Research Questions	Themes
RQ1: How do middle school teachers use technology after the pandemic, and how are they planning on using it in the future?	Theme 1: Teachers use targeted technology for engagement and support. Theme 2: Teachers experienced challenges using technology to meet student and family needs during virtual learning.
RQ2: What are the middle school teachers' experiences during and after the COVID-19 pandemic, and how did these experiences affect their perceptions of technology's effectiveness in the classroom?	Theme 3: Although teachers struggled with the mandated technology during the pandemic, they may modify and adapt technologies post-pandemic.
RQ3: What support do middle school teachers need from administration and staff to use technology well in their classrooms?	Theme 4: Teachers want technology driven professional development and clear administrative support.

Evidence of Quality

The data I collected through in-person, semistructured interviews with open-ended questions, were essential to establish the study's credibility and confirmability. Credibility and confirmability were achieved for this through member checks. Member checks are where participants will review and verify the interpretation of the participants' interview (Ravitch & Carl, 2016). This gave the participants an opportunity to clarify, fix, or add any information that was misinterpreted during the interview process. This process helped to ensure that the interpretation of data presented in this study represents the perspectives of the participants.

This study aligned with the methodological frameworks that support qualitative research to ensure comprehensive and transparent reporting of this research project.

Additionally, the research design process established qualitative research principles, employed research practices such as member-checking to increase the credibility and trustworthiness of the findings of this study. Furthermore, a detailed description of the research procedures, including the data collection, analysis methods, and how certain decisions were made, and will be maintained within the academic rigor and standards of Walden University. This documentation allowed the potential replication of this study.

Discrepant Cases

It is possible to get data from a particular participant that does not follow the norms or themes of the other participants. When this happens, this is referred to as disconfirming evidence or discrepant cases. This can be an issue because it had the potential to inscribe the orientations or a marginalizing stance towards those whose themes do not fit what the researcher may consider the norm for their study (Ravitch & Carl, 2016). When discrepancies happen within the data, the researcher must carefully document the cases, reflect upon any other possible explanations for these themes, and challenge themselves to develop alternative explanations (Ravitch & Carl, 2016). The researcher also needs to reach out to experts in the field, such as their educational advisor or advisors, and get their input. Lastly, no discrepant cases were identified during the data analysis portion of this study, as all the participant responses were consistent across the themes.

Data Analysis Results

The IRB was approved by Walden University, and 10 teachers were interviewed for this study. Hennink and Kaiser (2022) stated that data saturation occurs in interviews

between nine and 17 participants. Therefore, 10 participants were adequate to obtain the data-saturated needed to answer each of the research questions, which were:

RQ1: What are the experiences of middle school teachers using technology during and after the pandemic?

RQ2: What is the perceived usefulness of technology in the middle school classroom?

RQ3: What support may teachers need to use technology in their classrooms consistently?

I sent an e-mail to the entire staff that outlined the project and its goals. The email also asked for volunteers to participate in the study as long as they fit the proper guidelines. These guidelines were that the teachers needed to be teachers in the building before, during, and after the COVID-19 pandemic. The e-mail outlines the guidelines for participating in the study. These guidelines were that they had to be a teacher in the building before the pandemic, teach virtually in the building during the pandemic, and teach in the building afterward. From this e-mail, ten teachers responded to the email, and interviews were set up. Out of these participants, the majority of them were over the age of 50, with a total of eight. The other two participants were over the age of forty. All participants had 20 or more years of experience teaching. These participants were asked a total of eleven open-ended questions and allowed for follow-up questions. The interviews were arranged with the 10 participants, and these meetings were voluntary, and they could withdraw at any time from the study. I recorded the interviews with an audio device, and I took detailed notes during the interview to record their body language. I

assigned each participant a number, which was recorded on a password-protected USB, and I was the only one who password and had access to the USB device. I did this to protect the identity of each participant.

I transcribed each recording in a Word document that was stored on the same password-protected USB. I listened twice to each recording to double-check the accuracy of the typed-out interview. The interviews were summarized and given to the participants so they could review my summary. They could add or change the summary at this time. After all the interviews were typed out, summarized, and checked, they were coded.

For the coding process, the software program I used was NVivo. I uploaded the transcripts into NVivo so they could be coded. I read each transcript multiple times. During this time, specific meaningful segments of text began to emerge. I highlighted these segments of text and represented them by a code that best described what the participants were trying to describe during their experiences. After I coded all ten interviews, specific codes were represented across multiple participants. These codes, which were similar across all ten interviews, were then grouped to form categories. Through an iterative process of comparing these categories, themes started to form. These themes associated with the codes were then organized and aligned with this study's three research questions. The three research questions and the theoretical framework guided the data analysis and coding process, followed by a review of the data. Below is Table 2, which gives an example of the data analysis.

Findings

Table 2

Alignment of Research Questions and Themes

Research Questions	Sample Codes	Categories	Theme
RQ1: What are the experiences of middle school teachers using technology during and after the pandemic	Student engagement tools; Multimedia lessons; Real-time feedback; Lesson organization; Accessibility of materials.	Students' engagements and learning challenges, tools and resources selection, and student engagement and learning challenges.	Middle school teachers use targeted technology for engagement and support.
	Student attendance issues; Lack of accountability; Parent technology challenges; Student access issues; Emotional stress	socio-emotional challenges and support, and adaptation to virtual and hybrid teaching	Teachers experienced challenges using technology to meet student and family needs during virtual learning
RQ2: What is the perceived usefulness of technology in the middle school classroom	Frustration with mandated tools; Increased comfort over time; Continued use of digital platforms; Abandoning ineffective tools; Pedagogical adaptation	barriers and limitations, organizational and operational changes, and pedagogical strategies	Although teachers struggled with the mandated technology during the pandemic, they adapted technologies post-pandemic
RQ3: What support may teachers need to use technology in their classrooms consistently	One-size-fits-all PD; Need for hands-on training; Peer collaboration; Administrative clarity	barriers and limitations, organizational and operational changes, and pedagogical strategies	Teachers want technology driven professional development and clear administrative support

The three research questions were used to guide this project study which were:

RQ1: What are the experiences of middle school teachers using technology during and after the pandemic?

RQ2: What is the perceived usefulness of technology in the middle school classroom?

RQ3: What support may teachers need to use technology in their classrooms consistently?

The problem that was addressed by the research questions is that during the COVID-19 pandemic, teachers began using new or existing technology for which they were unprepared. The site where this study took place was a suburban middle school that housed grades seven and eight in the Midwest.

RQ1

The first research question asked about the experiences that middle schools had during and after the pandemic and was aligned and addressed with theme 1 and theme 2. There was a total of 10 interviews, and after analyzing the data from these interviews, it showed that the participants struggled moving from a traditional classroom to a virtual classroom. Most of the teachers felt overwhelmed by this rapid shift and had to rely on their peers or learning on their own. However, forcing these teachers to teach virtually made them more familiar with different online tools and made the participants realize that these online tools can help them streamline their classes and help them stay more organized. Overall, the participants experiences with technology over this timer period evolved and moved from a time of difficulty to a time where digital tools became integrated into their everyday lessons.

Theme 1: Middle school teachers use targeted technology for engagement and support

In this theme, all participants discussed how they use technology for student engagement and support. There were three categories were created from 22 codes were subsumed into this theme and those categories were *students engagements and learning challenges, tools and resources selection, and student engagement and learning*

challenges. The participants also discussed both constructs that are used in TAM (ease of use and usefulness).

The participants in this study selected certain technology to engage students and address learning challenges in their own classrooms. Seven of 10 participants (P2, P3, P4, P6, P7, P8 and P9) shared that certain technological tools that they used in their classrooms increased student participation and comprehension. For example, Participant 4 stated “I have so many more lessons now that are accessible through Google Slides...the students will not miss a beat because I have a presentation for them with videos of me speaking for any day that I could be absent.” Participant 2 also highlighted how recording their lessons made it easier for students to review what was taught because, the students were able to go back and watch the lesson. Participant 2 said “The programs like that, a lot of us started using those recorded lessons, and it does make it easier. The lessons are right there, and the students can watch-it’s not the same as in-person, but it gives them the next best thing.” These participants showed that the usage of technology helped students stay engaged in the lessons and improved teacher feedback.

Five participants (P2, P4, P6, P7, and P9) deliberately selected technology tools and resources that engaged students and addressed the diverse learning challenges that their students faced. Additionally, P6, P7, P8, P10, and P11 specifically mentioned choosing tools based on their ease of use, effectiveness, and ability to support different learning needs. For example, Participant 7 discussed the importance of selecting “user-friendly” tools. This helped the participant be more efficient in their own classroom. Participant 9 also mentioned that “Google Suite has made our life so much easier in the

classroom” because it streamlined lesson planning and student communication.”

Participants articulated how technology can positively affect both teaching and student learning outcomes when the necessary tools are accessible.

Six different participants explained how using tools from Google Suite increased student participation and comprehension. For example, Participant 8 stated, “Google Classroom has become the central hub of my teaching.” Using a specific technology, in this case Google Classroom, made it easier for this participant and most participants to communicate with students and parents. Participant 10 also discussed Google Meet and said, “Google Meet has been a huge help with parent communication.” The participants also mentioned that Google Meet allowed them to give real-time feedback to students and be engaged with those who required help or wanted extra help and support from them. Lastly, Participant 11 discussed the usefulness of Google Suite by saying, “I prefer to have students work in front of me so I can write notes and make comments on it,” which shows that Google Suite was beneficial to Participant 11 as a technology tool to increase student engagement and support.

The participants identified strategies for using specific technologies to help improve student engagement in student learning. Four participants (P7, P10, P9, and P8) mentioned the importance of specific technologies that allowed students to communicate in real-time, allowed them to participate anonymously, and supported a more inclusive classroom. For example, two participants (20%) mentioned Pear Deck as a tool they used in their classroom. Pear Deck was shown to increase students’ engagement in the classroom. These two participants felt that Pear Deck helped improve student

engagement. For example, Participant 7 said, “Pear Deck provides questions and allows the students time to respond.” This helps the students feel more comfortable participating in a classroom setting. Participant 7 also mentioned, “Pear Deck allows me to model both positive and negative examples to the whole class without letting other students know who wrote them.” Additionally, Participant 10 mentioned that “Pear Deck allowed for “more student interaction with lessons because they could respond directly on their devices instead of just sitting and listening to a lecture. These participants show how Pear Deck’s interactive features are a way to include all students in their lessons and enhance participation and deeper comprehension.

When it comes to PD, six participants felt that PD could help with technology integration if done correctly. For example, the participants felt that the PD was too general, was not hands-on enough, and was not specific to their needs. For example, participant 9 said, “PD should be focused on what we need, but too often, it’s just here’s a cool new technology thing, let’s all learn it. It should be about who this would actually benefit.” This quote highlights the frustration that these participants had with PD. Participants want current hands-on training that is aligned with their lessons and standards.

One more support that five participants (50%) or half mentioned was administrative support. While most participants felt that the administrative support was, in fact, helpful, most of the time, they found it inconsistent. For example, participant 7 said, “Admin did give us opportunities to learn along the way, but a lot of it was on us to figure out. There were some PDs, but they weren’t always targeted to what we actually

needed.” This quote shows that support was provided. However, it was not aligned with the specific needs of the teachers’. These five participants and this quote show that while administrative support is present, the support needs to be better aligned with the teacher’s needs and wants for them to succeed.

The first theme from these interviews was that teachers use targeted technology for engagement and support. Of the participants, nine (90%) discussed how technology helped engage the students in their classrooms. The technology these nine participants discussed was interactive lessons, real-time feedback, or multimedia resources. This shows that most participants used different technologies to help keep their students engaged in their classrooms. For support, eight teachers (80%) discussed in some way how support is important when it comes to using the technology properly in their own classrooms. The support mentioned were PD, collaboration with other teachers or peers, and administrative support. Overall, this shows how the participants felt that support systems with technology are important to their success as teachers.

Theme 2: Teachers experienced challenges using technology to meet student and family needs during virtual learning.

Theme 2 comprises 17 codes and two categories, *socio-emotional challenges* and *support*, and *adaptation to virtual and hybrid teaching*. The participants shared their struggles and identified which technologies worked well and which did not. As a result, the material in this theme aligns well with the constructs in the conceptual framework, TAM.

While the participants were teaching virtually during the pandemic, all faced some sort of struggle to meet the needs of the students or parents. These struggles with the students and parents related to technology usage by the teachers, students, and parents. Seven participants discussed struggles that students had during the virtual learning period. These struggles ranged from issues with access to technology, to not logging on to the class or doing their assigned work. For example, participant 4 shared their frustration by saying, “Getting the kids on the Chromebooks at the right time was always a challenge; getting the kids to understand the materials was also challenging.” This challenge shows that there was a gap between the participant’s expectations and the realities of virtual teaching.

Parents and families often struggled to support their children at home. Participants shared that these challenges ranged from not having proper hardware and software to not having the requisite knowledge to navigate the required technology when they teaching virtually. Half the participants noted that the parents were not properly equipped to help their child with virtual learning. This made it difficult for the Participants to effectively teach the students because students did not have enough help at home. Participant 8 described this situation by saying “I had parents and kids in tears on Google Meet telling me that they couldn’t do this, they didn’t understand it.” The lack of technology support that was given to the parents at home made it difficult for the teachers to have success and help their students learn the necessary materials.

Another issue that arose during virtual teaching was the lack of accountability from the students and their engagement during this time. Out of all the

participants, 70% reported having difficulties holding students accountable for attending virtual classes or completing their work. As stated, Participant 4 said “Getting the kids on the Chromebooks at the right time was always a challenge; getting the kids to understand the materials was also challenging.” More than two thirds of the participants (N=?) reported similar issues during virtual teaching. They expressed concern that students did not attend virtual lessons, and they were not held accountable. Student engagement was another issue that all the participants faced (100%). During virtual teaching, students struggled with staying engaged while sitting in front of their computer while they were at home. For example, Participant 10 described how students would “turn off their cameras or just disappear from class.” This made it difficult to ensure these students were paying attention and working on what they needed to do. There was also no way of making the students accountable for turning their cameras on during class because the teachers were not in the same room. These issues show that while the proper use of technology can enhance learning at times, during virtual learning, technology influence student engagement and participation. The participants faced many challenges while using different technologies to meet the needs of students and their families although teachers were teaching virtually. Seven participants discussed how students did not have adequate technology or failed to log in, which made it difficult for them to teach the students due to not using or correctly using the necessary technology. Also, nearly half of all the participants stated that the parents themselves were not equipped to support the technology needs of their children during virtual teaching. This particular gap made it difficult to help and teach the students during this time.

RQ2***Theme 3: Although teachers struggled with the mandated technology during the pandemic, they adapted technologies post-pandemic.***

Theme three comprised 29 codes and three categories. These categories included *barriers and limitations, organizational and operational changes, and pedagogical strategies*. The participants shared what worked and did not work with technology before, during, and after the pandemic and how they adapted their pedagogy to their new teaching environment. Participants spoke directly to the conceptual framework (TAM) construct of the *ease of use* of the technology, which may influence whether a participant or teacher decides to use specific technology in their teaching practices.

The participants perceived the usefulness of technology in their middle school classroom had evolved post-pandemic. While all ten participants struggled with technology to some degree during the pandemic, eight (80%) of them modified or increased their technology usage when they returned to face-to-face teaching. Most of the participants (P2, P3, P4, P5, P6, P7, P8, and P10) stated that they were frustrated with certain tools at the beginning of the pandemic and were required to use them. However, eventually they found some value in integrating certain technologies when they returned to the classroom. One example of this was that use of Google Classroom and Suite was mandated by the administration during the pandemic. All the participants did not use Google Classroom or Suite daily before the pandemic, and most of them struggled to use it at first. However, all the participants reported they currently use Google Suite and Classroom. For example, Participant 10 said, “That’s what we use as a district, and I like

it; I think it's improved as well, and I've improved with it." This shows how the feelings toward Google Suite and Google Classroom have changed throughout the pandemic to today.

Though most participants indicated they continue to use some of the technology required during the pandemic, six participants (P2, P3, P4, P4, P6, P7, and P8) stated that they no longer use some technology tools during virtual learning. These same six participants (P2, P3, P4, P6, P7, and P8) indicated programs like Screencastify and Boom Cards are now unnecessary for their classroom. However, nearly all (P2, P3, P4, P6, P7, P8, P9, and P10) of these participants stated they continue to use some of technology that they adopted during the pandemic. For example, P8 no longer records their lessons, which they did during the pandemic, but continues to use different digital resources that allow their students to review concepts they learned from previous lessons. Similarly, P7 shared that they initially struggled with adapting to certain technologies. The participants now recognize the benefits of using technology for tracking different data sets, Participant 7 said, "I think I should have jumped on the technology bandwagon a little earlier than I did." Participant 7 exemplified a desire to have used and integrated technology earlier in their lessons and classrooms and now sees the benefits of doing so.

A key factor in the participants' success was their ability to adapt and modify certain technologies to enhance their lessons rather than following administrative mandates. In their interviews, seven participants stressed that they only chose digital tools that enhance engagement and/or its effectiveness rather than using technology simply because of a mandate. All the participants of the participants mentioned how they

continue to use Google Classroom and some parts of Google Suite. Most teachers did not use this before the pandemic, but it was mandated for teachers to use it during the pandemic. This shift in technology integration shows how these participants once struggled with technology during the pandemic to purposefully integrate and use technology tools in their classrooms today that fit their needs as teachers, which shows that they find the technology valuable and useful.

While most participants struggled with the mandated technology integration during virtual teaching, almost all adopted it to some degree and continue to use some form of Google Suite. While most participants stopped using specific technology tools like Screencastify and Boom Cards, they now use digital tools like different parts of Google Suite. Additionally, seven participants (70%) of the teachers now prioritize technology that enhances student engagement, learning, and efficiency rather than using technology to meet an administrative mandate or requirement. This shift seen by the participants shows that they have a greater sense of autonomy in selecting the digital tools they need to support their needs and the needs of their students.

RQ3

RQ3 explored teachers' perspectives on the support they need to use technology in their classrooms more effectively. The participants' statements suggest that high-quality PD and administrative support influence how they use technology and how useful it is to meet student needs. The participants discussed the importance of hands-on, relevant, and tailored PD, not the one-size-fits-all model used in the past. The participants

also stated the need for clear expectations and guidance from administrators within the district for technology integration.

Theme 4: Teachers want technology driven professional development and clear administrative support

Theme 4 illustrates the participants' need for better hands-on PD and clearer administrative support. Theme 4 comprised 35 codes and two categories. These categories included *PD and Support* and *Technology Integration and Management*. The participants noted that they hoped for more specific, hands-on, and peer-led PD and clearer support from the administration. These findings directly relate to the TAM since PD and support from the administration could help the participants see how specific technology is easy to use and useful in their classroom.

All ten participants in this study expressed a desire for purposeful PD and administrative support to help integrate new technology in their classrooms effectively. Seven participants felt that the current PD was either ineffective or not tailored to their needs. All ten participants said that the PDs were often too generalized and not focused on subject-specific needs and wants. For example, two participants (20%) said they struggled to find PD that directly addressed the needed tools or helped them differentiate their instruction. Instead, these participants had to go outside the PD or resources or rely on peers for help.

Support from the administration played a key role in participants' ability to effectively and consistently use technology in their classrooms. Half of the participants (P3, P4, P6, P7, P11) noted no clear expectations and structured support from

administrators. Some participants expressed that how technology was implemented across grade levels has been inconsistent and confusing in the past. Based on their experiences, half of the participants (P2, P4, P6, P8, P10) also stated that they had little guidance on assessing the effectiveness of technology in their classrooms and whether they should continue to use it. Half the participants said that teachers within the school district should lead PD as they understand the daily needs and challenges they face in the classroom. Lastly, the teachers receiving targeted support and time to collaborate with their peers found integrating technology into their daily lessons easier. For example, participant 4 stated, “We were sharing more...we would each take a couple of days and make presentations so that it wasn’t just us doing all the work. That became more collaborative during that time and made things easier.” This collaborative approach not only reduced the participants’ workload but helped create a supportive environment where coaches were confident in integrating new technology into their classrooms.

Administrative support affected the participants’ perceived *ease of use* when integrating technology into their classrooms. Six participants felt that having clear guidance from administrators made it easier for them to integrate technology. These six participants said that when the administration gave them proper PD, clear expectations, and ongoing support, they felt confident integrating technology into their classrooms. For example, Participant 10 explained that “When I knew what the expectations were, and I had someone to ask questions, I felt way more confident using the tools in my classroom.” However, five other participants stated that integrating technology into their

classrooms was difficult when the administrators were unclear. This made properly integrating technology in their classrooms difficult.

The participants in this study expressed that they want PD that is relevant, hands-on, and focused on the needs rather than the broad, one-size-fits-all training. In fact, over half of the participants felt that the technology training the district provided lacked relevance to their specific needs. For example, Participant 6 shared this with frustration, stating, “We had zero technology training... the training needs to go with current technology hardware. I don’t even know what’s out there- that’s it’s hard for me to say what I need.” Half of the participants (P2, P4, P6, P8, and P10) stated they need clear administrative guidance on technology expectations and ongoing support for effectively integrating technology into their classrooms. Without ongoing support, the participants stated that it was difficult to correctly assess the technology’s effectiveness within their classroom. As a result, the participants need relevant, hands-on, and focused PD that, combined with proper administrative support, would improve the participant’s integration of technology into their classrooms more effectively.

Discrepant Cases

When conducting qualitative research, it is possible to collect data from a participant that does not align with the common themes and patterns of the other participants. When this happens, it is referred to as a discrepant case. Discrepant cases are significant because they can reveal participant biases or marginalize assumptions within the study (Ravitch & Carl, 2016). This is why it is important to carefully document all cases and reflect upon whether a set of data fits within the themes of the study. If data

from a participant does not fit within themes, it could be considered a discrepant case. However, there were no discrepant cases in this study because all participants' data aligned with the themes, thus showing consistency throughout this study. However, several participants (P3, P5, and P8) wished they had a district-issued laptop or Chromebook that could work on at home. They did not feel comfortable using their personal computers to do schoolwork and would be more successful in their classrooms if they had one.

Summary

Out of the 10 participants, eight mentioned how they wanted better support with technology put into place. The support that these participants mentioned were peers as a support system (six participants), PD (seven participants), and administrative support (five participants). The six participants who mentioned peers as a support system emphasized that, without their peers, they would not have had success with technology integration without their peers. For example, participant 11 said, "I had a very helpful teacher, and even when I was at home, he was kind enough to let me call him, and he would walk me through some things with regards to technology." This participant felt strongly about how peers helped them integrate technology into their classroom.

The findings from the interviews show that middle school teachers' integration of technology was influenced by the perceived usefulness and ease of use, which is outlined in the TAM. At first, most teachers struggled with the sudden move to virtual teaching because of the lack of preparation and support. However, throughout virtual teaching, most participants integrated new technology into their teaching and classrooms after the

pandemic ended, and they returned to classrooms. This integration shows how teachers moved from the mandated use of technology to the intentional use of technology as they realized how technology could improve their instruction and student engagement. This integration of new technology helps validate the TAM principle that perceived usefulness helps drive technology acceptance.

The participants also showed increasing autonomy when selecting tools aligned with their instructional goals. Seven participants (all except P1, P5, P10) specifically picked certain technologies that supported student engagement and learning differentiation, which aligns with the TAM construct of perceived usefulness. The participants also continued using tools that had an influence on their instruction. The simplicity and functionality of these digital tools represent TAM's construct of perceived ease of use, which further encouraged participant technology integration. Participants also reported that, post-pandemic, they stopped using tools that lacked usefulness in their classrooms, thus reinforcing both primary constructs of TAM; perceived usefulness and ease of use, which are critical for long-term technology integration.

Finally, external variables that the participants discussed as an influence on their technology integration, such as PD and administrative support, directly influenced participants' technology integration. These factors affect how teachers used and integrated technology which supports the variables within TAM's framework. The participants felt that if training was hands-on, collaborative, and relevant to their class, they would have more confidence integrating technology into their classrooms. The participants also discussed how consistent communication and ongoing administrative

support improved their comfort and willingness to use new technology in their classrooms. In contrast, when the communication and support did not fulfill the teachers' needs, using or integrating new technology created confusion. Overall, the participants expressed that careful integration of technology, intentionally informed by a framework such as the TAM', can help with technology integration in middle school classrooms.

Evidence of Quality

To address the rigors of qualitative research, authors must include credibility, transferability, dependability, and confirmability to ensure trustworthiness of the findings (Peters, 2023). Trustworthiness in qualitative research also refers to the perceived reputability of a source and quality which relates to the methodological rigor and completeness of reporting of the study itself (Albert et al., 2025). In this study trustworthiness was established through consistent data collection procedures, transparent documentation, and member checking to verify interpretations with participants. Additionally, this study incorporated credibility, dependability, transferability, and confirmability ensuring that the findings were accurate and consistent.

Interviews were conducted face-to-face and were recorded using a USB recording device. These interviews were transcribed and summarized, and the summaries were sent to the participants within a few days. As the participant's responses to the interview summaries were returned, I began to analyze them for codes. The interviews were typed out and put into a software program, NVivo. NVivo allowed for codes, patterns, and themes to be documented as the data were analyzed. While NVivo helped with the organization portion of the data, I was responsible for confirming the codes' accuracy,

verifying that themes accurately reflected the participants' experiences, and ensuring meaningful connections were data driven.

Transferability

Transferability refers to the extent to which a study's findings and interpretations can be applied to other settings or periods that differ from the original study (Köhler et al., 2025). I conducted this study in a Midwestern middle school, and I examined the experiences teachers had with technology integration before and after the COVID-19 pandemic. I also provided detailed descriptions of the school setting, the data collection process, and the procedures used to collect the data. These descriptions enable readers to understand how the findings from this study can be applied in other educational contexts.

Dependability

In qualitative research, the findings need to be dependable. Dependability refers to the findings of a study that are consistently found across different studies under similar conditions (Lim, 2025). This study established dependability by maintaining transparency in the data collection process, transcription, coding process, and the development of themes. I asked the participants the same interview questions, and they underwent the same data collection process. I also used the same procedures for member-checking procedures by allowing the participants to review their own data. By establishing dependability in this study, it strengthens the overall trustworthiness of the findings, as they are repeatable and free from researcher bias.

Credibility

The identification of codes and patterns was followed by member checking, in which the summarized version of their interview was given to them. The participants checked the summary for accuracy and to ensure that it reflected their experiences with technology usage before, during, and after the pandemic. They were asked to review the accuracy of the summary and provide any necessary additions or corrections to ensure that the participants' experiences and perspectives were accurately represented. By having participants from a study engage in member-checking to verify that the summaries are accurate and that the codes and themes align with the research questions and theoretical framework, credibility can be established in a study (Lim, 2025). This process of member checking and aligning the research questions with the framework shows that credibility has been achieved in this study.

Confirmability

Two of the ten participants added to their summaries to better reflect their experiences; no corrections were needed from all ten participants. The summary was returned to the participants shortly after the interviews. This feedback from the participants' summaries was added to the data. The member checking used in this study helped ensure that the themes aligned with the participants' experiences. This member checking used in this study helped ensure that the themes aligned with the participants' experiences, enhancing this study's confirmability. Confirmability refers to whether the study findings are based on and reflective of information gathered from participants' responses rather than the researcher's bias or personal assumptions (Johnson et al., 2020).

By having the participants verify their own interpretations directly with the participants and therefore having confirmability.

Conclusion

The findings from this research show that the teachers who participated in this study value PD. Participants stressed that they need ongoing, hands-on support and proper technology training. The data showed that the teachers experienced several barriers to effective PD: a lack of administrative backing, insufficient follow-up support, and limited opportunities to collaborate with other teachers. The teachers also noted that they want a voice in the technology that they will be integrating, and they prefer the technology to be valuable and easy to use. Based on the findings from these interviews, I chose to develop a white paper. Through the project in Appendix A, I provided evidence-based recommendations to sustain meaningful change in the school's approach to technology integration.

Section 3: The Project

Introduction

This section will explain how the project was developed, including its goals, required resources, and support needed, potential barriers and solutions, and the implications of this study and its timeline. The chosen project was a white paper (Appendix A). This was selected based on the wants and needs expressed during the interviews: better PD and more support from administrators. Participants also expressed their struggles with teaching virtually during the pandemic and the ongoing technology issues some are experiencing in their classrooms. Therefore, from this data, a white paper project was the best choice. The white paper project was developed to improve the usage and integration of technology in the classroom of teachers in this school district, while giving the teachers the freedom and autonomy to choose what best fits their own needs.

Description of Goals

In this section I present how the project was developed, including the goals, required resources and support, potential barriers and solutions, and the implications of this study and its timeline. The chosen project was a white paper (Appendix A). I selected this approach based on the needs expressed by participants during the interviews: better PD and more support from administrators. Participants also expressed their struggles with teaching virtually during the pandemic and the ongoing technology issues some are experiencing in their classrooms. Therefore, from this data, a white paper project is the best choice.

In this white paper, I provided the school district administration with recommendations for implementing PD, establishing clear technology goals, and increasing access to reliable technology. This white paper is based on findings from interviews with teachers about their experiences teaching virtually and with technology today. In the white paper, I describe the research problem, the findings, and research-based recommendations to address these issues. The white paper contains a brief description of the themes that emerged from the interviews and a summary of the findings. The white paper (Appendix A) includes cohesive, research-based recommendations to address the concerns raised by the teachers during their interviews.

When the participants discussed PD, they described dissatisfaction with (a) a one-size-fits-all approach, (b) lack of hands-on practical training, (c) limited training on new technology, and (d) insufficient follow-up or support. These issues led to teachers struggling during virtual teaching during the pandemic, and some issues are still present.

Rationale

Based on findings from the study, I decided the white paper approach was the most appropriate vehicle to present my findings and provide the school administration with evidence based recommendations. The teachers began using technology for which they were unprepared during a global pandemic, and the RQs were developed to address this problem and provide insight and answers. Interview questions were developed from the research questions to gain a deeper understanding of the experiences these teachers had in teaching virtually during and after the pandemic.

Based on the data that were gathered from these interviews, I developed a white paper to present the findings and make sound recommendations for supporting teachers in their use of technology. A white paper is a persuasive, research-based paper that explains a problem and proposes a solution to solve the issue. It is written to inform and influence a specific audience, which is often decision-makers (Purdue Online Writing Lab, 2025). This white paper allows this study to bridge the gap between educational research and practice. The white paper transformed participants' responses into a document that could prompt administrators to change how technology is implemented in the school district.

This project was grounded in the technology acceptance model (TAM; Granić & Maranguic, 2019), which provided the theoretical foundation for examining teachers' adoption and continued use of technology before, during, and after the COVID-19 pandemic. TAM helps explain why a person would choose a specific technology based on perceived usefulness and ease of use. This theoretical foundation is supported by other peer-reviewed research documenting the impact of the COVID-19 pandemic on how teachers prepared, PD, and student engagement (Francom et al., 2021a), and the importance of ongoing hands-on PD (Hubers et al., 2022). Other studies showed the need for clear administrative guidance and continuous support (Jaeger et al., 2024). They showed the effectiveness of collaboration and technology coaching in improving technology integration into teachers' classrooms. By aligning the TAM framework, the empirical research, and the educational goals, this white paper addresses teachers' immediate needs for technology integration and meaningful technology integration to enhance student learning outcomes.

Review of the Literature

I conducted a literature review using the databases EBSCOhost, ERIC, Academic Search Complete, and Academic Source, which provided scholarly, peer-reviewed articles. The keywords that were used to search for literature for this study were: *PD, technology integration in education, teacher perceptions and attitudes, PD for technology, administrative support for technology in education, student engagement and learning outcomes, and technology collaboration in a school setting.*

White Paper Genre

A white paper is a report where the researcher explains their research and findings. The white paper also provides recommendations to address a problem. The purpose of a white paper is to advocate for the best way to fix a problem and to influence the decision-making process (Purdue Online Writing Lab, (2025)). The audience for a white paper can be the public or a specific group; however, this white paper's audience is the school administration, where this study took place. By tailoring the content and recommendations to the schools' administration, this white paper was designed to give solutions that affect the school and improve technology integration and student learning. The findings and results of this study are presented in a White Paper in the Appendix. I picked a white paper after reviewing all the interview data because it was meant to address a problem that became apparent after that review. From there, I reviewed other white papers to better understand the format and its purpose. The white paper contains an introduction, a summary of the local problem, methodology, its findings, three recommendations to fix the problem, and a conclusion

Professional Development

PD is vital for helping teachers become better educators through training and for increasing their ability to integrate technology into their classrooms. PD helps teachers align their pedagogy, methodology, and goals while allowing them to learn new skills to use in their classrooms. PD also helps teachers develop both content knowledge and pedagogical strategies (Schoen et al., 2026). Teacher PD aims to align and improve teaching practices in their classrooms or how they integrate a particular piece of technology (Teo et al., 2021). When PD is well-designed and high-quality, it can enhance teachers' skills and knowledge in technology integration (Stavermann, 2025). Effective PD ultimately acts as a catalyst for lasting instructional improvement, helping teachers integrate technology into their classrooms and confidently improve student learning.

Castellano and Mikeska (2024) demonstrated the importance of PD in improving teachers' instructional abilities through an evaluation assessment. This assessment was a summative assessment that measured the elementary school teachers' content knowledge in science. Castellano and Mikeska (2024) used data from 822 teachers across the United States. The data from this study showed that teachers who integrated both subject-matter knowledge (SMK) and pedagogical content knowledge (PCK) were more effective. These findings show that CKT assessment can inform PD by identifying teachers' strengths and weaknesses, allowing them to grow and train more effectively. This type of PD directly supports teachers' needs and ultimately student learning outcomes. Balbi et al. (2025) conducted a similar study, implementing a 4-month co-designed PD program on formative assessment for math teachers. This study used teacher self-reports and

student reports to track math teachers' knowledge, self-efficacy, and classroom practices. Both studies show the importance of targeted PD that addresses teachers' needs. Additionally, both studies found that growth in teacher knowledge and pedagogical skills is the most impactful when it translates into observable classroom practices.

A study by VanUitert et al. (2023) examined how PD could help science teachers teach vocabulary in inclusive classrooms. This study randomly selected 13 sixth-grade science teachers with 980 students. These teachers who participated in this study had students with and without behavioral disabilities. Some teachers received the Content Acquisition Podcast PD, or CAP-PD. The data from this article showed that the teachers who got the CAP-PD used more evidence-based vocabulary practices and dedicated significantly more time to their instruction. Similarly, Craig et al. (2022) examined how a week-long PD on the implementation of the universal design for learning framework. This study included 143 teachers from one Midwestern district: 73 attended the Summer Institute, and 70 served as a comparison group. The training that the teachers participated in consisted of content-focused training, modeling of effective practices, opportunities for feedback, and reflection. Teachers were evaluated after a few weeks using a rubric, which measured how well they implemented the UDL framework, and data from this study showed that teachers who attended the Institute improved their overall UDL implementation in their teaching more than teachers who did not attend PD.

Both studies by VanUitert et al. (2023) and Craig et al. (2022) demonstrated that targeted PD for teachers enhanced their ability to implement new teaching strategies in their own classrooms. The 2023 study by VanUitert et al., demonstrated that PD focused

on CAP-PD can increase teachers' use of evidence-based practices in their own classrooms. In a study by Craig et al. (2022), the authors described how PD that focused on modeling, providing feedback to teachers, and having the teachers reflect on their lessons led to the implementation of educational frameworks, such as the Universal Design for Learning Framework. Both of these studies demonstrate that research-based PD enables teachers to acquire new skills, thereby enhancing student learning.

Research across these studies highlights the importance of targeted PD in supporting teacher growth and student achievement. Castellano and Mikeska's (2024) and Balbi et al.'s (2025) studies showed that PD designed from assessments of teachers' content knowledge and pedagogical practices is more effective because it allows PD to address teachers' specific strengths and weaknesses. Targeted PD helps teachers improve their teaching, which can enhance student learning. VanUitert et al. (2023) and Craig et al. (2022) found that when PD teaches new or different teaching strategies that teachers did not use before, they are more likely to use them in their classrooms. Teachers who used these new teaching strategies improved student learning. These findings from these articles show that targeted PD can help teachers learn new teaching strategies, fill knowledge and pedagogical gaps, which will help improve student learning.

Designing Professional Development

The purpose of PD is to train teachers, which helps to increase student achievement. One example of how high-quality PD can lead to an increase of student math achievement is a quantitative meta-analysis study by Franklin and Chang (2025). In this study, Franklin and Chang (2025) described how high-quality PD for math teachers

can improve students' learning, which is a key goal in all PD efforts. In another study by Prakasha et al. (2025), discovered that when PD is well-designed, focusing on data literacy and instructional practices, it can also help improve students' achievement. Both studies, by Franklin and Chang (2025) and Prakasha et al. (2025), demonstrate that well-designed PD can lead to higher student achievement. For educators, PD needs to be evidence-based, which explicitly targets the needs of the teachers (Ponet et al., 2023). PD must be done correctly because PD aligned with teachers' pedagogical practices enhances classroom performance, improving learner outcomes (Dempsey & Mestry, 2023). Therefore, PD must be designed to be both meaningful and practical for teachers and address their specific needs. After surveying 113,667 teachers in a quantitative study, L. Zhang, et al. (2024) discovered that over 80% of teachers agree that PD needs to be on separate days, not integrated into the school day, content-focused for the subject areas the teacher teaches, adapt to the personal needs of the teachers, provide opportunities for the application in the classroom, and enhance active learning.

PD needs to be more than just a person or group of people talking or presenting to a group of teachers. In a qualitative study, Spante and Moffitt (2024) interviewed 20 teachers who participated in professional writing development in an active learning classroom. This classroom allowed the participants to move around, create groups, and have more hands-on experience. Spante and Moffitt (2024) discovered that all 20 teachers preferred this method of PD and preferred this freedom of PD over the more traditional models. In a qualitative study by Smith and Williams (2020), six English teachers participated in small group face-to-face PD. The PD took place over a long

period of time throughout the school year. Smith and Williams (2020) discovered through interviews that the ongoing PD positively impacted their teaching practices. Both of these articles highlight the importance of making sure that PD needs to be targeted to the teachers. The authors mention that for PD to be successful, it should have inclusive strategies. By doing this \ teachers have an opportunity to improve upon their teaching and enhance student learning.

Hubers et al. (2022) looked at the effective characteristics of PD programs. Hubers et al. (2022). This qualitative study consisted of four principals with up to nine educators across the three programs, which totaled approximately 13 participants. This study found that hands-on, teacher collaboration, and continuous PD positively impacted teachers implementing what they were taught at the PD (Hubers et al., 2022). These three studies show that hands-on, collaborative, and continuous PD was more effective than typical lecture-based approaches of more traditional PD. In a similar study by Bichler et al. (2021), the authors describe the support needed for effective PD. In this qualitative study, the authors interviewed 23 science teachers who participated in a virtual PD. During this PD, teachers set goals for their students, assess their students on their accomplishments in the classroom, reflect on their teaching, and realign their goals. This process needed to happen many times over the course of the year. Tools were used, such as Curriculum Visualizer and structured online virtual meetings. This PD had teachers use evidence-based pedagogy after reflection to improve their teaching and help them reach their goals. This PD was ongoing, interactive, and collaborative. This study shows that carefully designing a PD that is collaborative, hands-on, ongoing, reflective,

and meaningful to the teacher can help improve teachers' ability to teach and improve student learning. Both of these studies show that a well-designed PD that consists of hands-on learning, has elements of collaboration, and is ongoing, not only strengthens the teacher's ability to teach but also enhances student learning.

These studies show that ongoing, well-designed, hands-on PD is more effective than traditional lecture-based PD. The articles also show that if PD is focused on the needs of the teachers, the teachers are more likely to implement what they learned in the professional. (Bichler et al., 202; Franklin & Chang, 2025; Hubers et al., 2022).

Attending and implementing hands-on, ongoing, well-designed, and collaborative PD will ultimately enhance student learning.

Administrative Support for Professional Development

As mentioned above, there are many key attributes of successful PD, one of which is administrative support. Teachers need administrative support for successful PD. Massey et al. (2023) found that teachers were more successful in implementing what they learned in PD when administrators were actively involved with observations, data collections, and monitoring implementation. In a similar study, Jaeger et al. (2024) interviewed 31 teachers to examine administrators' roles in PD, support, communication, and leadership. Jaeger et al. (2024) qualitative study found that administrators are vital in ensuring teachers have the support and leadership needed to succeed in their classrooms (Jaeger et al., 2024). Jaeger et al. (2024) further discussed how administrators play an essential role in mentoring teachers, showing leadership regarding implementing what

they learned during PD. This research shows the role administrators can play in teachers' potential success after receiving effective PD.

PD does more than help teachers improve their teaching abilities and classrooms. PD has been shown to help with teacher retention, which has become an issue in different parts of the world (Shuls & Flores, 2020). In an article by Shuls and Flores (2020), they conducted semistructured interviews with district-level personnel from three different school districts in the St. Louis area. Shuls and Flores (2020) found that PD is about improving teachers' ability to teach and creating environments for teachers where they feel valued, supported, and inspired to continue working in the educational field. In a quantitative study by Tosun and Bostanci (2024), 304 surviving teachers had similar findings. Tosun and Bostanci (2024) found that creating an environment where teachers feel valued and supported is essential in making teachers feel important and empowered. One way to foster these environments is by having meaningful and helpful PD. Tosun and Bostanci (2024) also found that having administrative support helps improve teacher leadership and job satisfaction. Job satisfaction is an important factor in keeping teachers happy, engaged, and staying within their field. Both Tosun and Bostanci (2024) and Shuls and Flores (2020) discuss how teacher retention benefits both students and administrators. Overall, administrators supporting quality PD can lead to improved teaching leadership, and improving job satisfaction can lead to teachers feeling valued and, therefore, retaining the teachers within the school district.

Other than teachers stating their experiences with administrators' support and ongoing help, administrators feel the same regarding ongoing support. For example, a

qualitative study by Roff (2021) described superintendents' roles in the ongoing PD during the COVID-19 pandemic. Throughout the article, Roff (2021) the struggles and barriers that the 30 superintendents from two counties in New York described while moving from face-to-face teaching to virtual teaching. These struggles were preparing teachers and students for virtual teaching, the different levels of preparedness from the teachers, proper and valuable PD, and ongoing technology support. Through the surveys, Roff (2021) found that administrators were pivotal in equipping teachers with the necessary tools for success during the COVID-19 virtual teaching period. The author concluded that when administrative support is ongoing and responsive, teachers are better prepared to face the challenges and be effective during virtual teaching. Similarly, Luo et al. (2023), study looked at how teachers could integrate computational thinking into elementary education and the schools' administrators played an essential role in the designing of the PD through collaboration.

Ongoing Support Beyond Professional Development

It is important for teachers to have ongoing support after the PD session ends. This will ensure that the teachers continue to use what they learned in the PD in their classrooms. A quantitative study by H. Zhang, et al. (2024), in which they surveyed a total of 12,667 teachers from 672 schools across four countries, found that ongoing PD helps create more effective teaching practices. H. Zhang, H., et al. (2024) also discovered that ongoing PD improved teachers' motivation and self-efficacy and supported the school culture. In a qualitative study by André et al. (2021), the authors looked at how continuous support, reflection, and collaboration helped make PD more effective and

empower the teacher. This study had one teacher go through PD to transform their classroom from teacher-centered to student-centered. There were PD leaders that checked in with the teachers throughout the school year. This ongoing support since the original PD has helped with teacher growth and student engagement throughout the school year. Both these studies have shown that ongoing teacher support after PD is essential for teachers to correctly implement what they have learned during PD in their own classrooms. Teachers need continuous support from administrators, or it is unlikely that the teachers will implement what they learned from the PD in their classrooms.

PD has also been shown to increase student learning and outcomes. One example of this is a study by Lara-Alecio et al. (2024). This quantitative study involved 121 fifth-grade science teachers from 68 schools in 35 public school districts. This study showed the value of ongoing virtual PD and virtual mentoring for science teachers. Lara-Alecio et al. (2024) discovered that this ongoing PD helped improve the teachers' instructional practices and this led to students within their classrooms showing an improvement in reasoning, comparing, and predicting skills, which are important in a science classroom. Another quantitative study by Shanahan et al. (2023) showed that ongoing PD can enhance the teachers' ability to help improve student learning and outcomes when the PD is focused on building the teachers' knowledge and skills. In this quantitative study Shanahan et al. (2023) examined 49 teachers that were participating in an ongoing PD that focused on teachers altering their early writing interventions with students. These data-driven interventions increased student writing outcomes (Shanahan et al., 2023). This article shows that ongoing PD with the correct support helps teachers improve their

teaching methods and interventions and also helps improve student outcomes. Both studies show that when paired with the correct support, ongoing PD helps teachers and improves student outcomes, which is PD and educators' underlying goal.

Collaboration

The purpose of collaboration between teachers is to improve student learning and the teaching environment. Collaboration is when teachers work together to share knowledge and resources and to develop instructional practices, which has been shown to increase teaching effectiveness (Avci et al., 2025). Teachers in schools across the United States are encouraged to work together by sharing their expertise and strategies.

Collaboration can act as a type of PD and add to a supportive school or district staff. By having teachers pool all of their resources, such as their skills and ideas, teachers can improve their teaching methods and help address the diverse student needs of today. Therefore, collaboration is an important tool that schools must focus more on to help improve student learning and the teacher's teaching environment. Research has shown that when teachers have access to teacher coaching and have time to collaborate, they are more likely to improve their instruction and enhance student learning (Smit et al., 2022). These studies demonstrate that collaboration among educators is crucial for student learning.

Collaboration between teachers has been used in many ways. One of these ways was a qualitative study by Smit et al. (2022). In this study, four high school English teachers worked with a university to improve students' standardized test scores. These four teachers collaborated with instructional coaches from a university to improve student

writing. With the university's help through coaching and teacher collaboration, these four teachers overcame the educational barriers, such as classroom behavior, and improved the students' writing skills and attitudes towards writing. This improvement was documented and shown through analyses of the students' writing samples taken before and after the teacher collaboration.

In an article by Schmitz et al. (2025), the authors discussed how school administrators can influence teacher collaboration and technology integration in their classrooms. Schmitz et al. (2025) found that transformational leadership increases both formal and informal teacher collaboration and, in turn, technology integration in classrooms. By setting clear goals and giving teachers enough time to meet and collaborate, these administrators increased technology integration in their schools. A study by Smit et al. (2022) states that when a teacher effectively integrates technology into their classroom, it can enhance student learning and outcomes. Both studies focused on the importance of teacher collaboration with technology and how teachers can help one another. Lastly, both articles emphasize how teacher collaboration and a tailored integration design process contribute to meeting teachers' needs and enhancing teachers' understanding.

Another way to improve instruction and support effective technology integration in the classroom is through teacher collaboration. In this quantitative study by Avci et al. (2025), the researchers examined factors influencing teachers' ability to use technology effectively in their classrooms. Avci et al. (2025) analyzed data from 2,414 secondary teachers across 165 schools in the United States. The researchers' goal was to identify the

factors that influence teachers' digipedagogical competence. The researchers found that teacher collaboration was a major predictor of whether a teacher would integrate technology into their own classroom. Working with other teachers allowed them to share knowledge about using technology effectively in their own instruction. The results of these two studies by Schmitz et al. (2025) and Avcı et al. (2025) show that when teacher collaboration focuses on technology, teacher collaboration can enhance technology integration in classrooms, thereby improving student learning.

In a similar qualitative article, Rice (2021) discussed four teachers' struggles while integrating technology into their classrooms. Rice (2021) examined a traditional linear approach to technology integration in teacher classrooms. Rice (2021) discovered that this model does not work well and typically fails. This is due to the complexity of technology integration that teachers face daily in their classrooms and the limitations of the traditional models. Therefore, a new model must be implemented to ensure teachers have the proper support for technology integration. Rice (2021), and Schmitz et al. (2025) both discussed how technology integration needs to be flexible, contextually aware, and responsive to the specific needs and circumstances that teachers face with technology. All three articles call for a more meaningful and in-depth focus on technology integration, leading to more effective learning outcomes.

Collaboration between teachers is an important strategy that can improve student learning and the teaching environment. Schools all over the United States promote teacher collaboration as a form of PD to build a stronger and more supportive community within the schools and the school districts. When teachers meet with other teachers and

discuss what they are doing in their classrooms, and collaborate, they can improve their teaching methods and pedagogy. This collaboration between the teachers can help meet the needs of their students and help other teachers. Therefore, school districts need to make sure they carve out time throughout the school year for teachers to collaborate. School districts also need to promote collaboration between teachers since it has been shown to positively affect their classrooms and enhance student learning.

Teacher Coaches with Technology

Another form of collaboration between teachers is with technology coaches. Technology coaches support teachers with integrating new technology within their classrooms and lessons and help provide ongoing PD (Gallagher et al., 2024). Technology coaches are often current or former teachers who served within the school or district and are recognized for successfully using technology in their classrooms. These coaches help other teachers in the district who might struggle with technology integration by offering guidance or modeling how they use technology in their classroom and helping with issues they might have with technology. However, just because someone is a good teacher or good with technology does not mean that they will be a good technology coach. Effective PD is essential for technology coaches, as it equips them with the knowledge and skills that are necessary to support other teachers (Coward & Jin, 2024). Thus, the role of technology coaches requires not just prior teaching experience but also proper PD for these technology coaches.

Technology coaches can support teachers in integrating technology into their classrooms. For example, a mixed-method study by Liao et al. (2021) found that

technology teacher coaches helped integrate technology in teachers' classrooms.

However, some factors helped improve the integration: personalized, sustained classroom support. The technology coaches gave the teachers greater confidence in integrating technology in their classrooms. Also, these teachers received targeted coaching from the technology coaches and in-class modeling with ongoing feedback. When technology coaches used focused and targeted modeling with ongoing feedback the teachers tended to integrate technology that would be meaningful and better aligned with their needs.

A similar qualitative study by Ottenbreit-Leftwich et al. (2020) also examined how technology teachers could impact technology integration in classrooms. This study followed a group of technology coach teachers whom they were training. This study expanded on technology teacher coaches by assigning a technology teacher coach for the entire school year. It used research-practice supports that gave the teacher personalized help to help bring better technology integration into the classroom. Another study by Ruzycski and Chisholm (2024) further reinforced the findings of the other two studies by identifying the key characteristics of technology PD that need to be fun and how technology coaches need to show modeling, hands-on activities, and ongoing support from the coaches. All three of these studies show that technology teacher coaches effectively ensured teachers had the support they needed and improved technology integration in teachers' classrooms. This shows that schools should add well-trained technology teacher coaches who prioritize long-term, individualized support if they want to improve technology integration within their building.

While the articles above discuss the success and effectiveness of technology coaches in improving teachers' technology integration in teachers' classrooms, it is important to look at what causes their success. Qualitative research by Susin et al. (2023) showed that the impact of technology and STEM coaches depends not only on their instructional support but also on administrative support, the time allocated, and the access to the technology teachers need to integrate. For example, administrative support, training of the coaches, and time allocation all play roles in determining if the technology teacher coaches can bring change to a teacher's classroom technology integration. Additionally, Grierson et al. (2024) qualitative study showed that for technology coaches to be effective, they need the mindset to grow within their roles and be flexible, which will help them build a positive relationship with the teachers they are trying to help. This building of relationships was shown within this study with a technology coach, showing her humility and responsiveness and their ability to collaborate, which helped raise other teachers' confidence and integrate technology into their classrooms. Therefore, forming these types of relationships is important in ensuring that technology coaches succeed in helping others with technology integration.

In a similar study to Grierson et al. (2024), Cowart and Jin (2024) found that how online PD was designed mattered to the success of technology coaches. Cowart and Jin used a qualitative study to focus on collaboration, modeling, feedback, and coaching support. These factors contributed to the success of the technology coaches. The most significant factor that led to technology coaches' success in helping others was providing structured and sustained support. Both Grierson et al. (2024) and Cowart and Jin (2024)

demonstrate that factors beyond their knowledge of technology or skills with it contribute to the success of technology coaches. To ensure that technology coaches succeed, the research above shows they need to build personal relationships with the teachers they are working with, and PD that fits their needs. The factors described in this study will enable technology coaches to grow, succeed, and, most importantly, help other teachers integrate technology.

Technology coaches can be a good resource for school districts to help other teachers integrate technology into their classrooms. However, to ensure that technology coaches succeed, they need to know more than just how technology works to help other teachers. The best way to support technology coaches is by supporting the school administration, building personal relationships with those with the teachers they are working with, and having ongoing and meaningful PD. Technology coaches must be flexible, reflective, and committed to growth to succeed. When school districts ensure that technology coaches are given what they need for their success, these coaches can help the teachers succeed with technology integration in their classrooms.

Project Description

Necessary Resources and Existing Supports

For this school district to implement the recommendations in the white paper, the district leadership will need to find teachers who have had success with technology integration and have them help other teachers during dedicated collaboration time or during PD days. This collaboration time will need to be worked into the schedule or during PD days, and this time needs to be protected and not changed throughout the

school year. The school district must be flexible with the PD delivery and must be targeted and hands-on. Some potential barriers to this project are a lack of time for collaboration between teacher coaches and teachers, administration priorities, and teacher resistance. These barriers can be addressed by maintaining dedicated time during PD days, hands-on and ongoing PD, and implementing accountability measures for both the teachers and administration.

The implementation of the plan cannot happen overnight. Therefore, a phased timetable for this project would start with finding a group of teachers willing and able to be technology coaches within the building. These teachers must be trained by the end of this school year. Administrators ideally will set up protected times throughout the next school year where technology coaches can meet with teachers needing help with technology integration. During the summer, administrators must set up dedicated hands-on training and the framework for ongoing PD. Ideally, administrators would schedule one of these ongoing PD during one of the contractual PD days before school starts. Students are not participating directly in this study; therefore, they do not have a role or any responsibilities, which fall on the administrators and teachers. Lastly, the administrators must present a clear vision and expectation for how technology usage should look in the classroom. Using teachers as technology experts, protecting collaboration and PD, and ensuring the administration sets technology expectations will ensure sustainable and meaningful technology integration in their classrooms.

Potential Barriers and Solutions

As with any educational change, there are potential barriers when implementing the presented in the white paper. Finding time for practical, hands-on PD will be difficult. However, the school has four PD days built into the school year. The school district could redesign the PD days to focus on technology integration and collaboration. During these days, training could be divided into smaller sessions and led by teachers who have succeeded with technology integration in the past and have been trained before this PD. Teachers could also be offered flexible scheduling to participate in these sessions, or the teachers could collaborate with peers outside of the contract hours. In the past there have been stipends for teachers that collaborate with other teachers outside of contract hours. The school administration can look into bringing this program back. The singular, PD approach is a potential barrier. A potential solution would be to focus on PD that is subject-specific and grade-level specific. Allowing PD to be more personalized, relevant, and practical could better address the teachers' needs.

Another barrier that needs to be addressed is the inconsistent administrative guidance and follow-through with technology integration. To address this issue, the school district could develop a way or ways for the administration to communicate consistently for technology integration. This could be done quarterly through a quick Google Form and with small group meetings with the technology coaches. The administration needs to explain all of the expectations, the timelines, and how to get support if they have issues. The district could also designate technology mentors in each school building that could help quickly if issues arise. By addressing these barriers with

defined solutions, the school district could make a more supportive environment for teachers and empower them to use technology confidently in their classrooms.

Proposal for Implementation

Ideally, I will present the white paper to the administration just prior to the end of the second semester. During this meeting, I will recommend that PD be practical, ongoing, and collaborative. I will briefly present the findings and detail the need to establish a peer support system and a technology collaboration network that is made up of technology coaches, the district's technology department and building administrators. These coaches, the technology department, and administrators could share a Google Doc and use it as a working document to take notes and help each other. Also, when integrating new technology, the administration would ideally establish clear guidelines, communicate clearly, and follow up.

The timetable for this project would start in the second semester, when technology coaches will be picked, and they will need to attend training before the end of the school year on how to be a successful technology coach. After the school year ends, the administration starts planning the four PD days before school starts. During this time, the district leadership team, in charge of the four PD days, would set times and dates for implementing the hands-on and ongoing PD. Also, during one of these PDs, the administration will describe how the district will implement the teacher coaches. Lastly, during this time, the administration will clearly describe its expectations for technology integration.

After the first quarter of school, the administration will meet with the technology coaches and send out their Google Forms to assess how the program works. This will continue each quarter for the rest of the year, and modifications can be made based on the feedback from Google Forms and the technology coaches' feedback. Also, during PD during the first semester, there will need to be one session on technology that relates to a previous PD, and it needs to be hands-on. This will also need to happen during the second semester PD. At the end of the school year, an additional Google Form will be sent out to assess everyone's feedback from this PD. The administration and the technology coaches will need to assess these Google Forms to see what areas they need to improve upon and focus on fixing these areas going forward.

Roles and Responsibilities

The goal of this white paper is to help the teachers at the school district to improve the integration of technology into middle school classrooms. Using PD and laying out clear guidelines for communication with teachers using technology could help address the issues that arose from the interviews. My role would be to contact the school district's leadership and see what time works best for a meeting to take place where I can present my paper. The school district would be responsible for a time and place for us to meet. After the project presentation, it would be their choice to determine if they want to implement my recommendations, just parts of it, or none of the project. This decision will fall under the school district's leadership on how they would want to move forward after hearing the information. If the district leadership team decided use the white papers recommendations the teachers would be responsible for attending the PDs, filling out a

Google Form quarterly, and if they were good with technology they would need to become a technology coach.

Project Evaluation Plan

An evaluation plan is needed to ensure that the recommendations in the white paper are successful and appropriately assessed. A successful evaluation plan does more than measure the goals of the plan; it also provides feedback from the participants, which allows the plan to be refined later (Schultes, 2023). The evaluation plan will use a structured approach that identifies what will be measured in this study and how the different parts will be assessed, such as PD and the technology coaches. This section outlines the rationale of those assessments and how would collect the data and use it to make further decisions on improving technology integration within this middle school.

Type of Evaluation and Justification

To determine if the recommendations from the white paper are carried out and if they have the desired effect, an evaluation must be conducted. How? What? by whom? When? For each of the three recommendations, I will use a multi-faceted approach. This evaluation plan uses a goal-based framework because of the goals of this study. The goals are improving PD, having a type of technology coach to help integrate and use technology in teachers' classrooms, and improving administrators' communication of technology expectations. To understand the PD goal, having technology coaches and communication from administrators, a Google Form will be sent out before the program starts after the first semester (halfway point) and the end of the year to see if this program

is working. These Google Forms will act as an assessment that will be the way to gauge whether the plan is working, or changes still need to be made.

I will also give a short survey to the administration on Google Forms on the improvements in technology usage in the building. I will gather the information from these surveys, and I will report back with the findings from the teachers and the administrators. I will assess how the plan and the recommendations have worked over the past year and discuss any improvements to the plan for the following school year. I will also look at technology trends and issues within the building and suggest targeted PD, look at the effectiveness of the teacher coaches, and see if any adjustments are needed to ensure that this plan's ongoing effectiveness continues.

Overall Goals of the Project and Evaluation Goals

The overall goal of this project is to improve technology integration into the classroom within this middle school. This is the goal of this project, as integrating technology into the classroom has been shown to help improve student engagement and motivation (Wali & Popal, 2020). Improving student engagement and motivation can also enhance student learning and outcomes. Therefore, integrating new technology into the classroom can lead to improved student engagement, motivation, and improve learning outcomes.

The evaluation of this project is to gather feedback from teachers and administrators and assess to see if there is any improvement in technology integration and administration communication. This feedback will be gathered at the end of the next school year through informal interviews with the teachers in the buildings and through a

Google Form that the administration will take. This data will be broken down and reported to the administration with additional recommendations for PD and communication with the administrators regarding technology expectations with teachers. The school district can use this data to improve its' PD and communication between administrators and teachers.

Key Stakeholders

The key stakeholders in this study are the teachers and administrators and the administration leadership team who oversees PD. The teachers who are going to be participating in hands-on, focused, and ongoing PD should help improve their technology integration. The administrators within the school will give clearer expectations regarding technology integration and, therefore, improve their leadership within the building. The last group of key stakeholders are the students within the building. Teachers should integrate technology effectively through PD, and better communication should improve their lessons. This should improve student learning, which is the ultimate goal of education.

Project Implications

Delivery and implementation of the recommendations in the white paper may promote positive social change by providing the school's administration with research-based recommendations that expose the technology needs of the teachers. The findings and recommendations that are outlined in the white paper (Appendix A) support the school district's goal of improving technology integration to enhance student engagement and learning. This project is important to the local stakeholders because it attempts to fix

the technology usage gaps within the school. The gaps will be filled with hands-on PD, collaborative peer support, and clear ongoing communication from administrators.

Ultimately, this project benefits the overall wellness of the school by helping students be better prepared for a technology-driven future through the effective integration of technology in classrooms.

Conclusion

This project was developed from the results of the interviews with the participants. The white paper in Appendix A addresses the local problem of insufficient preparation and support for teachers with technology integration before, during, and after the COVID-19 pandemic. The white paper gives the administration recommendations on addressing and fixing these issues to improve teacher technology integration in classrooms. The findings are both grounded in the data that was collected from the interviews and a review of current and relevant literature; the white paper provides three recommendations that are targeted to improve PD, improve collaboration between peers, and enhance administrative communication and support with technology. In the next section of this paper, I examine the strengths and limitations of the recommendations presented in the white paper, along with my reflections and the personal growth I experienced as a student at Walden University.

Section 4: Reflections and Conclusions

In Section 4, I present the strengths and limitations of this qualitative study, which described the experiences of middle school teachers using technology before, during, and after the COVID-19 pandemic. This section includes my reflective analysis and my personal growth as a scholar and the developer of this project. I also share my experiences with how I designed the research project, the data analysis, how the project was developed, and the leadership skills I gained by working on this study. Additionally, I reflect on the significance of the work, what I have learned, and the broader implications for future research in educational technology integration.

Project Strengths and Limitations

The project for this study is a white paper that offers recommendations for improving teacher technology integration, peer collaboration, and communication between administrators and technology expectations. Teachers will be trained to integrate technology into their classrooms through focused, ongoing, and hands-on PD. They will receive the necessary support through technology coaches and ongoing support. Administrators will review and establish expectations with classroom technology integration and communicate clearly and continuously with their staff. These recommendations are outlined in the white paper in the appendix.

One of the key strengths of this project lies in the qualitative data and how it was collected. The in-depth data were collected through face-to-face interviews with middle school teachers who taught before, during, and after the COVID-19 pandemic. Through interviews, these participants shared first-hand accounts of their experiences during this

period. Four themes emerged from the data collected from this interview that aligned with the technology acceptance model (TAM). TAM helps provide a valid way to predict if a person or group of people is likely to adopt and use a certain type of technology (Francom et al., 2021b). TAM helps interpret the participants' experiences and perceptions of the different technologies' usefulness and ease of use while integrating a new technology. The use of direct quotes from participants further adds credibility and depth to this project, giving voice to their challenges and experiences in the ever-changing technology landscape in education.

Another strength of the study is the white paper's real-world significance. This white paper, based on data findings, outlines three realistic, evidence-based recommendations for the school district to implement. They are making PD practical, ongoing, and collaborative, building a peer support network, and improving administrative communication and follow-up. These recommendations are supported by data from participants' interviews and by current peer-reviewed literature on technology integration. The white paper will help guide the administration in addressing the issues outlined and improving teacher technology integration within their school. These strengths are evidence-based and can be directly applied within the school. Also, by connecting the teachers' experiences with peer-reviewed research, the white paper is credible and sustainable for improving technology integration within this school.

There are limitations to this project. First, the project was developed from data conducted at a single middle school in the Midwest, which may limit the generalizability of the findings to other settings. Although the sample reached saturation, it mainly

consisted of veteran teachers. Their own experiences during this period were valuable; the data may not have fully captured those of younger teachers. Another limitation this study faces is the implementation of the recommendations presented in the white paper. The reasons are logistical barriers such as limited training, rescheduled PD, and PD budget constraints. For example, the school district may require additional planning time, teacher incentives, or adjustments to its current contractual responsibilities to build a peer collaboration network and ensure it remains ongoing. The white paper project gives practical suggestions for addressing these challenges. The implementation will require an investment from the school district and sustained commitment.

Recommendations for Alternative Approaches

A white paper was the appropriate choice to explore middle school teachers' experiences with technology before, during, and after the COVID-19 pandemic. The participants were recruited via a school-wide email outlined the requirements for participation and the study's purpose. The participants could have kept a logbook on when and how they integrated technology into their lessons. This could have provided additional insight into how technology was used in real time and how the students responded to it.

Another approach could have been a broader quantitative study to assess technology usage before, during, and after the COVID-19 pandemic. A survey could have been sent out to many schools across the Midwest. While the surveys would not have provided the same depth and insight as an interview, they could have identified commonalities and outliers in how technology is used in a middle school classroom. The

survey could also have shown how effective technology is perceived by a larger group and which PD or administrative support is valued most. This information from this quantitative study could have been used to help produce district-wide policies or changes to technology integration or PD.

Scholarship, Project Development and Evaluation, and Leadership and Change

Throughout all my classes at Walden University, there was a focus on promoting positive social change, being a positive leader, and scholarship. The focus on these ideals helped me grow significantly as a person, educator, and researcher. This process of developing and completing a study and subsequent project helped me understand the educational research process and how data-driven change can occur in an educational setting. From the very first class through the beginning of the study, learning was structured to prepare me for this research process with authenticity and to ensure that teacher and student voices were heard. This journey through Walden University has given me a new sense of purpose in addressing issues within the world of education.

The development of this study has helped me understand the value and influence of qualitative data. Before this experience, I valued quantitative data more because the focus in the middle school setting was on test scores and other metrics. However, conducting in-depth interviews during this study made me realize the value of collecting and analyzing teachers' perspectives, which gave me new insight into their personal experiences. The inductive coding process allowed the themes to emerge from the participants' experiences with technology integration before, during, and after the COVID-19 pandemic. This study did more than just expand my understanding of how

technology is perceived and used in a middle school classroom. It also furthered my understanding of how qualitative researchers can uncover gaps in PD, administrative support, and pedagogy practices. These insights have made me more reflective as a teacher, leading me to consider both human and data elements of education.

After completing this study and the project, I have thought more critically about the issues that influence our school. Previously, these problems or issues were beyond my teacher's responsibility to fix. However, I have begun consulting peer-reviewed literature on various issues plaguing our school and school district. This coursework at Walden University has fostered a more research-based approach to problem-solving and has motivated me to seek out literature to address problems affecting the school.

As a teacher, I have grown more confident in collaborating with others, asking for feedback, and showing more empathy when others have technology issues. As a technology leader, I now realize that meaningful change must include the perspectives of all those directly impacted. The completion of this study has reinforced the importance of building support, encouraging collaboration, and listening to all stakeholders. I now view leadership as a path to help an individual and an opportunity to promote positive social change within my building and school district.

Overall, the coursework at Walden University had a dual impact: it taught me how to contribute scholarly knowledge while also allowing me to drive meaningful, data-driven, positive change in my school district. Walden has taught me that scholarship, practice, and leadership are all interconnected and that research can lead to positive social change. This new knowledge helps guide me as an educator and a leader, ensuring that

my work is grounded in evidence, reflective, and directed towards improving student and teacher environments.

Reflection on the Importance of the Work

The Doctor of Education Program at Walden University has taught me about myself as a student, researcher, teacher, and leader. Each class, step, and part of this program had its unique challenges. In the first class, I learned how to evaluate educational publications and think critically about their content and findings. Throughout the coursework, we discussed these publications, and as a class, we got to see everyone's point of view. During the capstone process, the proposal stage taught me how to find, break down, and explain findings, as well as how to use the APA format properly. The proposal stage allowed me to think critically about how I would run my study, implement what I have learned at Walden University, and complete the study itself. I used what I learned at Walden to collect and analyze qualitative data during the research process. During this research process, I also learned the value of reflection and feedback, as well as how to better manage my time. Before the start of the study, I struggled to receive critical feedback; however, now I view it as a necessity in educational research.

As a middle school teacher, the skills I have developed throughout my time as a Walden University student have directly affected how I teach. When I develop a new lesson, I always have to step back and examine many different parts of it, consider different research, and reflect on what is best for the students. I now reflect on my lessons and consistently seek feedback. These habits have improved my teaching and delivery

and also helped me collaborate with colleagues and show empathy towards them when they might struggle.

This process at Walden University took me longer than I expected. There were many different reasons for this. As a father, teacher, and coach, most of my time is taken up throughout the day and night. I always told myself that I would not let my schoolwork affect my family or job. This caused me to be overwhelmed at times, but I learned the importance of resilience and flexibility while keeping an attitude of never giving up. With the support and guidance of my advisor at Walden, I finally finished the study. These lessons learned during this doctoral process continue to influence me as a teacher and have made me a better educator.

Implications, Applications, and Directions for Future Research

As a result of this study, I found that the data collected through qualitative interviews revealed the experiences of middle school teachers with their technology use before, during, and after the COVID-19 pandemic. This study revealed how middle school teachers' perceptions of technology's usefulness and ease of use changed over time, particularly under the technology acceptance model (TAM) framework. This study's methodology demonstrates the strength of qualitative inquiry through in-depth interviews with teachers, inductive coding, and thematic analysis. This process highlighted the experiences teachers had with technology before, during, and after the COVID-19 pandemic. Empirically, this project contributes to the limited body of literature on middle school teachers' experiences with technology during the COVID-19 pandemic.

This study also extends TAM's application by showing that systemic factors, such as PD and administrative support, influence whether teachers use a specific type of technology in their classrooms. The findings demonstrated the importance of targeted teacher-focused PD and consistent administrative support for sustaining classroom technology use. Based on these findings, I recommend that the school district implement subject-specific, hands-on, ongoing PD and establish a technology coaching system. This should help the teachers meet the instructional goals. These three recommendations aim to support teachers in using and integrating technology into their classrooms. Better technology integration will improve student engagement and learning outcomes and prepare students for the future by enhancing their technology-use skills. By addressing the teachers' actual experiences and voiced needs, this study can guide data-informed changes that benefit educators, students, and other school communities.

This study can bring positive social change to the individual and organizational levels by helping teachers and school districts integrate more technology into classrooms. At the individual level, teachers could feel more confident in integrating technology into their classrooms since they have the correct support from administration, along with the proper training through PD. At the organizational level, the school can fill gaps by investing in administration and PD, fostering a culture in which technology is integrated more regularly, benefiting both teachers and students. This could lead to more equitable, engaging, and future-ready classrooms and school districts. By addressing the gaps in PD and administrative support, this study and the project can help promote a school culture of continuous improvement that benefits students, educators, and the broader school

community. This project could be expanded to include teachers from additional grade levels or schools to explore how teachers integrate technology into their classrooms. Additionally, a longitudinal study could follow some teachers who participate in the newly developed PD to assess whether the ongoing hands-on PD has an impact on them.

Conclusion

For my study, I identified the issue of teachers not integrating technology at the same rate as during COVID-19. To explore why this issue was occurring, I reviewed literature on technology use in education during and after the pandemic and on the lasting impact of emergency remote teaching on education. Grounded in the TAM conceptual framework, I designed a basic qualitative study to understand middle school teachers' experiences with their technology usage in classrooms before, during, and after the COVID-19 pandemic.

I recruited 10 teachers who taught within the school district before, during, and after the COVID-19 pandemic. Through these one-on-one, in-depth interviews, I gathered rich, descriptive data on the issues they faced during this period with technology integration and their ongoing needs today. I transcribed and analyzed that data using NVivo coded their responses, and identified four major themes that highlighted their relationship between teacher experience, PD, administration support, and continued technology use. The findings from these interviews, codes, and themes were used to create a white paper with recommendations for the school district where the study took place. These recommendations included implementing ongoing, teacher-driven PD, improved administrative support, and collaborative technology coaching. These

recommendations can improve teaching and student learning in my school district by having a positive momentum in technology usage that began during the pandemic and by addressing the teachers' needs with further technology integration. The findings of this study reinforce the importance of listening to classroom teachers' experiences and using that data to improve a school.

This doctoral program at Walden University has been meaningful and impactful, and I have become a better educator. In addition to improving my ability to conduct educational research, I can now analyze educational issues and develop evidence-based solutions that lead to positive change. This long journey has empowered me with the knowledge and confidence to suggest improvements within my school and school district. However, most importantly, it has made me a better leader as an agent of positive change who looks to improve educational outcomes for teachers and students alike.

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Appendix A: The Project

Recommendations for Improving Technology Integration
By
William Primrose



Introduction

Integrating technology into a classroom is critical in supporting student learning (Panysai et al., 2025). However, integrating technology is not easy for every teacher, and some struggle with technology integration. In one school, in the Midwest, teachers appeared to struggle integrating technology at the expected pace. This is an issue because one of the objectives in the district's strategic plan is to align technology with student learning, and another objective is to improve professional development by making it relevant, practical, and hands-on, with learning opportunities that meet the needs of all roles (Suburban School District in Midwest 2025). However, the majority of the PD offered focused on interpreting and improving test scores, according to some teachers in the district.

During PD days and through multiple discussions before and after the pandemic, teachers expressed concerns about struggling to utilize technology effectively within their classrooms. To address this problem, a study was conducted within the school, where I interviewed ten teachers who have been teaching in the building before, during, and after the pandemic, about their technology usage. These teachers all had the same access and training to the technology within the school where this study takes place.

The Local Problem

The problem in the school district was that middle school teachers were not using the technology that they have access to in order to improve student learning. In the strategic improvement plan for the district, it states that technology integration and proper training to use these tools are goals for the district to accomplish (Suburban within their

classrooms and buildings, however, these teachers are not using the technology to its full potential. Teachers have expressed that they would like targeted hands-on PD to better fit their needs.

Teachers in this district have also expressed that they would like time set aside to collaborate with teachers about what technology other teachers are using and its effectiveness. Currently, teachers within this school district have expressed that they do not have a choice when it comes to what type of PD they can attend and how PD is presented. This happens because PD is often decided by administrators at the central board office and rarely by the teachers. This happens because PD is focused on the whole district's needs instead of individual teacher needs. However, administrators may struggle to give adequate support for teachers to give proper technology support for teachers since there are many barriers, such as limited time, insufficient training, a lack of resources, and not enough technical support to implement new technology in buildings (Francom, 2020). This project study was developed to investigate how to improve technology integration for the teachers at this middle school. The teachers within the school have access to a wide range of technology but have expressed frustration with how the PD has been implemented and the lack of collaboration opportunities that they have had.

Research Study

I conducted a qualitative study to explore how technology integration has changed during and after the COVID-19 pandemic and why technology integration has decreased. During this study, I conducted interviews with 10 teachers to examine how and why teachers integrated technology during and after the COVID-19 pandemic and how they

use technology in their classrooms today. I developed the interview questions by using the framework of the technology acceptance model (TAM). To participate, teachers must have been teaching in the building during the 2019-2020 school year and must have continued to teach in the building during the recruitment period for the study. I conducted each of the interviews in person and each happened outside of school hours.

I asked the participants questions on their own technology usage and integration prior, during, and after the COVID-19 pandemic. There were three research questions that were developed through the framework of TAM:

RQ1: How do middle school teachers use technology after the pandemic, and how are they planning on using it in the future?

RQ2: What are the middle school teachers' experiences during and after the COVID-19 pandemic, and how did these experiences affect their perceptions of technology's effectiveness in the classroom?

RQ3: What support do middle school teachers need from administration and staff to use technology well in their classrooms?

To understand why these teachers chose to use or not use certain technology, I used TAM as the framework. TAM was described by Davis (1989) and has two variables that help describe why a certain person might choose to use a certain type of technology and why they might not. TAM is useful to identify that people use technology because of behavior intention and they are influenced by two main variables and these two variables are perceived usefulness and perceived ease of use (Granić & Marangunić, 2019). These two variables within the framework of TAM gave insight into why teachers would choose to use a certain type of technology. These two variables gave a deeper

understanding of why teachers choose to use certain types of technology during and after the COVID-19 pandemic. This framework acted as the foundation for the research questions, the interview questions, the data collection, and the data analysis that was conducted in this study. Through the inductive analysis of the interview data from the 10 participants, I identified four themes.

Research Findings

Table 3

Research Questions	Themes
RQ1: How do middle school teachers use technology after the pandemic, and how are they planning on using it in the future?	<p>Theme 1: Teachers use targeted technology for engagement and support.</p> <p>Theme 2: Teachers experienced challenges using technology to meet student and family needs during virtual learning.</p>
RQ2: What are the middle school teachers' experiences during and after the COVID-19 pandemic, and how did these experiences affect their perceptions of technology's effectiveness in the classroom?	Theme 3: Although teachers struggled with the mandated technology during the pandemic, they may modify and adapt technologies post-pandemic.
RQ3: What support do middle school teachers need from administration and staff to use technology well in their classrooms?	Theme 4: Teachers want technology driven professional development and clear administrative support.

Theme 1: Teachers use targeted technology for engagement and support

This theme of teachers uses targeted technology for engagement and support, and all participants discussed how they use technology for student engagement and support. The data from these interviews showed that the participants deliberately decided to use certain technologies to increase student engagement and overcome certain barriers they faced during and after the COVID-19 pandemic. The tools that these teachers were using were Boom Cards, Pear Deck, and Google Suite. These tools not only increased student engagement and participation but also increased student comprehension and allowed the participants to give real-time feedback. All the participants felt that these digital tools made classroom interactions more comfortable within their own classrooms. The participants chose to use these technologies in their classroom due to their ease of use and their effectiveness. All the participants felt that these tools helped streamline communication between students and parents alike. These participants highlighted the important role that certain technology had and continues to have within their own classroom.

Teachers also highlighted throughout their interviews that they need better support regarding technology integration. One factor that the participants wanted more access to was peer collaboration. These participants noted that they relied on their peers to troubleshoot, share lesson plan ideas, and discuss best practices when experimenting with new digital tools. Most of the participants mentioned that even though administrative support was sometimes inconsistent, all the teachers noted that the

administration gave clear guidance and assistance, which led to a higher confidence level in integrating new technology into their classrooms. Overall, the participants felt that having more time to collaborate with others and consistent administrative support would help them integrate technology into their classrooms even more.

Theme 2: Teachers experienced challenges using technology to meet student and family needs during virtual learning.

While teaching virtually during the pandemic, the participants faced many different challenges. The issues that they faced were student technology issues, student engagement, and effective classroom communication. The technological issues that the students faced were unreliable internet service, a lack of access to a computer or a device that would allow them to participate in class, and students not understanding how to use the digital platforms that the teachers were using. These issues affected students' engagement since they struggled to be online to get proper instruction. Students also struggled to understand how to use specific digital platforms like Google Classroom; this led to some students not doing the assigned classwork. The lack of students not turning in the assigned classwork at times led to teachers being unable to assess their students properly. These issues that teachers faced were the teachers' ability to teach and deliver proper instruction.

When these students struggled at home, it was not because of a lack of hardware but a lack of needed digital literacy. For example, at times, parents became educators, and they, too, struggled with unfamiliar technology, and they were the ones who were tasked to help their child or children. This issue led to more student disengagement and student

attendance. These issues compounded, making it even more difficult for teachers to deliver effective and meaningful classroom instruction. A disconnect between parent and student understanding of the digital platforms that the teachers were using made it difficult for teachers to teach students properly throughout the virtual teaching period.

Theme 3: Although teachers struggled with the mandated technology during the pandemic, they may modify and adapt technologies post-pandemic.

At first, all of the participants struggled with the technology mandated by the school district to some degree. This happened because they did not have sufficient training or time to use these mandated technologies. The participants noted that this was because of how fast the school district had to move to virtual teaching during the pandemic. However, over time, all the participants noted that they have become more familiar with specific digital tools like Google Suite. All participants still use some parts of Google Suite today in their classrooms. This adaptation of Google Suite, along with other mandated digital tools, led to the participants' realization that they were challenging; now, they are tools that help them enhance student learning.

After the pandemic, the participant's technology integration has become more vibrant as they continue to use and modify different digital tools for their classrooms. All of the participants now focus on digital tools or resources that support or enhance their teaching styles and meet their students' needs. All participants also noted that they would only use new technology if they found it easy to use and valuable. This shows a shift towards teacher-driven technology usage and integration, which shows a greater sense of autonomy and improved digital literacy. Forcing these participants to use this mandate

during the pandemic has caused them to grow in their technology integration usage and their own strategic decisions when adopting or using new technology.

Theme 4: Teachers want technology driven professional development and clear administrative support

Most participants felt that effective, technology-driven PD is essential for meaningful and successful technology integration in their classrooms. The participants felt that the traditional one-size-fits-all PD was inadequate for their needs. This traditional PD left the participants without what they needed: hands-on experiences to help them understand how to use the new technology. What the participants want is PD that is tailored to their subject and their own needs. The participants also highlighted the importance of PD led by teachers already using or know how to use the new technology. This type of PD also allows for real-time problem solving and collaboration which allows them to explore other digital tools.

Along with better-targeted training, the participants want clear and consistent administrative support. The participants noted that this is essential for integrating technology in their classrooms. The participants also noted that if administrators gave more specific guidelines, better ongoing support, and more accessible technology support, it would help boost the participant's confidence in the usage and integration of technology. This type of educational leadership can help PD initiatives that should translate into the teachers' classrooms. Finally, combining targeted PD with more proactive administrative support should lead to teachers confidently integrating technology into their classrooms.

Recommendations

RECOMMENDATIONS

- **Make Professional Development Practical, Ongoing, and Collaborative**
- **Build a Peer Support and Collaboration Network**
- **Improve Administrative Communication, Support, and Follow-up**

Based on the findings from the interviews with the participants who taught before, during, and after the COVID-19 pandemic, I have made three recommendations to improve technology integration at the middle school where this study has taken place.

Recommendation 1: Make professional development practical, ongoing, and collaborative

The first recommendation is to ensure that PD is practical and ongoing. This is important since the PD goal is to improve what the teachers teach in their classrooms or how they integrate a particular piece of technology (Teo et al., 2021). Currently, the school district offers five PD days for its teachers. All participants in this study reported that the school district could improve how PD is delivered. For PD to be meaningful for teachers, it has to be high-quality, and well-designed PD will then improve teachers' skills and knowledge, thereby enhancing their teaching in their own classrooms (Stavermann, 2025). I recommend that the school district develop and implement PD that better meets staff needs. Therefore, I recommend that the district differentiate PD to better meet teachers' needs.

Another way PD could be improved is with interactive and hands-on training. Allowing teachers to explore new technology in real-time with a person who knows the

technology will allow them to ask questions and try the new technology in a supportive environment, giving them a better understanding of the technology. I recommend that the school district has PD that allows hands-on training in real time, so the teachers feel confident and capable with the technology they are integrating.

PD alone is not enough for teachers to have success with integrating new technology into their classrooms. Teachers need ongoing and follow-up support from administrators to have successful PD (An et al., 2022). Ongoing and follow-up support can reinforce concepts from PD and allow the teachers to ask any additional questions if they have any new questions. With ongoing and follow-up support from the administrators, the teachers are also more likely to continue use what they learned in PD because they have the needed extra support within the school (Johnson & Williams, 2023). This support with technology integration shows that administrators care about the technology, making it more meaningful to use within their classrooms.

I recommend that the administrators build time within the school year to do this. Once a month, an administrator attends team meetings, and we have a whole staff meeting once a month as well. Both times could be used as a “check-in” time to help foster a better understanding of technology integration. I would also recommend that administrators designate technology point people or technology coaches within their buildings as technology helpers. These technology helpers or technology coaches could go around on the quarterly teacher workday and check in with other teachers to ensure they grasp the technology they use in their classrooms.

Recommendation 2: Build a Peer Support and Collaboration Network

To have successful technology integration, teachers need time to collaborate with other teachers. In fact, six participants (60%) mentioned that they needed to collaborate with other teachers. When teachers have time to work together and share what they are doing in their own classrooms, along with teaching strategies that work, it can increase a teacher's confidence and make them more effective in technology integration.

Collaboration is also more effective when it is supported by the administration; therefore, the administration needs to plan time within the PD to make sure the teachers have time to collaborate. Due to how important it is for teachers to collaborate throughout the school year; I am recommending that administrators plan to have collaborative time for the teachers at least 1 hour per PD day.

To further help with collaboration, the school district should launch technology coaches. This is where tech-savvy teachers volunteer and are selected to help other teachers who struggle with technology as a technology coach. A technology coach is a teacher who helps others with the integration of technology in their classroom in the form of common planning time or during the built-in collaborative time during PD days. The tech-savvy teachers could share what technology they are using in their own classrooms and different strategies with these technologies. Therefore, it is important that the administration gives the technology coaches enough time, support, and training to make sure that they have success in helping other teachers, because if they do not, the technology coaches will not be able to succeed (Gallagher et al., 2024). Hence, by giving the technology coaches the support that they need throughout the school day and year,

this could reduce overall teacher frustration with technology and increase technology integration.

Recommendation 3: Improve Administrative Communication, Support, and Follow-up

Most of the participants (60%) stated that there is a lack of communication between the administration and the expectations for the usage of technology in the classroom. This lack of communication suggests the administration could be more proactive in communicating its technological expectations. Some participants (40%) also felt they needed clear guidance and expectations from the administration regarding technology. These participants also noted that when administrators give guidance and clear expectations with technology, they feel more confident about integrating it into their classrooms. Administrators play an essential role in teacher success by providing support, leadership, and communication, and without this support, teachers would struggle or possibly fail (Jaeger et al., 2024). When there is a lack of communication from the administration, it may create barriers to teachers' technology integration. Research indicates positive outcomes when administrators stay closely connected to teachers' professional development needs and create supportive conditions within their schools (Karakose et al., 2025).

Within the interviews, participants indicated the need for sustained, ongoing PD or training session that includes follow-up and support from administrators. They also indicated a desire for time to implement what they learned through these PD or training sessions. As a result, I recommend the school district implement follow-up sessions after

PD and allow time for peer collaboration, along with peer technology “coaching” sessions that could help reinforce what they have learned.

To improve administrative communication, support, and follow-up, I recommend the continued usage of the digital hub, which is already established. The administrators also need to start the school year by giving clear technological expectations, which must be outlined and aligned across both grades and the exploratory teachers. A technology liaison must be designated for the building to improve ongoing technology. This will allow for hands-on and personalized support for the teachers needing help with technology. After each PD day, administrators need to schedule follow-up meetings within a given time frame to allow reflection from the teachers and allow them to try out what they learned and implement what they learned. Lastly, administrators should create an anonymous Google Form that teachers could fill out. This Google Form would allow the teachers to share their concerns, what they need help with, and their classroom successes. These Google Forms will help inform the administrators of what is happening within their building and allow them to be more proactive and responsive. Together, these strategies should improve administrative communication, support, and follow-up, giving the teachers more confidence in their classrooms.

Conclusion

Studies have shown that, as Niu (2024) notes, teachers face difficulties in student learning during virtual teaching, particularly in using and integrating suitable technology resources to support virtual instruction. Studies have shown that one-time technology PD is not enough to help teachers feel confident integrating new technologies into their

classrooms. To ensure teachers feel confident in PD, they need sustained, ongoing support from their administrators (Johnson & Williams, 2023). One-way administrators can accomplish this is through ongoing support for teachers through peer interactions, such as with technology coaches. These technology coaches are teacher who helps others with technology integration in their classrooms through additional PD or collaboration (Gallagher et al., 2024).

The findings from this study showed that when the COVID-19 pandemic started and teachers were forced to teach virtually, many teachers struggled during this period. There was a lack of preparation due to the limited two-day PD and insufficient ongoing support. This study highlights the need for targeted, hands-on PD and clear, consistent administrative guidance to ensure that teachers have the confidence to effectively and adequately integrate technology into their teaching practices. To help improve technology integration, the district needs to rethink the way teachers are trained and how they are supported within their schools.

The data from the interviews showed that the school district needs a new approach to technology integration, and the current model for PD needs to change. Ideally, administrators could allocate time for collaboration with technology, engage technology peers and coaches, and conduct regular follow-up sessions that provide teachers with support and confidence. Overall, by providing teachers with proper technology support, employing technology coaches and offering peer support through collaboration, and receiving support from the administration, the district can help achieve its goals of enhancing technology usage and improving student achievement.

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Appendix B: Interview Protocol

Participant (number):

Interviewer: William Primrose

Date:

Time:

Location:

Say: Thank you for taking the time to participate in this study. As part of my doctoral work at Walden University, I am conducting a survey to gain insight into how the pandemic has affected the use of technology in the classroom. During this interview, I will ask why certain teachers use certain types of technology and the most effective methods for administrators to support their staff with integrating and using technology in their classrooms. It's important to note that your responses will not result in any differential treatment by anyone at Walden University, the school district, or your workplace. Additionally, no rewards or compensation are associated with participating in this study. All information collected during this process will be kept confidential, and pseudonyms will be used for both you and your school. Your participation is voluntary, and you can end the interview or withdraw from the research project anytime. Finally, I will allow you to review the findings to ensure that your opinions and experiences are accurately represented before completing this study.

Interview questions for participants

1. Please take a moment to share your experiences as a middle school teacher with technology use in the classroom before the COVID-19 outbreak. Refer to the technology you utilized and explain how it changed your methodology and teaching. (RQ1)
2. Please describe the intended use and any adjustments you made when using technology to demonstrate how you taught your class while instructing virtually. (RQ2)
 - a. How did your students respond to these changes? (RQ1)
3. What supports did you find worked well during this period of teaching virtually? Which supports did you not use or find useful? (RQ3)

4. What were your experiences using technology and teaching from home during the pandemic? (RQ1)
 - a. What pieces of technology did you use that you perceived as easy to use and were they useful? (RQ2)
5. How do you choose the resources or technology to utilize in your classroom during and after the pandemic, and what standards do you use to assess their effectiveness? (RQ2)
 - a. What technology did you use during the pandemic that you are planning on using or have incorporated into your classroom. (RQ2)
 - b. In what ways did you find this technology useful and was it easy to use or incorporate into your classroom. (RQ2)
6. How do you choose the resources or technologies to employ in your classroom during and after the pandemic, and what criteria do you use to assess their effectiveness? (RQ3)
 - a. How does the ease of use affect how you choose the resource or technology that you use in your own classroom? (RQ2)
 - b. How useful does a technology or resource have to be before you decide to use the technology in your own classroom? (RQ2)
7. Before the pandemic, what training or opportunities for professional growth did you have? What do you need to do now to improve your use of technology in the classroom? (RQ3)
 - a. Do you feel you were properly prepared to teach virtually during the pandemic? (RQ1)
8. How do you think the use of technology will continue to progress or change in your classroom, at the school you work at, and in education overall? (RQ2)
9. Based on your own experiences, how can professional development most effectively help you improve your capacity to integrate technology in your classroom? (RQ3)
 - a. How would you change how PD is done regarding technology integration at your school? (RQ3)

10. What best practices or advice would you give to other educators trying to use technology in their classrooms effectively both during and after the pandemic?
(RQ1)

11. Is there anything else you would like to add about your experiences with teaching virtually during the pandemic, the usage of technology in your classroom, or how the administration can help improve your technology usage in your classroom?
(RQ1/2)