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Effective Use of Interactive Technology in Elementary Classrooms

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Effective Use of Interactive Technology

in Elementary Classrooms

by

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Abstract

Statement of the Problem

While there was ample literature highlighting the limited use of interactive technology by teachers, minimal research was located which identified the critical resources and supports that need to be in place in school districts and classrooms to assist teachers in engaging students through interactive technology in the elementary classroom. The findings from this study are intended to provide school and district administrators with information regarding essential resources and supports to assist elementary classroom teachers in their use of interactive technology.

Study Purpose and Overview

The purpose of the mixed-method study was to determine how school and district leaders can provide support and resources to elementary classroom teachers in the implementation and use of interactive technology in the elementary classroom. The study examined resources provided to teachers to actively engage students in using interactive technology in meaningful instruction to increase student engagement, motivation, and ultimately learning outcomes. The following research questions were designed to support these aims:

1. What resources did select school district superintendents, technology personnel, principals, report were provided to elementary classroom teachers to support use interactive instructional technology in their classrooms?
2. What did select elementary teachers report as their frequency of use of specific methods of interactive technology in their elementary classrooms?
3. What resources and supports did select elementary classroom teachers report were essential to implement interactive technology in their elementary classrooms?
4. What did select elementary teachers identify as the level of importance of the specific district and site resources/supports needed for the integration of interactive technology in the elementary classroom?
5. What types of interactive technologies did select elementary teachers report were used for assessment, instruction and student activities?

In order to address the research questions, the research questions, the researcher created an online survey that gathered data from 3 school districts, totaling over 120 respondents' perceptions of their perceptions regarding essential resources and supports needed to effectively implement interactive technology in the elementary classroom. In order to enrich the study findings, one-on-one phone interviews were conducted with six respondents who volunteered to expand upon survey questions with the researcher.

Key Findings

The study results found that Administration, Technology Personnel, as well as Elementary Classroom Teachers valued the use of interactive technology for instructional purposes. Both reported that internet connectivity is a critical component in the school districts surveyed and essential to effective interactive technology implementation.

The survey participants reported a willingness and interest to use technology effectively in their classrooms to provide authentic learning experiences for their students.

Dedication

This dissertation is dedicated to my family, for their endless support and encouragement throughout this journey. They have been my cheerleaders from the beginning of my journey, always respecting the time commitment needed to make my dream a reality.

I also dedicate this to the classroom teachers who work tirelessly before and after school; building their skills to ensure they are providing students with the most meaningful, effective education. They understand the impact interactive technology can have on students' learning and are willing to be lifelong learners to provide it for them.

Attitude + Ambition = Achievement

Acknowledgment

The completion of this dissertation has been a personal dream of mine. The process of completing a doctoral degree has been an invaluable experience both personally and professionally.

A special thank you to my professors and especially my committee members: Dr. Kay Worner, Dr. Roger Worner, Dr. John Eller, and Dr. Julie Jochum. I appreciate the many hours they spent reviewing my dissertation drafts and providing me with timely and constructive feedback.

Being a part of Cohort VII was a learning experience for me. I enjoyed the activities used to help us build our leadership skills and enable us to process the content at a deeper level. I appreciated the diversity of our cohort as they brought many different perspectives to our discussions.

Thank you to Dr. Julie Jochum for the many days she gave up to help me work through the entire process. She was the one who believed I could from the very beginning. Her love of teaching guided me when I was an undergrad and continued through my Master's and now finally, my Doctorate. Thank you.

Finally, Dr. Kay Worner, she was amazing, I will forever be grateful for her support throughout this dissertation journey. She provided timely feedback, guidance and encouragement to complete this body of work.

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Chapter 1: Introduction

School leadership focuses on effective and efficient instruction in the classroom (Cranston, 2013). School leaders are expected to employ research-based strategies and provide teachers with a variety of tools, such as interactive technology, to help improve student's academic achievement (Cranston, 2013). Interactive technology is a form of Computer-Assisted Instruction (CAI) that enhances instructional delivery, engages students in the lessons and enables teachers to obtain feedback on skill development to ensure student growth. Interactive technology ensures students are interactive and engaged therefore motivated to learn the concepts being taught (Musti-Rao, Cartledge, Bennett, & Council, 2014).

There are a variety of interactive technologies used in school classrooms. Interactive whiteboards have been employed in elementary clssrooms since the 1990. School systems have Internet access, of which 97% have high-speed connections (Miranda & Russell, 2012). Student-to-computer ratio was close to 4:1 in 2008 (Clausen, Britten, & Ring, 2008), and hundreds of school districts have implemented 1:1 iPad or Chromebook programs. Even though billions of dollars are spent on technology equipment in the schools, teachers are not using technology to its full potential (Smith & Throne, 2007, p. 47). Welk and Welk (2017) found that only 25% of teachers used technology in their classrooms (p. 15). The American Association of School Administrators reported that principals had great concerns about the low usage of technology in their schools (cited in AASA, 2014).

The gap between teachers' knowledge of the enhancement of instruction and the pedagogical use of technology in the elementary classroom is unknown. A great number of classrooms have interactive devices available for use, but they are not used due to a variety of concerns such as: lack of teacher training, little to no planned support, and technical issues

(Herold, B., 2017). Some school districts have paired the implemention of interactive devices with quality support for teachers in the classroom in their use of technology (Herold, 2017).

The study focused on implementation and the resources school districts employed to support teachers in their use of interactive technology in the classroom to engage students in learning. Because the use of interactive technology in the classroom continues to escalate, it is timely to examine teacher and other personnel perception of the types of support needed for effective implementation.

Conceptual Framework

An International Society for Technology in Education (ISTE) document on Technology Facilitation and Leadership Standards (2009) cited the need for school leaders to understand the change process and incorporate support for conceptual change in school leadership. They noted that Fullan (2001), Matzen and Edmunds (2007) along with Rogers (1995) addressed the need for leaders to understand how to plan and design instructional lessons utilizing interactive technology in order to assist technology specialists and technology integrationists in supporting teachers. Williamson and Redish (2009) extracted from Fullan's 1999 work to identify the "outside-in" collaboration which is crucial for leaders to provide in order for change initiative to be successful.

Mauer and Davison (1998) stated, "Leadership is neither power, authority, nor status. Instead it is the responsibility to envisage intelligent action" (p. v). Leadership is developed through reflective and evaluative practice. Mauer and Davidson stated that instructional technology changes the focus of the school, which in turn changes the organization of its leadership. The use of technology to support an effective and quality academic program is a systemic change. Technology causes the school community to change instructional methods and

strategies. Leadership must change in order to organize, govern and implement new methodology. Uluyol and Sahin (2016) reiterated the concept that teachers need effective leadership and support to facilitate their use of interactive computer technology (ICT). They contended (as cited in Martin & Yee) that interactive technology support should focus on creating accessible classrooms, providing resources, timely support, and training on integrating interactive technology in the curriculum. Organizational support needs to include not only the technical, but also the pedagogical support teachers require when utilizing interactive technology in their elementary classrooms (Uluyol & Sahin (2016).

School district and site leadership serve as change agents to provide supports and resources to ensure interactive technology is addressed to create interactive classrooms through three main domains:

1. Student engagement and attention; allowing students to become more knowledgeable and achieve higher standards;
2. Teachers who use interactive technology are better prepared and more effective;
3. Classroom interaction provided in ways that support student learning (Smith & Throne, 2007, pp. 11-12).

Technology does not teach students; rather, students learn as they use technology. Meaningful learning occurs when teachers utilize technology to engage students in the construction of knowledge, conversation and collaboration, as well as articulation and reflection (Howland, Jonassen, & Marra, 2007). Teachers do not use interactive technology in isolation; they cannot be successful in its implementation without providing school and district personnel and support. In similar fashion, the lack of connection between integrated technology planning, including district and school technical service implementation, can have negative effects. A

combined effort between and among teachers, district leaders, and support personnel in order to implement interactive technology in the classroom to enhance student learning is essential (Howland et al., 2007).

Statement of the Problem

While there was ample literature highlighting the limited use of interactive technology by teachers, minimal research was located which identified the critical resources and supports that need to be in place in school districts and classrooms to assist teachers in promoting student learning through interactive technology in the elementary classroom. The study was believed to be important and timely because many classroom teachers have access to expensive technology equipment, yet, may not be utilizing that equipment effectively in classroom instruction.

Purpose of the Study

The purpose of the study was to contribute knowledge and practice to the field of education by providing information for school and district leaders regarding the support teachers required to effectively implement interactive technology to enhance classroom instruction and student learning. The findings from the study are intended to provide school and district administrators with information regarding essential resources and supports to assist elementary classroom teachers in their use of interactive technology.

Research Questions

In their 2017 National Technology Plan Update, the Office of Educational Technology in their 2017 National Technology Plan Update stated the need for students to develop 21st century skills in critical thinking, complex problem solving, collaboration and multimedia communication. There is a new digital divide between students who use technology to create, design, build, explore and collaborate and those who simply use technology to consume media

passively. Access to connectivity and devices does not guarantee access to engaging educational experience or a quality education (U.S. Department of Education, 2017).

The study was focused on five guiding questions:

1. What resources and supports did select school district superintendents, technology personnel, and principals report were provided to elementary classroom teachers to support their use of interactive instructional technology in their classrooms?
2. What did select elementary teachers report as their frequency of use of specific methods of interactive technology in their elementary classrooms?
3. What resources and supports did select elementary classroom teachers report were essential to implement interactive technology in their elementary classrooms?
4. What did select elementary teachers identify as the level of importance of the specific district and site resources/supports needed for the integration of interactive technology in the elementary classroom?
5. What types of interactive technologies did select elementary classroom teachers report were used for assessment, instruction and student activities?

Assumptions of the Study

Assumptions of the study included the following:

- The participants would answer the study survey honestly.
- By accessing three different sized school districts the study identified key components that would be standard in a successful technology implementation model, regardless of district population size.

- The availability of district/site resources would have similar based on the funding formula provided by the state.
- The locations of the district/school sites in Minnesota would have similar access to technology training and materials.
- The background of teachers completing the survey would be similar based on state licensing requirements, and classroom experiences would be similar based the districts' socio-economic status.
- Responses to the surveys would accurately reflect the participants' professional opinions.

Delimitations of the Study

Roberts (2010) identified delimitations as factors that the researcher can control in the study. Those factors are involved in the researcher's decisions in narrowing the scope of the study. They are conscious decisions made by the researcher in identifying what was included or not included in the study and how those decisions may have impacted the study's results.

- The study was conducted in schools that are known for quality implementation of interactive technology. Therefore, the survey results will be more likely positive than those obtained in surveying a randomly selected elementary school.
- For study purposes, the term "interactive technology" refers only to such computer devices, as interactive whiteboards, iPad, chrome books or other 1:1 devices that students may use in the classroom.

Definition of Terms

Constructivist approach. There are three fundamental theoretical assumptions of the constructivist approach to teaching: learning is an active constructive process for students, teaching is focused on the students' process of understanding, and finally, teaching focuses on the learner first (Mooij, 2000).

Contemporary teaching philosophy. Contemporary teaching philosophy defines the teacher as a guide for learning, as well as an agent for change. According to contemporary teaching philosophy, students and teachers often engage in dialogue.

Educational technology. Educational technology includes a variety of electronic tools and applications that help deliver learning materials and support the learning process in K-12 classrooms (Cheung & Slavin, 2013).

Interactive technology. For purpose of the study, the term "interactive technology" only refers to such computer devices, as interactive whiteboards, iPad, chrome books or other 1:1 devices students may be permitted to use in the classroom.

Interactive whiteboard (refers to a SMARTboard). An interactive whiteboard is a giant touch-sensitive version of the computer screen. An interactive whiteboard can range in size, with the average size a 4'x 6' rectangle screen either mounted on a wall or on a large moveable platform. Instead of using a mouse, teachers can control the computer through the interactive whiteboard screen just by touching it with a special pen (or, on some types of boards, with a finger). (http://www.pearsonlongman.com/newcuttingedge/pdf/what_is_cutting_edge_ digital.pdf).

Resources. For purpose of the study, the term "resources" refers to financial and natural resources, including materials, staff, and other components that can be drawn on by a teacher or school district in order to effectively use interactive technology in the elementary classroom.

Supports. For purpose of the study, the term "supports" refers to human, financial, and material assistance which serves as a foundation to sustain or with stand, serve and endure, approval, encouragement given to a teacher or school district to function or act effectively in the implementation and integration of interactive technology in the elementary classroom.

Technology integration. Technology integration means that technology is not taught as a separate class, but integrated into the classroom; students use technology to learn content and demonstrate their understanding of content, not just their expertise with a tool (Hertz, 2011).

Technology integrationist. A school district specialist who collaborates with the classroom teachers for effective classroom implementation of technology. Primary focus of this individual is to enrich and support teaching and learning while strengthening the technology skills of students, teachers, and staff (https://boone.k12.ia.us/new/wp-content/uploads/2015/01/Technology_Leader, 2015).

Traditional teaching philosophy. Traditional teaching philosophy describes the role of a teacher who serves as an authority in the content taught. The teacher dominates the lesson with explanations and lectures (Butler, Carr & Siegel, 2006).

Summary

The study identified materials, resources, and training that school districts use to support teachers in engaging students through interactive technology in the elementary classroom. Critical elements of Change Leadership theory form the foundation of the study through five

guiding research questions. The study identified the support teachers receive and need in their use of interactive technology.

The following chapters describe critical research supporting the study and the methodology used to complete it. Chapter 2 is the literature review that was completed to provide an overview of the prior research conducted and how this guided the statement of the problem. Chapter 3 defined the research questions and methodology of the study. It addressed the participants, procedures for identifying the population of participants, the characteristics, size and how the selection was made. Chapter 3 outlined how the rights of human subjects were protected. Chapter 3 addressed the research design, instrumentation, data analysis, and procedures and timeline of the study.

Chapter 2: Review of Literature

Since the 1990s, the integration of technology into classrooms has been somewhat inconsistent (Welk & Welk, 2017). It is not uncommon for educators to receive minimal training in the proper utilization of classroom technology, with the predictable result of technology misused, undervalued, or even outright ignored (Philip & Garcia, 2013). It is imperative that this trend be reversed (Welk & Welk, 2017). Expensive pieces of equipment are being poorly utilized even though interactive technologies can enhance the learning environment for all students and can help the teacher become more effective and efficient in his/her instruction (Welk & Welk, 2017).

Angeli and Valandes, (2009) developed a process for ensuring effective use of interactive technology in the classroom. Angeli and Valanides (2009, 2013) advocated recognition of technological pedagogical content knowledge (TPCK) as a holistic and transformative form of knowledge; they proposed a teacher-oriented approach to TPCK that includes holistic and transformative knowledge assessed using five proposed criteria/competences. These criteria/competences are centered on the mapping of how technological tools can transform content into powerful representations by using appropriate pedagogy. They advocated technology mapping as a method for developing TPCK competencies that is required for teachers to be able to adequately teach with technology (Angeli & Valanides, 2013). In particular, technology-mapping guidelines capitalize on the affordances of technology and represent an instructional design model.

Leadership's focus is on effective and efficient instruction (Cranston, 2013). Restsrepo's work (2011) clearly demonstrated that classroom technologies allow students to attain higher academic achievements and engagement (O'Brien, Beach & Scharber, 2007; Scherer, 2011;

Storz & Hoffman, 2013). These studies argued for a student-centered, (Warschauer, 2007) collaborative learning environment (Lei & Zhao, 2008). Other experts disagreed, arguing that, when technology is over-emphasized, there is little evidence of academic improvement. Such a stance assumes that good teaching is at the heart of learning (Philip & Garcia 2013).

Use of Interactive Technology in the Classroom

Using technology, schools are able to access additional resources which allow students the opportunity to see and experience learning concepts that would otherwise be unknown to them. Research has shown the importance of accessing prior knowledge or background knowledge when teaching students, but it is worth noting that a similar effort must be made to make new information accessible to students (Musti-Rao et al., 2015). If students are not able to experience different places, cultures, materials, artifacts, or environments, then they will not be able to connect with them. Technology can bring places, cultures, materials and artifacts into the classroom in a manner that affords all students the opportunity to engage with the presented material in a deep and meaningful way (Howland, Jonassen, & Marra, 2012).

Strengths in the Use of Interactive Technology in the Classroom

Teachers view one of the instructional benefits of interactive technology is the engagement of students in both the content and the process of learning. Interactive technology fosters an interest in learning and enhances the process of learning by providing new stimuli as well as access to a wide variety of knowledge (Empirica, 2006). It also affords educators additional opportunities to evaluate and give feedback to students (Becta, 2003; Empirica, 2006). In addition, teachers remarked that interactive technology allows for more engaging, exciting, and diverse lessons (Uluyol & Sahin, 2016). But despite all this promise, interactive technologies may fail to live up to their potential if they are not utilized effectively (Kimber & Wyatt-Smith,

2006). Three key elements of interactive technologies with which educators must be familiar identified by Uluyol and Sahin (2016) were :

1. increasing visualization of hypertext,
2. the character of advanced writing spaces, and
3. the character of students' attention (Kimber & Wyatt-Smith, 2006).

Kimber and Wyatt-Smith (2006) declared that teachers must understand the new technology literacies' direct impact on redefining forms of knowledge if they are to make effective use of these new technologies, and they must tie that understanding to accurate and efficacious teaching methods. Studies show that when these conditions are met, teachers are able to provide students with more engaging learning opportunities. Teachers must utilize technology to create opportunities for students' collaboration and solve problems as teams. Goldhaber in 1997 and Lanam in 1997 (as cited in Kimber & Wyatt-Smith, 2006) make the argument that attention, not information, is the most precious resource available to educators.

Kimber and Wyatt-Smith (2006) noted the teachers' central role in helping students become critical thinkers, strategic problem solvers, and active learners. Teachers work to create a learning environment centered on real-life applications, thereby encouraging individual thinking and allowing for necessary adjustments to students' needs and the rapidly changing world of pedagogical technology. Kimber and Wyatt-Smith recognized that quality learning comes from active engagement with key concepts, from opportunities for reflection, and from the students' ability to identify patterns within those broader concepts. Through the use of interactive technology in the classroom, teachers are able to build these components into their lessons.

Volman and Van Eck (2001) asserted the use of interactive computer technology (ICT) as the building block for a strong learning environment, changing the learning and teaching process

into one where students are active and self-directed, using technology in a constructive manner as a means by which meaningful learning might take place. Sang et al. (2010) establish that student teachers who displayed strong constructivist teaching beliefs, a commitment to teaching efficacy, and a sense computer self-efficacy all anticipated integrating ICT into their future classrooms.

Hands-on-tasks which require physical interaction not only yield positive results among students with tactile learning modalities (Beeland, 2002) but have also been shown to motivate students in general (Smith, Higgins, Wall, & Miller, 2005). The result is a student body with a deeper and more meaningful understanding of core content (Shenton & Pagett, 2007). Creating multiple opportunities for students to use interactive technology themselves yields higher engagement among students (Hall & Higgins, 2005; Preston & Mowbray, 2008; Slay, Siebörger, & Hodgkinson-Williams, 2008; Wall, Higgins, & Smith, 2005). While the benefits are great, research has shown these interactive activities are rarely mentioned as being used and students have also recognized the lack of implementation in the classroom (Al-Qirim, 2011; Hall & Higgins, 2005; Shenton & Pagett, 2007; Uluyol & Sahin, 2016).

Padron and Waxman (2012) ascertained that using technology for cooperative learning or enhancing classroom materials to be effective for students at risk of academic failure. Likewise, using technology to create more challenging lessons and develop deeper critical thinking skills engages students in the learning process. Research has shown technology-enhanced instruction is an effective teaching method for minority students such as Hispanics, English Language Learners (ELLs), and students from low-income households (Padron & Waxman, 1996; Padron, Waxman, Lee, & Lin, 2012; Park, 2008; Waxman & Padron, 2002; Waxman, Padron, & Arnold, 2001; Waxman, Padron, & Garcia, 2007). Historically disadvantaged students have had fewer

opportunities to build their background knowledge to form meaningful connections to material being taught. Technology has the ability to create equity in the ability to access quality learning materials and expertise on subject matter that was not available in their own community (U.S. Department of Education, 2017).

Metacognitive devices such as concept maps, concept webs or other retrieval devices are often connected with computer-based tasks (Kimber & Wyatt-Smith 2006). Learners are provided tools which they can use to reflect on the information and learning process in which they are involved. The students are thus able to connect the visual representations presented to them with their own background knowledge and personal experiences.

There is an increased interest in simulating the 'real world' application for learning through actively building knowledge, rather than merely having students sit passively and listen to the instructor. This is where Information and Communication Technology (ICT) can help create new learning environments (Mooij, 2000).

Learning environments have shifted focus from the traditional teacher-centered orientation to a more engaging student-centered orientation. Student-centered learning environments are created so that students might more actively build on knowledge with their peers (Mooij, 2000). This change came about as a result of constructivism, in which school learning and 'real-world learning' are connected. For these environments to succeed, learning activities must be as authentic as possible. Students should examine problems from different angles, thereby ensuring that they incorporate a variety of resources to process new information. Collaboration and interaction between peers is essential. The focus is on knowledge construction and less on reproduction of information. The classroom is often student-driven, and the teacher functions as a coach who guides the process. By making multimedia easily available to students,

interactive technology allows students to collaborate, to operate within a complex system, and to transform abstract information into practical knowledge (Mooij, 2000).

The process described by Mooij (2000) was developed identifying four paradigms for computer-assisted learning. These were: the instructional paradigm connected to program learning, the revelatory paradigm focusing on guided discovery, conjecture where students learn by experimenting and exploring ideas and concepts, and finally the emancipatory paradigm where the underlying thought is that the computer is a tool to reduce the amount of "inauthentic labor of the learner" (Mooij, 2000). Due to the fact one cannot monitor mental activities of students, time on task is often the way researchers measure the success of technology application. Time on task correlates in a positive manner with acquired learning. There was a significant difference in time on task behaviors in classrooms where technology was actively used compared to classrooms with minimal use. Angeli and Valanides, (2009) developed five criteria for using technology in classroom instruction:

1. the identification of suitable topics to be taught with technology;
2. the identification of appropriate representations to transform content;
3. the identification of teaching strategies difficult to be implemented by traditional means;
4. the selection of appropriate tools and appropriate pedagogical uses of their affordances; and
5. the identification of appropriate integration strategies.

The instructional benefits provided by interative technology in the elementary classroom are well documented in the literature. Interactive technologies not only provide access to comprehensive knowledge-bases and an expanded pool of learning materials, but also yield

increased student collaboration, and, perhaps most importantly, help to create environments that are focused on individual student needs and learning processes. These results suggested that there is much to be gained from the implementation of interactive technologies within the elementary classroom (Angeli & Valanides, 2009).

Preparation in the Use of Interactive Technology in the Classroom

Much attention has been given to the use of technology in the classroom, yet teachers are still struggling to use these technologies in the classroom effectively (Musti-Rao et al., 2015). Laffey (2004) examined teaching candidates' instructional technology skill development and determined that there is a need for regular career training on the appropriate pedagogical uses of technology. Too often a significant part of the training is focused on basic operations and not on its use as a teaching tool (Guerrero, 2005; Sandholtz, 2001).

Teachers prepare students to use new technologies, yet they struggle with being able to teach their content utilizing technology (Niess, 2011). Teachers did not learn with technology nor did the instructors have access to it as they learned to teach their content. These are barriers that hinder the use of interactive technology in the classroom. Elementary educators need to learn ways to incorporate content-specific pedagogy; similarly, they need to be trained to utilize technologies under the specific circumstances when those technologies will be most efficacious for the students (Niess, 2011). Through building these skills the teachers will eliminate these barriers.

According to Ertmer (1999), two motivational barriers may inhibit the effective utilization of technology by teachers in the classroom: extrinsic barriers and intrinsic barriers. Extrinsic barriers are those over which the teacher does not have control; these include, but are not limited to, a lack of resources, technical support, time, or training. Intrinsic barriers are

connected to a teacher's beliefs, attitudes, and views about knowledge, learning and teaching. Teachers must evaluate these barriers on an individual basis (Uluyol & Sahin, 2016). Research conducted by Uluyol and Sahin (2016) revealed five categories for the use of interactive technologies by teachers: presentation, capturing, editing, practicing, and communicating. Findings from the research found that interactive technologies were almost exclusively used for presenting. Very little use was noted at the elementary level in any of the other areas. Even though the last twenty years have yeilded a large investment in interactive technologies in the classroom, too often teachers must be self-sufficient when it comes to making use of these technologies. They have little-to-no planned organized support for the exploration and development of pedagogical technology in their classrooms. Principals and technology specialists are often non-existent in the process of ensuring effective use of the technology. In theory, the technology specialist should be guiding the integration of teaching and learning in the classroom, but too often he/she is viewed as a technician whose primary task is to care for the components of the computers (rather than as pedagogical resources whose primary task is to impart didactic expertise or experience) (Uluyol & Sahin, 2016). It is of vital importance to distinguish between technology specialists who maintain hardware and software and media specialists who implement and support technological integration in the classroom (Uluyol & Sahin, 2016). When faced with these setbacks, many teachers lose confidence in the efficacy of classroom technology. This in turn may reduce the frequency with which they utilize it (Miranda & Russell, 2012).

Commonly Used Interactive Technology

Interactive whiteboards. Interactive whiteboards have been in the elementary classrooms since the 1990s. Ninety-seven percent of school districts have high-speed internet

access (Miranda & Russell, 2012). In 2008, the student-to-computer ratio was close to 4:1 (Clausen et al., 2008) and hundreds of school districts are now implementing 1:1 iPad or Chromebook programs. Yet, despite the billions of dollars spent on technology in the classroom, research has found that use of this technology is not as extensive as assumed (Bebell & Kay, 2010; Cuban, 2006).

Strengths in use of interactive whiteboards (IWB) in the Ccassroom. Interactive whiteboards have a plethora of uses in the classroom. They enable teachers to efficiently manage the classroom, access multimedia content, move from one activity to another, and access a variety of resources from a single location, all while interacting with the students (Glover & Miller, 2001). Teachers can individualize and differentiate instruction according to students' respective needs, as well as to actively engage students in lessons through interactive activities where they manipulate the content on the whiteboard. Teachers are thus able to deliver consistent instructions to each student, and students are more motivated to engage with the lessons that are being taught (Musti-Rao et al., 2014). Having students physically involved in the instructional process helps to engage those who would otherwise be reluctant to learn.

Issues in the use of interactive whiteboards (IWB) in the classroom. Research conducted by Beauchamp (2004, p. 335) found that student interaction and participation activities and lessons presented on the IWB was rather limited. Students did not think of the IWB in similar terms to their instructors and did not seem to associate the IWB with interactive learning. Other findings confirm that students did not think of the IWB in dialectical terms. What these studies do highlight are the teacher-centered activities organized around the IWBs (i.e., better visual presentations, visualizations, contextualizations, etc.). This implies that IWB are used primarily as fast and effective presentation tools by teachers rather than as engaging

pedagogical alternatives; the teachers essentially transferred their traditional computer knowledge into IWB lessons. This finding is consistent with Smith, Hardman, and Higgins (2006), who stated that having IWB technology in a classroom does not bring about changes in traditional whole class instruction. Based on the frequent reference to technical problems, many teachers may even be at the pre-initial stage of integrating IWBs into the classroom.

Interactive whiteboards are efficient time-saving tools when utilized effectively, but it is important to address the fact that their use can be a negative. At times, the use of IWB can impair the students' ability to comprehend and process everything that the teacher is presenting (Wall, Higgins, & Smith, 2005). Smith et al. (2006) cautioned that the delivery of faster lessons can come at the expense of the students' ability to answer questions.

An interesting finding from the student survey, conducted by Wall et al. (2005) was, although it is well documented in literature, that multimedia presentations are one of the greatest strengths of an IWB (Adıgüzel, Gürbulak, & Sarıçayır, 2011; Elaziz, 2008; Gursul & Tozmaz, 2010; Hall & Higgins, 2005; Levy, 2002; Slay et al., 2008; Smith et al., 2005), but most of the students surveyed were not aware of this feature. When students were asked about the negative aspects of IWBs, they emphasized their teachers' lack of interactive technology skills and mentioned the cost associated with IWBs, they also addressed the technical issues which occurred when the IWBs do not work correctly. So extensive are technical problems that in 2003 the Department of Education considered the technical issues with IWBs to be among the biggest problems facing modern schools (Slay et al., 2008). If teachers are not knowledgeable in the use of interactive technology and still try to use it in their instruction, it can lessen learning for students. Students from all the focus groups identified the interruptions and distractions caused by technical problems like power cuts, unintentional shut-downs, impaired color settings, virus

program blocking screen, and recalibration as negatives (Wall et al., 2005). Recalibration was the most frustrating technical problem. Students explained recalibration as the inability to write/draw where one wanted to on the board, the screen is not reading the interaction correctly. This was also one of the most common problems identified in literature. This happens when the boards' content and interaction are off and the information shown can confuse the students (Beeland, 2002: Gursul & Tozmaz, 2010; Smith et al., 2005). The frequency with which recalibration issues occur may be linked to the poor technological instruction provided to the teachers in question (Beauchamp, 2004). However, it must be pointed out that other technical issues such as freezes, system crashes, and power outages were also widely documented by teachers and students (Al-Qirim, 2011; Şad & Özhan, 2012; Somyürek, Atasoy, & Özdemir, 2009 ; Wall et al., 2005). Students pointed out that inexperienced teachers struggled to use the IWB in an effective manner; this proved frustrating for students when the teacher tried to use it for instruction (Elaziz, 2008; Hall & Higgins, 2005; Lewin, Somekh, & Steadman, 2008; Shenton & Pagett, 2007; Slay et al., 2008; Smith et al., 2005; Wall et al., 2005).

One minor issue that students mentioned was that the IWBs could sometimes reflect sunlight, resulting in students having difficulty seeing the material (Al-Qirim, 2011; Ates, 2010; Elaziz, 2008; Hall & Higgins, 2005; Levy, 2002; Şad, & Özhan, 2012). Inexperience of teachers with the IWBs was another factor students described and how their novice teachers faltered while using IWBs. It is frequently reported that teachers lack the basic technical skills necessary to use IWBs effectively (Elaziz, 2008; Hall & Higgins, 2005; Lewin et al., 2008; Shenton & Pagett, 2007; Slay et al., 2008; Smith et al., 2005; Wall et al., 2005). This lack of skill development is perceived negatively by students (Levy, 2002).

Students' opinions of interactive whiteboards in classroom. When students are questioned about their thoughts on IWBs, they express appreciation for several their attributes (Wall et al., 2005). Students often recognize that IWBs are practical and economical. They also value the ability to write and erase without physical pressure, to copy and paste with ease, and to recall previous pages as necessary. This is a component that teachers also enjoy (Al-Qirim, 2011; Elaziz, 2008; Schuck & Kearney, 2007).

Students emphasized the fact that IWBs allowed for a more accurate representation of visual details (e.g., geometric shapes, illustrations using a variety of colors, etc.). Beeland (2002), Slay et al. (2008), Hall and Higgins (2005), Glover, Miller, Averis, and Door (2005), and Smith et al. (2006) all report that the richness of the IWB's presentation feature was considered the single element most responsible for increased student engagement. In addition, students appreciated the fact that IWBs allow them to do test-based practice. Students also expressed enthusiasm for the board's internet access which allowed them to find and manipulate new and engaging materials (Şad, & Özhan, 2012). Finally, the students expressed a belief that use of the IWB allowed them to learn more effectively. Interestingly, among both teachers and students this is the least referred to but most appreciated component of IWBs (Elaziz, 2008; Kaya & Aydın, 2011; Levy, 2002; Wall et al., 2005).

Overall, students feedback suggested that IWBs were an effective tool for capturing students focus and involvement in the learning process. Students especially enjoyed the ability to interact with the IWBs. The learners believed that the way in which information was presented and the ability for interaction helped them to maintain focus and pay attention (Slay et al., 2008).

Commonly used interactive technology: iPads and 1:1 devices. The use of iPads in the elementary classroom adds new and innovative ways to enhance literacy skills (Northrup,

Killeen, & Ng, 2013) including early letter naming, letter sound identification, sight word recognition, reading comprehension, and reading fluency (Musti-Rao et al., 2014). The addition of iPad technology in the elementary classroom had an impact on students' abilities to stay on task and increased student engagement (Cumming & Rodriguez, 2013). Through the use of iPads and 1:1 devices, teachers have the ability to access resources digitally including digital textbooks, and a wide variety of literature; differentiate curriculum to meet the needs of diverse learners. Digital texts require different skills, strategies and dispositions; these are often referred to as new literacies needed to navigate the use of iPads and 1:1 devices (Coiro, Knobel, Lankshear, & Leu, 2008). Teachers need to understand these differences and integrate digital technology into the curriculum to provide students with opportunities to learn (International Reading Association [IRA], 2009; National Council for Teachers of English, 2008).

Strengths in the use of iPads and 1:1 devices in the elementary classroom. iPads and 1:1 devices have changed how assistive communication is viewed as well as supporting materials (Maich & Hall, 2016). They add a way for students to self-monitor learning. Students found iPads have intuitive, interactive features that are appealing (Pilgrim, Bledsoe, & Reily, 2012, p. 18). Students can utilize built-in features to touch, swipe, listen, manipulate, explore, navigate, and take virtual walks to find their own paths to new learning. Students who refuse to write with a traditional paper-and-pencil approach may easily engage in iPad-based keyboarding or voice recognition applications as well as additional creative options (e.g., photos) for writing text (Maich & Hall, 2016). Students who learn at a significantly different level than the core grade level can unobtrusively engage in technology-based learning with the use of an iPad, an appropriate app, and headphones, it is an option for students who are self-conscience about their skills. Students can be directed to utilize apps to increase skill development in multiple domains,

such as fine motor and social skills learning, leading to increased ability and independence (Maich & Hall, 2016).

According to Gagne and Briggs (1979), in Wang and Sleeman (1994), the principles of instructional design included *contiguity*, *repetition*, and *feedback and reinforcement*. These principals are often embedded into the structure of apps (as cited by Musti-Rao et al., 2014, p. 155). This translates into continued practice by the student, with immediate feedback; traits that can benefit students who are struggling academically. Feedback lets students know that they are performing the skill correctly, or what they need to do differently if they are not performing it correctly.

Issues in the use of iPads and 1:1 devices in the elementary classroom. Studies examining comprehension of children reading e-books on iPads and 1:1 devices, found that students recall fewer narrative details when reading e-books and students can become distracted by animations or enhanced content (Chiong et al., 2012; de Jong & Bus, 2002). Because student achievement may be hindered by the use of technology, it becomes important to ensure that the iPad is used to enhance curricular integration and support and identified learning goals and not used for the purpose of technical integration or an instructional add-on (Harris &Hofer, 2009; Hutchison, Beschorner, & Schmidt-Crawford, 2012; Northrup & Killeen, 2013). According to Takacs, Swart, and Bus (2015), technology-enhanced stories are loaded with interactive features such as puzzles, memory tasks, amusing visual or sound effects, dictionary function, or word or picture labels appearing when activating hotspots on the screen. When these features were used during the narrative, it interrupted the student's ability to listen and comprehend the story because it disrupted the story. For this reason, it is important to look at the goal of using the app and ensure that the "extras" are congruent to the story without causing a block to comprehension.

Takacs et al. stated that animated pictures, sound, and music do not seem to distract students from the story text, when the nonverbal additions are meaningful to stories, boosting comprehension and vocabulary development. Rothschild (2011) described it as a "digital education prescription pad," which has the motivating ability to be customized to suit the needs of each individual student (as cited by Cumming & Rodriguez, 2013, p. 43).

Enhancing Effective Use of Interactive Technology in the Classroom

Teachers are essential in integrating technology in schools. They decide when, what, and how technology is used in the classroom, and in doing so they decide how students reap the benefits of technology. Ryan and Stiller (1991) addressed teachers' motivation in implementing technology in their classrooms. Uluyol and Sahin (2016) examined three different elements that motivate teachers to use technology in the classroom:

1. Incentives
2. Support
3. Benefits

In summary, incentives help teachers choose to use technology; support allows them to overcome challenges and keep up-to-date on emerging capabilities, and their observation of benefits for learning keeps them using technology. Research conducted by Strudler and Hearrington (2009) demonstrated that accessible support given by trained experts is essential to the successful utilization of classroom technologies; it has a direct impact on teachers' decisions to utilize technology in their classrooms. Support which focuses on creating accessible classrooms, providing one-on-one support, and teaching and encouraging technological collaboration with other educators should be available to teachers (Vanderlinde & Van Braak, 2010).

Teacher Background and Preparation

According to Miranda and Russell (2012) teachers' perceptions of the importance of classroom technology had the largest effect size of .42, this means that teachers perception concerning the use of technology in the classroom was the greatest determining factor as to whether it will be used in their classroom or not. The next variable in determining whether technology was used in the classroom was teachers' experiences with the use of technology with an effect size of .36 (Miranda & Russell, 2012). A teacher's confidence and his/her belief in the importance of using technology are linked. This suggested that teachers who have more experience with technology were more confident using it and may believe that using technology in the classroom is more important than do teachers who have not had much experience with technology (and who therefore have not built up their confidence with it).

O'Dwyer, Russell, and Bebell (2004) noted that it was essential that teachers be held accountable for the integration of technology into their classrooms. Those who believed they are accountable tend to connect students with technology and integrate it into their classrooms more often than those who do not perceive the same amount of institutional pressure of accountability (Miranda & Russell, 2012). Their study also demonstrated a strong connection between the integration of technology into the classroom and the value that the teacher places on that technology as an instructional tool. Teachers who value technological implementation tended to guide students to use technology more often as well.

The connection between teachers' experiences teaching with technology and teachers' confidence in using technology is also strong. Results found by Miranda and Russell (2012) suggested that teachers who have more experience teaching with technology were more confident in their ability to utilize technology than were less experienced teachers. Findings also

suggested that the level of confidence maybe a contributing factor to teacher's perceived importance of technology for instruction. Confidence and experience seem to be strong indicators of the extent to which technology is valued as a teaching tool. Experienced teachers may be more skillful at researching and implementing interactive technology.

A valuable point to be taken from Miranda and Russell's study (2012) was the need to build teachers' understandings of the wide array of benefits offered by interactive technology. This finding confirms Surry and Farquhar's (1997) earlier study which stressed the need to address teachers' beliefs concerning the role of technology in the classroom prior to implementing technological changes within the classroom (Miranda & Russell, 2012). Roblyer and Doering (2010) encouraged self-assessment as a beginning point for instructional decision making, evaluating understandings and thinking regarding technology integration.

Kimber and Wyatt-Smith, (2006) said it best:

> For teachers in the digital age, 'agency' implies being proactive—taking positive steps towards developing technology-based learning activities that engage and challenge learners. Basic prerequisites for such action include the teacher's epistemic knowledge of learning theories, familiarity with a range of technological applications, and willingness to experiment and step outside comfort zones and take risks. (p.21)

Teachers' primary objective is to engage their students in the curriculum and achieve academic standards. The extensive use of media and technology in everyday life, makes it even more necessary to ensure that students find the presentations of curriculum challenging, relevant, and engaging (Kimber & Wyatt-Smith, 2006).

Niess, Lee, and Sadri (2007) delineated a developmental progression of skills for teachers as they develop technology integration for instruction in the classroom. The researchers observed

teachers over three years of in-service on technology and found five levels of teachers' development for integrating technology at the point of instruction.

1. Knowledge, where teachers are in terms of their use of technology and their understanding the alignment of instructional content and appropriate use of technology to address course content.
2. Accepting, or persuasion, where teachers form opinions about teaching and learning with appropriate technology.
3. Choosing, where teachers interact with technology and make decisions about using it in teaching and learning of content with appropriate technology.
4. Implementation, where teachers actively integrate technology into teaching and learning of content materials.
5. Advancement, where teachers restructure curricula and evaluate the integration of technology on the teaching and learning of specific content. (Niess, et. Al., 2007, p. 312-313)

Angeli and Valandies (2009) proposed five competencies evaluating teacher's pedagogical and content knowledge, (TPCK) for using technology for developing quality instruction:

1. Identify topics with which the use of technology adds significant value, topics which students do not comprehend easily, or topics which teachers struggle to teach effectively;
2. Identify content representation where traditional means are difficult to utilize;
3. Identify teaching strategies that are difficult to implement using typical instructional processes;

4. Select technology based on pedagogical uses;

5. Identify learner-centered strategies where technology is an asset. (p. 309)

Connected with this progression is the need to focus on identifying: skills and abilities of teachers to effectively implement technology, amount and type of technology teachers need, factors impeding teachers from using technology, and finally, the types of supports required for teachers to implement technology in their classrooms (Padron et al., 2012).

Research suggested that teachers who have a constructivist approach to teaching and learning tend to use technology (Becker, 2000; Becker, Ravitz & Wong, 1999; Ertmer, Gopalakrishnan & Ross, 2001; Fisher, Dwyer & Yocam, 1996; Miranda, 2007; Miranda & Russell, 2011). O'Dwyer, Russell, and Bebell (2004, 2005) conducted a multilevel analysis of Use, Support, and Effect of Instructional Technology (USEIT) and found that teachers who believed in student-centered instruction were more likely to use technology in their instruction (Miranda & Russell, 2012). Traditional classrooms that focus on lecture, drill and memorization do not use as much technology in the classroom as do more student-centered classrooms (Collins & Halverson, 2009; Wenglinsky, 2005). Teachers' beliefs about technology are important predictors of how technology will be utilized within their classrooms. Thus, teachers who believe that technology is valuable and useful in instruction are more likely to make use of it in their classrooms than are those who do not believe in its efficacy or utility (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Russell, Bebell, O'Dwyer, & O'Connor, 2003). Other contributing factors to a teacher's use of technology in instruction are access, experience, and comfort level in its use (Becker, Raviz, & Wong, 1999; Guha, 2001; Miranda, 2007; Miranda & Russell, 2012, Russell, O'Dwyer, Bebell & Tao, 2007).

Classrooms in which teachers focus on socio-cognitive and constructivist approaches to learning, students are actively engaged in their environment; classrooms where problem-solving applications are central to the instructional guidance are more likely to make use of interactive technology (Kimber & Wyatt-Smith 2006).

Kimber and Wyatt-Smith stated:

> "'Meaningful learning will result when technologies engage learners in 'knowledge construction, not reproduction; conversation, not reception; articulation, not repetition; collaboration, not competition; [and] reflection, not prescription' (as cited in Jonassen, Peck, & Wilson, 1999, p. 16). Savery and Duffy (1995) also stressed the complex interplay of content, context, learner activity and learner goals in the learner acquisition of knowledge, advocating a problem-based learning model as their foundation to learning with hypertext" (p. 24)

Mayer in 2001 developed a theory of multimedia learning which addressed cognitive processing of verbal and visual material. His theory operated on three major assumptions:

1. Visual and auditory information are processed in separate areas.
2. Each area is limited in the amount which it can process at any one time.
3. For meaningful learning to occur, intentional focus needs to be given to selecting, organizing, and connecting new information to the students' background knowledge (Schmid, 2008).

Schmid's (2008) theory connected with the cognitive load theory from Sweller (1999) that addresses working memory and the students' ability to process multimedia information. Plass, Chun, Mayer, and Leutner (2003) also addressed this concept, acknowledging the relationship of limited capacity in working memory and the amount of information which can be

successfully learned. Some students who do not have prior knowledge about a subject will find that multimedia presentations require a complex cognitive effort on their part, as they will be forced to grapple with a wealth of information with which they were previously unfamiliar (Seufert, 2003). Since the students are expending so much cognitive energy merely engaging with this new information, they may not have the capacity required to complete the learning tasks associated with the presentation (Moreno, 2006; Schmid, 2008). Teachers need organizational support to help them understand how to integrate technology into the classroom, and that support needs to take both technical and pedagogical forms (Uluyol & Sahin, 2016).

> Yet the Organization for Economic Cooperation and Development (OECD, 2002) stated that only 28.2% of the World Wide Web educational sites included inquiry-based activities and only 5% included problem-solving or decision-making activities. The teacher is the curriculum designer for such activities, placing teacher agency as critical to their imaginative development and implementation. (Kimber & Wyatt-Smith, 2006, p. 25)

At the elementary level, Mueller, Wood, Willoughby, Ross, and Specht (2008) found that task-relevant and classroom-applicable experience were more important than ‘general’ training. The strongest indicator of a teacher’s continued use of technology in the classroom was the frequency with which that technology generates positive results. The study also noted that experiencing positive outcomes may increase teachers’ confidence in their technological acumen, which in turn may encourage them to continue utilizing technological solutions (Miranda & Russell, 2012). Since feeling at ease with technology was a key element of technology integration, appropriate training and the establishment of a support system were necessities which must be in place before implementation can effectively be achieved (Wood,

Mueller, Willoughby, Specht, & Deyoung, 2005). Even though training provided teachers with knowledge, it is imperative that teachers have access to continued guidance until they feel secure in the process.

Technology is ever-changing; this is one of the primary reasons why teachers struggle with using it in their classrooms on a consistent basis. Anderson, Wood, Piquette-Thmei, Savage, and Mueller (2011) found that 84% of the assistant requests by teachers were with computer hardware and software problems. When consistent assistance is available for teachers, requests for assistance decreased over time. Despite the overall consensus that continued support is important, studies found that fidelity is quite low, and can have a huge impact on efficacy of the process itself (McIntyre, Gresham, DiGennaro, & Reed, 2007).

Wood et al. (2005) noted that appropriate training for technology-based instructional programs helped to increase teachers' knowledge and reduce their anxiety. By increasing teachers' familiarity with technology and decreasing their anxiety with its use, it is possible to increase the extent to which those same teachers integrate technology into their classroom instruction (Mueller et al., 2008). Additional training also affords instructors the chance to continue to build their skills and expertise (Anderson et al., 2011). Thus, it is crucial to make sure that training and support are available at every stage of the integration process (Archer et al., 2014).

Summary

The review of literature examined the relevant strengths of interactive technology in the classroom and the support that teachers need to implement technology to benefit students.

Interactive technology offers opportunities for instructors to reach beyond the classroom and build on learning experiences in a variety of disciplines utilizing instructional materials

found beyond the classroom itself. School support for teachers to access technology resources and effectively engage students in the manipulation of the devices is paramount to a strong eductation system (U.S. Department of Education, 2017).

The review of the literature closely examined what is needed for effective technology implementation in elementary classrooms. Chapter 3 explains the methods for collecting and analyzing the survey data.

Chapter 3: Methodology

The contents of Chapter 3 includes the study's purpose, research questions, participants, human subject approval, instruments of data collection and analysis, research design, procedures and timeline, and a summary of methodology.

Study Purpose

The purpose of the mixed-method study was to determine how school and district leaders can provide support and resources to elementary classroom teachers in the implementation and use of interactive technology in the elementary classroom. The study examined resources provided to teachers to actively engage students in using interactive technology in meaningful instruction to increase student engagement, motivation, and ultimately learning outcomes.

As the literature review revealed, there has been minimal research conducted on the specific supports and resources needed from the district and school leaders for elementary classroom teachers to effectively implement interactive technology as a teaching/learning tool.

Research Questions

The study was focused on five guiding questions:

1. What resources and supports did select school district superintendents, technology personnel, and principals report were provided to elementary classroom teachers to support their use of interactive instructional technology in their classrooms?
2. What resources and supports did select elementary classroom teachers report were provided to support their use of interactive instructional technology in their classrooms?

3. What did select elementary classroom teachers report as the frequency of their use of specific methods of interactive technology in their classrooms?
4. What resources and supports did select elementary classroom teachers report were essential to implement interactive technology in their classrooms?
5. What types of interactive technologies did select elementary classroom teachers report were used for assessment, instruction and student activities?

Participants

The researcher conducted the study in three select Minnesota school districts which were identified through data obtained from Technology and Information Educational Services (TIES), a Minnesota-based educational technology collaborative owned by 48 member districts. These sites were chosen based on the recommendation from TIES having strong interactive technology resources and district support. Since the school districts which agreed to participate in the study represented 6.25% of the school districts which belong to the Minnesota-based educational technology collaborative, the researcher concluded the data gathered and conclusions drawn would not be generalizable to all Minnesota school districts connected to TIES support services.

The study secured participation of school administrators, technology specialists, technology integrationists, and elementary classroom teachers from each of the three participating Minnesota school districts. The total of study participants surveyed was 100 individuals and included administrators, technology specialists, technology integrationists, and elementary classroom teachers (Appendices A-C).

Human Subject Approval-Institutional Review Board

The researcher's training on the conduct of a study involving human subjects was completed on June 25, 2014, certification number is 1493994. (Appendix D)

Following approval of the preliminary study design by the researcher's doctoral committee on November 28, 2017, the study design was submitted to the Instructional Review Board (IRB) for review on December 11, 2017 (Appendix E). Final approval was secured from the IRB on March 30, 2018. Data collection measures, analysis and instruments included proper controls to ensure confidentiality for all participants and establish that no damage would occur to the school districts or participants associated with those school districts. The approval document from the IRB is included as Appendix F.

Instruments for Data Collection and Analysis

Three data collection tools were used in the study to gather information on respondents' perceptions of the resources and supports provided to ensure implementation of interactive technology in the elementary classroom.

There were three data collection tools. The first data collection instrument was administered to district leaders using ten questions asking their perceptions on resources and supports for implementation of interactive technology (Appendix G). The second data collection instrument was administered to elementary classroom teachers, and consisted of twenty questions, ten of which were forced questions on the resources and supports on the implementation of interactive technology and three multiple choice questions which allowed elementary classroom teachers to choose from a variety of options related to different interactive devices that they use in their instructional delivery and seven on the frequency of technology implementation in their elementary classroom (Appendix H).

The third data collection instrument focused on one-on-one phone interview opportunities provided to twenty-seven study respondents who volunteered to expand upon survey questions with the researcher. The follow-up phone interview was comprised of three (3) questions asking

about the resources and support available (Appendix J). These additional questions were to deepen the information obtained by the initial SurveyMonkey instrument. The follow-up interview sought further specifics about support and resources needed for elementary classroom teachers to enable them to implement interactive technology in the elementary classroom as well as identifying strengths and challenges of using interactive technology in the elementary classroom.

The study participants required time for completing the online data collection instrument was 7-10 minutes. Results were obtained from the internet-based SurveyMonkey program and complied by the Center for Statistics at St. Cloud State University, St. Cloud, MN (Appendix I).

Validity and reliability of the data collection instruments were established through an initial review of those instruments by a panel of experts, comprised of three St. Cloud State University professors of educational administration, one retired Concordia University professor of professional education, and examination by and feedback from members of St. Cloud State University doctoral cohort.

The Center for Statistics at St. Cloud State University prepared the survey and provided the informed consent agreement and electronic survey link for distribution to participants by email (Appendices K-M).

Using three data collection instruments in the research study was purposefully undertaken to enhance instrument validity through triangulation. Slavin (2007) defined triangulation as "…supporting conclusions using evidence from different sources" (p. 133). Using the mixed method should develop a more accurate picture of what is in place to create successful systems in a district.

Research Design

The research methodology for the study was a mixed method design, employing both quantitative and qualitative approaches. According to Creswell (2008), "qualitative and quantitative research in combination, provide a better understanding of a research problem or issue than ether research approach alone."

The researcher gathered quantitative data from five stakeholder groups which included: district and school leaders, district technology specialists, elementary school technology integrationists, and elementary classroom teachers. The respondents were surveyed through administration of online-based research tool, SurveyMonkey (Appendices F-G).

Further, the researcher gathered qualitative data from smaller subset of the sample group who volunteered to provide depth of understanding about the quantitative responses of sample group members. Creswell (2014) explained that collecting the data means that the analysis of one data set is used to lead into or build into the second data set.

Texas and Massachusetts School Technology and Readiness Chart (STaR Chart) was used as the template for developing the survey questions and interview questions. Components of this chart focused on four areas: Teaching and Learning, Educator Preparedness and Development, Administration and Support Services, and Infrastructure for Technology as well as using the Technology Integration Rubric, Massachusetts STaR Chart (School Technology and Readiness Chart), (2006) Texas Education Agency Educational Technology Advisory Committee (ETAC) (2006).

Procedures and Timeline

Following approval of the researcher's study and instrumentation by the St. Cloud State University Institutional Review Board, the study's data collection process was initiated in April 2018 and concluded in May 2018.

With the assistance from the superintendents of the three participating school districts, the school districts secured email addresses of potential respondent stakeholders, including district and school leaders, district technology specialists, elementary school technology integrationists, and elementary classroom teachers. Each school district electronically mailed potential respondents a brief description of the study's purpose and an invitation for participation in the study (Appendix N). Following respondents' agreement to participate, the school districts' superintendent distributed the SurveyMonkey instrument provided by the researcher, and requested respondents to complete their surveys.

Upon completion of the survey, respondents were asked to specify if they were willing to participate in a one-on-one phone interview with the researcher, and, if so, to indicate potential dates and times of their availability along with their email addresses and contact telephone numbers. The follow-up interviews were classified as structured interviews. Creswell (2014) identified interviews questions as few in number with the intention to obtain views and opinions from the participants. The phone interviews were conducted in May. The researcher sought and obtained permission to audiotape all interviews (Appendix O).

After each one-on-one interview, the participants received a non-coded transcript of the interview to ensure accuracy (Appendix P) . Participants were asked if there were additional remarks that should or could be added to the transcript. Follow-up communication occurred as was necessary.

Summary

The methodology employed in the study was a mixed method approach, using both qualitative and quantitative measures. Three data collection tools were used in the study to gather information on respondents' perceptions of the resources and supports provided to ensure implementation of interactive technology in the elementary classroom,

The first data collection instrument in the study was a ten question, online survey which contained ten forced-choice questions focused on district leaders' perceptions on their supports and resources for implementation of interactive technology in the elementary classroom. The second survey instrument in the study is a twenty question, online survey which contained 10 forced-choice questions focused on elementary classroom teachers' perceptions on districts support and resources provided to enable them to integrate interactive technology into their instruction. There were also three questions which allow elementary classroom teachers to choose from a variety of options related to different interactive devices that they use in their instructional delivery, the other seven questions address teachers perceptions of the importance of supports and resources needed to effectively use interactive technology in their instruction. The third data collection instrument focused on one-on-one interview opportunities provided to study respondents who volunteered to expand upon survey questions with the researcher in person. Total study participants surveyed included: district administrators, district technology specialist, school technology integrationists, and classroom elementary teachers.

In addition to a description of the study methodology, participants, and instrumentation, Chapter 3 provided a description of the human subject approval, research design, data collection and analysis, along with procedures and timeline. Results of the study are described in Chapter 4 and organized by research questions.

Chapter 4: Results

School leadership focuses on effective and efficient instruction in the classroom (Cranston, 2013). School leaders are expected to employ research-based strategies and provide teachers with a variety of tools, such as interactive technology, to help improve student's academic achievement (Cranston 2013). Interactive technology is a form of Computer-Assisted Instruction (CAI) that enhances instructional delivery, engages students in the lessons and enables teachers to obtain feedback on skill development to ensure student growth. Interactive technology ensures students are interactive and engaged therefore motivated to learn the concepts being taught (Musti-Rao et al., 2014).

There are a variety of interactive technologies used in school classrooms. Interactive whiteboards have been employed in elementary classrooms since the 1990. School systems have Internet access, of which 97% have high-speed connections (Miranda & Russell 2012). Student-to-computer ratio was close to 4:1 in 2008 (Clausen et al., 2008), and hundreds of school districts have implemented 1:1 iPad or Chromebook programs. Even though billions of dollars are spent on technology equipment in the schools, teachers are not using technology to its full potential (Smith & Throne, 2007, p. 47). Welk and Welk (2017) found that only 25% of teachers used technology in their classrooms (p. 15). The American Association of School Administrators reported that principals had great concerns about the low usage of technology in their schools (AASA, 2014).

Study Purpose

The purpose of the mixed-method study was to determine how school and district leaders can provide support and resources to elementary classroom teachers in the implementation and use of interactive technology in the elementary classroom. The study examined resources

provided to teachers to actively engage students in using interactive technology in meaningful instruction to increase student engagement, motivation, and ultimately learning outcomes.

As the literature review revealed, there has been minimal research conducted on the supports and resources needed from the district and school leaders for elementary classroom teachers to effectively implement interactive technology instruction for student learning.

Research Questions

The study was focused on five critical questions:

1. What resources did select school district superintendents, technology personnel, principals, report were provided to elementary classroom teachers to support use interactive instructional technology in their classrooms?
2. What did select elementary teachers report as their frequency of use of specific methods of interactive technology in their elementary classrooms?
3. What resources and supports did select elementary classroom teachers report were essential to implement interactive technology in their elementary classrooms?
4. What did select elementary teachers identify as the level of importance of the specific district and site resources/supports needed for the integration of interactive technology in the elementary classroom?
5. What types of interactive technologies did select elementary teachers report were used for assessment, instruction and student activities?

Research Design

The research methodology employed in the study was a mixed method design, employing both quantitative and qualitative approaches. The researcher gathered quantitative data from five stakeholder groups which included: district and school leaders, district technology specialists,

elementary school technology integrationists, and elementary classroom teachers. The respondents were surveyed through administration of online-based research tool, SurveyMonkey (Appendices F-G).

Further, the researcher gathered qualitative data from smaller subset of the elementary teacher sample group who volunteered to provide depth of understanding about the quantitative responses of group members.

Three school districts in Minnesota were identified as implementing interactive technology in their elementary classrooms. The administrative survey was distributed to 80 individual district and school leaders, district technology specialists, and elementary school technology integrationists in those districts. There were 20 responses to the survey. Fifteen (15) were completed for a 18.75% return rate from the district and school leaders, district technology specialists, and elementary school technology integrationists. The elementary classroom teacher survey was distributed to 400 teachers with 81 teacher respondents for a 20.3% return rate. At the conclusion of the survey was an invitation to volunteer to participate in a phone interview. Although 28 respondents checked yes–that they would agree to a phone interview–only nine (9) provided their email address for contact purposes. Of the nine respondents six (6) participated in a one-on-one interview.

The following tables provide detailed data regarding the four research questions developed by the researcher of the study. The first research question guiding the study was "What resources and supports did district superintendents, technology personnel, and principals report were provided to elementary classroom teachers to support the use of interactive instructional technology in their classrooms?".

Research Question One

In addressing the first research question, the researcher analyzed responses to questions 1-10 on the survey. Participants were asked to indicate their district's level of support using a modified Likert scale, employing the following response categories: initiated, defined as limited support/resources shared by several elementary schools; developing, defined as regular access to support/resources including site-based support; or demonstrated, defined as advanced implementation of support/resources including site-based support with ongoing interaction with teachers.

The first survey question focused on the level of on-site technical support. The frequency data for this question are found in Table 1.

Table 1

The Level of On-site Resource Support Reported by District and School Leaders, District Technology Specialists, and Elementary Technology Integrationists

(n = 15)

Response	Frequency	Percent
Initiating	1	6.7%
Developing	6	40.1%
Demonstrating	8	53.3%
Total	15	100%

Table data reveal that 53.3% (n = 8) identified their district as demonstrating district-wide on-site technical support, while 40.1% (n = 6) of respondents identified their district as developing. Only one respondent indicated that his/her district was initiating district-wide on-site technical support.

The second question in the survey asked respondents to express level of support of professional development provided to elementary teachers.

Table 2

Professional Development for Elementary Teachers, Both Periodic and On-going, Focused on Interactive Technology for Instruction

(n = 15)

Response	Frequency	Percent
Initiating	3	20.0%
Developing	8	53.3%
Demonstrating	4	26.7%
Total	15	100%

Table 2 data reveal that the majority of respondents or 53.3% (n = 8) indicated their districts were at the developing stage. Of the 15 respondents, 26.7 % (n = 4), identified their school district as demonstrating professional development for teachers focused on interactive technology for instruction 20.0% (n = 3), identified their district as initiating the use of professional development focused on interactive technology for instruction.

The third question in the survey examined Internet connectivity in all classrooms. The frequency data for this question are reported in Table 3.

Table 3

Internet Connectivity in all Classrooms

(n = 15)

Response	Frequency	Percent
Initiating	1	6.7%
Developing	1	6.7%
Demonstrating	13	86.6%
Total	15	100%

The largest number of respondents 86.6% (n = 13), indicated their districts were demonstrating Internet connectivity in all classrooms. Of the remaining two respondents, one identified his/her school district as initiating, and one identified his/her district as developing.

The fourth question in the survey asked about technology to support/enhance learning for all students, including special needs students. The frequency data for this question are reported in Table 4.

Table 4

Technology to Support/enhance Learning for all Students, Including Special Needs Students

(n = 15)

Response	Frequency	Percent
Initiating	1	6.7%
Developing	9	60.0%
Demonstrating	5	33.3%
Total	15	100%

The majority of the respondents, 60% (n = 9), responded that their district was at the developing level and 33.3% (n = 5), identified themselves as in the demonstrating level in the use of technology to support/enhance learning for all students. Only one respondent identified his/her district as initiating in using technology to support /enhance learning for all students.

Question number five in the survey asked the level of support for individual and class-wide technology needs (e.g., equipment, content access). The frequency data for this question are reported in Table 5.

Table 5

Support for Individual and Class-wide Technology Needs (e.g., equipment, content access).

(n = 15)

Response	Frequency	Percent
Initiating	1	6.7%
Developing	8	53.3%
Demonstrating	6	40.0%
Total	15	100%

Table 5 data reveal that 93% (n = 14), identified their school district as either developing or demonstrating support for individual and class-wide technology needs. Only one respondent, or indicated that his/her district was at the initiating level of implementation.

Question six in the survey asked about the provision of professional development in instructional technology for new teaching staff. The frequency data for this question are indicated in Table 6.

Table 6

Provision of Professional Development in Instructional Technology for New Teaching Staff

(n = 15)

Response	Frequency	Percent
Initiating	5	33.3%
Developing	8	53.0%
Demonstrating	2	13.3%
Total	15	100%

Data in Table 6 show that 86.3 % (n = 13), responded that their district was either initiating or developing professional development in instructional technology for new teaching staff. There were 13.3 (n = 2), who responded that their school district was at the demonstrating level.

Question 7 of the survey focused on district-wide expectations that teachers will use technology as a component of instruction. The frequency data for responses to this question are shown in Table 7.

Table 7

District-wide Expectations that Teachers Will Use Technology as a Component of Instruction

(n = 15)

Response	Frequency	Percent
Initiating	2	13.3%
Developing	6	40.0%
Demonstrating	7	46.7%
Total	15	100%

Table 7 data reveal that 46.7% (n = 7), reported district-wide expectations that teachers will use technology as a component of instruction is at the demonstration level, and an additional 40% (n = 6), identified their district at the developing level. Only 13.3% (n = 2), identified their district at the initiating level.

The eighth question on the survey asked the level of support for anytime learning (e.g., just-in-time support, online content) available to teachers and students through a variety of delivery systems to support the use of technology in each classroom. The frequency data for this question are found in Table 8.

Table 8

Anytime Learning (e.g., just-in-time support, online content) *is Available to Teachers and Students Through a Variety of Delivery Systems to Support the Use of Technology in Each Classroom*

(n = 15)

Response	Frequency	Percent
Initiating	2	13.3%
Developing	8	53.3%
Demonstrating	5	33.3%
Total	15	100%

The table data show that the largest number of respondents 53.3% (n = 8), indicated anytime learning (e.g., just-in-time support, online content) is available to teachers and students through a variety of delivery systems to support the use of technology in each classroom. Another 33.3% (n = 5), identified that their district was at demonstrating level and 13.3% (n = 2), indicated their district at the initiating level.

Question nine of the survey asked about the level of encouragement of the development of a school and community culture that supports integration of technology instruction. The frequency data are reported in Table 9.

Table 9

Encouragement of the Development of a School and Community Culture that Supports Integration of Technology Instruction

(n = 15)

Response	Frequency	Percent
Initiating	1	6.7%
Developing	10	66.7%
Demonstrating	4	26.7%
Total	15	100%

Table 9 data reveal that the majority of respondents, 66.7% (n = 10), identified their school district at the developing level for the encouragement of the development of a school and community culture that supports integration of technology instruction. Of the remaining respondents, 26.7% (n = 4), respondents indicated their district is at the demonstrating level and one respondent reported his/her district at the initiating level.

The tenth and final question of the survey asked respondents about the use of PLCs to encourage and assess the use of interactive technology to enhance student learning. The frequency data to survey question ten are reported in Table 10.

Table 10

PLCs Encourage and Assess the Use of Interactive Technology to Enhance Student Learning

(n = 15)

Response	Frequency	Percent
Initiating	4	26.7%
Developing	5	33.3%
Demonstrating	6	40.0%
Total	15	100%

Table 10 data reveal that 40% (n = 6) of respondents that their school districts are at the demonstrating level, 33.3% (n = 5), identified their district at the developing level in terms of utilizing PLCs to encourage and assess the use of interactive technology to enhance student learning, and 26.7% (n = 4), identified that their district is at the initiating level.

Tables 1-10 provide data regarding the level resources and supports that district superintendents, technology personnel, and principals identified were provided to elementary classroom teachers to support the use of interactive instructional technology in their classrooms.

Research Question Two

A second research question asked, "What did select elementary teachers report as their frequency of use of specific methods of interactive technology in their elementary classrooms?"

In addressing the second research question, the researcher analyzed responses to questions one through six on the teacher survey. The teacher survey was distributed to 400 elementary teachers in three Minnesota school districts with 81 teachers who responded, a 20.25% return rate. Of those 81 teachers only 71 participants completed this section. Participants were asked to rate their perceptions identifying how frequently they use each interactive technology activity in their classroom, using a modified Likert scale using four choices: daily, several times a week, once a week or NA (not applicable).

The first survey question focused on the use of technology for presentation and interactive student activities (communication, production, collaboration). The frequency data for this question are found in Table 11.

Table 11

Use of Technology for Presentation and Interactive Student Activities

(n = 71)

Response	Frequency	Percent
Once a week	4	5.6%
Several times a week	11	15.5%
Daily	53	74.6%
NA (not applicable)	3	4.2%
Total	71	100%

Table data reveal that 74.6% (n = 53) identified that they use technology presentation and interactive student activities (communication, production, collaboration), while 15.5% (11)

utilize it several times a week. Only four respondents, 5.6% (n = 4) reported they used technology once a week, and 4.2% (n = 3) selected the NA response.

The second question in the survey asked respondents to how they often use technology to access information to deepen lessons and student engagement. Table 12 shows the frequency data for this question.

Table 12

Use of Technology to Access Information to Deepen Lessons and Student Engagement

(n = 71)

Response	Frequency	Percent
Once a week	5	7.0%
Several times a week	22	31.0%
Daily	42	59.2%
NA (not applicable)	2	2.8%
Total	71	100%

Table 12 data reveal that the majority of respondents or 90.2% (n = 64) indicated they used technology to access information to deepen lessons and student engagement several times a week or daily. Five respondents, (7%) identified that they use it once a week and 2.8% of respondents (n = 2) indicated not applicable.

The third question in the survey examined the use of technology to support higher level learning objectives. The frequency data for this question are reported in Table 13.

Table 13

Use Technology to Support Higher Level Learning Objectives

Response	Frequency	Percent
Once a week	11	15.5%
Several times a week	24	33.8%
Daily	29	40.8%
NA (not applicable)	7	9.9%
Total	71	100%

The largest number of respondents 74.6% (n = 53), indicated they use technology to support higher level learning objectives either daily or several times a week and 15.5% (n = 11) identified using it once a week. Seven respondents reported not applicable.

The fourth question in the survey asked about teachers encouraging students to choose and use technology appropriate to assigned tasks. The frequency data for this question are reported in Table 14.

Table 14

Encourage Students to Choose and Use Technology Appropriate to Assigned Tasks

Response	Frequency	Percent
Once a week	16	22.5%
Several times a week	20	28.2%
Daily	17	23.9%
NA (not applicable)	18	25.4%
Total	71	100%

The results for this question are fairly equally distributed. The number of respondents that identified encouraging students to use technology appropriate to assigned tasked once a week was 22.5% (n = 16), while 28.2% (n = 20) indicated several times a week, 23.9% (n = 17) responded daily, and 25.4% indicated it was not applicable.

Question number five in the survey inquired about involving students in identifying a range of ways of using technology to achieve curricular objectives. The frequency data for this question are reported in Table 15.

Table 15

Involve Students in Identifying a Range of Ways of Using Technology to Achieve Curricular Objectives

Response	Frequency	Percent
Once a week	19	26.8%
Several times a week	18	25.4%
Daily	9	12.9%
NA (not applicable)	25	35.2%
Total	71	100%

Table 15 data reveal that 35% (n = 25) respondents identified not applicable as their response to the survey question. There were 26.8% (n = 19) of respondents who selected once a week, and 25.4 % (n = 18) indicated they involved students in identifying a range of ways of using technology to achieve curricular objectives as several times a week. Nine respondents (12.9%) chose daily as their response to how often they involved students in identifying a range of ways to use technology to achieve curricular objectives.

Question six in the survey asked about the use of on-site technical support for collaboration and pedagogical guidance. The frequency data for this question are indicated in Table 16.

Table 16

Use On-site Technical Support for Collaboration and Pedagogical Guidance

Response	Frequency	Percent
Once a week	20	28.2%
Several times a week	11	15.5%
Daily	5	7.0%
NA (not applicable)	35	49.3%
Total	71	100%

Data in Table 16 show that 43.7% (n = 31), responded that they use on-site technical support for collaboration and pedagogical guidance either once a week or several times a week. Five respondents (7%), indicated they do so daily, while 49.3% (n = 35) indicated the question was not applicable.

Research Question Three

A third research question asked, "What resources and supports did select elementary classroom teachers report were essential to implement interactive technology in their elementary classrooms?"

In addressing the third research question, the researcher analyzed responses to questions eleven through twenty on the teacher survey. The teacher survey was distributed to 400 elementary teachers in three Minnesota school districts with 81 teachers who responded, a 20.3% return rate. Of those 81 teachers, 67 participants completed all questions while 65 only completed question eleven. Participants were asked to rate their perceptions of the importance of specific district and site resources/supports needed for the integration of interactive technology in elementary classrooms using a modified Likert scale using four choices: essential, important, somewhat important, or not important.

Question eleven focused on the importance of on-site technical support. The frequency data for this question are found in Table 17.

Table 17

On-Site Technical Support

(n = 65)

Response	Frequency	Percent
Not important	4	6.2%
Somewhat important	9	13.8%
Important	23	35.4%
Essential	29	44.6%
Total	65	100%

Table data reveal that 90% (n = 52) identified that on-site technical support is essential or important in order to use interactive technology in their classroom. Of the respondents, 13.8% (n = 9) identified the resource as somewhat important, while 6.2% (n = 4) identified it as not important.

The twelfth question in the survey asked respondents to express the importance of professional development for teachers, both periodic and on-going focused on interactive technology for instruction. The frequency data for this question are found in Table 18.

Table 18

Professional Development for Teachers, both Periodic and On-going, Focused on Interactive Technology for Instruction

(n = 67)

Response	Frequency	Percent
Not important	0	0
Somewhat important	11	16.4%
Important	27	40.3%
Essential	29	43.3%
Total	67	100%

Table 18 data reveal that the majority of respondents 83.6% (n = 56) identified having professional development provided as either essential or important in using interactive technology effectively in the elementary classroom. The next largest number of respondents, 16.4% (n = 11), identified it as somewhat important. None of the respondents selected not important.

The thirteenth question in the survey examined the importance of internet connectivity in all rooms. The frequency data for this question are reported in Table 19.

Table 19

Internet Connectivity in all Rooms

(n = 67)

Response	Frequency	Percent
Not important	0	0
Somewhat important	1	1.5%
Important	4	6.0%
Essential	62	92.5%
Total	67	100%

The largest number of respondents, 92.5% (n = 62), indicated that internet connectivity in all rooms is essential for using interactive technology in the classroom. Of the remaining five respondents, 6.0% (n = 4) identified it as important and 1.5% (n = 1) indicated it was somewhat important.

The fourteenth question in the survey asked about the use of technology to support/enhance learning for all students, including special needs students. The frequency data for this question are reported are reported in Table 20.

Table 20

Technology to Support/Enhance Learning for all Students, including Special Needs Students

(n = 67)

Response	Frequency	Percent
Not important	1	1.5%
Somewhat important	1	1.5%
Important	24	35.8%
Essential	41	61.2%
Total	67	100%

The majority of the respondents 61.2% (n = 41), responded that it is essential for technology to support/enhance learning for all students, including special needs students. A lesser number of respondents, 35.8% (n = 24) identified this as important, with one respondent (1.5%) who identified it as somewhat important, and one (1.5%) indicated it was not important.

Question number fifteen in the survey asked how important support for individual and class-wide technology needs (e.g., equipment, content access) was for implementing interactive technology in the elementary classroom. The frequency data for this question are reported in Table 21.

Table 21

Support for Individual and Class-Wide Technology Needs (e.g., equipment, content access)

(n = 67)

Response	Frequency	Percent
Not important	2	3.0%
Somewhat important	0	0%
Important	22	32.8%
Essential	43	64.2%
Total	67	100%

Table 21 data reveal that 97.0% (n = 65) responded that it was either important or essential to have support for individual and class-wide technology needs. Of the remaining respondents, 3.0% (n = 2), responded that it was not important.

Question sixteen in the survey asked about the importance for the provision of professional development in instructional technology for new teaching staff. The frequency data for this question are indicated in Table 22.

Table 22

Provision of Professional Development in Instructional Technology for New Teaching Staff

(n = 67)

Response	Frequency	Percent
Not important	0	0%
Somewhat important	9	13.4%
Important	32	47.8%
Essential	26	38.8%
Total	67	100%

Data in Table 22 show that 86.6% (n = 58), responded that having a provision of professional development in instructional technology for new teaching staff is either important or essential in enabling teachers to use interactive technology in the elementary classroom. Nine respondents (13.4%) reported it was somewhat important.

Question 17 of the survey focused on the importance of district-wide expectations that teachers will use technology as a component of instruction. The frequency data for responses to this question are shown in Table 23.

Table 23

District-Wide Expectations that Teachers Will Use Technology as a Component of Instruction

(n = 67)

Response	Frequency	Percent
Not important	5	7.5%
Somewhat important	21	31.3%
Important	33	49.3%
Essential	8	11.9%
Total	67	100%

Table 17 data reveal that 80.6% (n = 54), reported district-wide expectations that teachers' use of technology as a component of instruction as either somewhat import or important, whereas 11.9% (n = 8) identified it as essential. The remaining 7.5% (n = 5) of respondents indicated that it was not important.

The eighteenth question on the survey asked the importance that anytime learning (e.g., just-in-time support, online content) is available to teacher and students through a variety of delivery systems to support the use of technology in each classroom. The frequency data for this question are found in Table 24.

Table 24

Anytime Learning (e.g., just-in-time support, online content) *is Available to Teacher and Students through a Variety of Delivery Systems to Support the Use of Technology in Each Classroom.*

(n = 67)

Response	Frequency	Percent
Not important	3	4.5%
Somewhat important	16	23.9%
Important	35	52.2%
Essential	13	19.4%
Total	67	100%

The table data show that the largest number of respondents 52.2% (n = 35), indicated anytime learning (e.g., just-in-time support, online content) is available to teacher and students through a variety of delivery systems to support the use of technology in each classroom is important. Another 23.9% (n = 16) indicated that it was somewhat important and 19.4% (n = 13), identified it as essential. The fewest number of respondents, 4.5% (n = 3) reported that it was not important.

Question twenty-five of the survey asked about the importance of encouragement of the development of a school and community culture that supports integration of technology instruction. The frequency data are reported in Table 25.

Table 25

Encouragement of the Development of a School and Community Culture that Supports Integration of Technology Instruction

(n = 67)

Response	Frequency	Percent
Not important	1	1.4%
Somewhat important	14	20.9%
Important	34	50.8%
Essential	18	26.9%
Total	67	100%

Table 25 data reveal that the majority of respondents 77.7% (n = 52), identified encouragement of the development of a school and community culture that supports integration of technology instruction as either important or essential. Of the remaining respondents, 20.9% (n = 14) respondents indicated that it was somewhat important and one respondent (1.4%) reported that it was not important.

The twentieth and final question of the survey asked respondents about the level of importance providing PLCs used to encourage and assess interactive technology to enhance student learning. The frequency data to survey question 20 is reported in Table 26.

Table 26

PLCs Used to Encourage and Assess Interactive Technology to Enhance Student Learning

(n = 67)

Response	Frequency	Percent
Not important	9	13.4%
Somewhat important	15	22.4%
Important	34	50.8%
Essential	9	13.5%
Total	67	100%

Table 26 data reveal that 50.8% (n = 34) identified PLCs used to encourage and assess interactive technology to enhance student learning as important, 22.4% (n = 15) identified it as somewhat important, 13.4% (n = 9) identified it as essential, whereas the same percentage, 13.5% (n = 9) indicated that it was not important.

In summary, Tables 17-26 provided data regarding elementary classroom teachers rated perceptions of the importance of the specific district and site resources/supports needed for the integration of interactive technology in elementary classrooms.

Research Question Four

A fourth research question asked, "What did select elementary teachers identify as the level of importance of the specific district and site resources/supports needed for the integration of interactive technology in the elementary classroom?"

In addressing the fourth research question, the researcher analyzed responses to questions eight, nine, and ten on the teacher survey. Participants were asked to select all interactive devices

they utilize in their classroom. They were able to identify multiple devices in response to these questions. The response categories were identified as computer-based tools, digital recording devices, electronic portfolios, other and NA (not applicable). The teacher survey was distributed to 400 elementary teachers in three Minnesota school districts with 81 teachers who responded, a 20.3% return rate. Of those 81 teachers 69 participants completed this section.

Question eight focused on the types of technologies they use to create flexible assessments for all students. The frequency data for this question are found in Table 27.

Table 27

Technologies Used to Create Flexible Assessments for all Students

(n = 96 responses)

Response	Frequency	Percent
computer-based tools	47	49.0%
digital recording devices	11	11.4%
electronic portfolios	11	11.4%
other	6	6.3%
NA (not applicable)	21	21.9%
Total	96	100.0%

Table data reveal that 49.0% (n = 47) identified computer-based tools as utilized to create flexible assessments for all students. Additionally, respondents identified digital recording devices and electronic portfolios the same as 11.4% (n = 11) for each and, 6.3% (n = 6) respondents identified ‘other’ as their technology tools. A total of 21.9% (n = 21) shows the NA response to this survey question.

The ninth question in the survey asked respondents to identify types of interactive technology devices they use in their elementary classroom for instruction. Table 28 provides the frequency data for this question.

Table 28

Types of Interactive Technology Devices Used in Elementary Classroom for Instruction

(n = 127)

Response	Frequency	Percent
Interactive whiteboard	54	42.5%
iPads	24	18.9%
Chromebooks	41	32.3%
Other 1:1 devices	5	3.9%
NA	3	2.4%
Total	127	100%

The majority of respondents, 42.5% (n = 54) identified interactive whiteboards as an interactive technology device used in their elementary classrooms for instruction. Chromebooks were used by 32.3% (n = 41), iPads were utilized by 18.9% (n=24), other 1:1 devices respondents identified 3.9% (n = 5) by the teachers surveyed. 2.4% (n = 3) respondents indicated that these devices were not applicable.

The tenth question of the survey examined the type of interactive technology devices their students use in their elementary classroom. The frequency data for this question are reported in Table 29.

Table 29

Type of Interactive Technology Devices Students Use in the Elementary Classroom

(n = 129)

Response	Frequency	Percent
Interactive whiteboard	46	35.7%
iPads	31	24.0%
Chromebooks	47	36.4%
Other 1:1 devices	3	2.3%
NA	2	1.6%
Total	129	

When looking at the number of respondents that identified interactive devices utilized by their students in their classrooms the top two devices were the interactive whiteboard 35.7% (n = 46) and Chromebooks with 36.4% (n = 47) other respondents, 24.0% (n = 31), identified iPads as being utilized, 2.3% (n = 3) indicated other 1:1 devices, and 1.6% (n = 2) identified NA.

Research Question Five

Research question five asked "What resources did the select elementary classroom teachers report that were essential for them to implement interactive technology in their elementary classrooms?"

In addressing this question, the researcher looked at data from two sources, the interview questions on the teacher survey questions eight through thirteen. The interviews were conducted with six elementary classroom teachers. At the end of the teacher survey, participants were ask if they were willing to participate in a 4-question phone interview. Of the 81 respondents, 61 answered the question. Twenty-eight responded that they would be willing to participate, however, of those 28, only nine provided their email address for researcher contact. The researcher emailed a Doodle poll to the respondents asking them to identify a day and time in which they would be willing to complete a phone interview. Of those, only two responded. After two email reminders were sent to those indicating they agreed to be interviewed, a total of six participants were interviewed.

The researcher utilized "Virtual Classroom" available through the university D2L system to conduct interviews. A link was sent to each interviewee through email the day before the interview which provided a copy of the interview questions. A half hour before the stipulated interview time, the interviewer sent the interviewee a phone number along with a code so they could call in if they preferred. The interviews ranged in time from 8 minutes to 15 minutes in

length. The researcher utilized a program available through St. Cloud State University for recording the interview and for transcript creation. After the transcript was reviewed, each interviewee was sent an email with only their responses to review to ensure their dialog was accurate.

Interview question one asked, " What do you believe are the three most important district or site resources that have helped you successfully implement interactive technology in your elementary classroom?"

Key district or site resources identified, one was technology, and the other was human resources. Participant One focused on what she used everyday in her classroom, "something I use on a daily basis. So, it would be my Smartboard, and my document camera, and my laptop, and actually, I have four, because with the Smart Board, I have to have notebook software." This concept was shared by participants Two, Four, Five , and Six. Participants Two and Four identified 1:1 devices such as iPads or Chromebooks as important resources. Participant Two's indicated that Chromebooks were available. "…students have instant access, makes it easier for me to plan…" Participant Two found using Google Suites "students had everything in one spot …really helpful…especially to elementary students." Participants Five and Six commented on Smartboard use. Participant Five addressed the acquisition of the Smartboard where as Participant Six addressed the training provided as an important resource/support for interactive technology in the classroom.

Participant Three stressed the human aspect to resources,

> ""The first one I would say would be human resources. We have a technology department for our district, and those people have come to our school and provided in-services, and so first of all, I'd say the people. The second would be the in-services that

> they've provided. … And then another, our district partners with TIES to do conferences, and in the summer, I took workshops on Google Classroom and just different applications that can be used with Chromebooks in the classroom."

In relation to other support Participant Four indicated

> " … there's really no support. Like I said, we have professional development things that we can go to or attend, but oftentimes, they're coinciding with something else or they're very few and far between."

Seesaw, a student driven digital portfolio application, was implemented in Participant Three's classroom this year but staff development for learning it was limited to thirty minutes and happened only twice. Respondent Six had more positive experiences;

> "we had Smartboard training…. Now that was probably like eight years ago now, but that was helpful. There were some follow up trainings, both at our school that were teacher led and then offsite led by trainers. That was helpful. We have a tech liaison person in our building most days…. I have a great number three resource. There is a district tech person who sometimes gives us ideas…"

Interview question two asked, "What do you believe are the three most important district or site supports (human or technical) that have helped you successfully implement interactive technology in your elementary classroom?"

The participants' responses to this question were primarily on training and technical support. Several of the respondents focused on not just the availability of a technology specialist, but also about peer supports in working and learning with each other. Participant One addressed the idea of district trust. The district provided support the teachers needed, however, the respondent identified the fact that some things the teachers would be able to address on their own

if the district trusted them by having them build the skills and understanding to problem solve on their own.

> "For us, it's more like you have to call the Help Desk,.... I can change a light bulb but they don't let me. So, I'm looking at my LCD player and I can see the bulb's out, but they have to go through a whole bunch of red tape. So, I think enabling teachers to ... teaching them so they can function on their own without being so dependent on someone else for technology. There are so many teachers I know that are not technologically able even now, because we're not allowed to be."

Other key components noted were the need to have technology support at the building site. Participant One shared,

> "So, this is a very large school, and we all have Smart Boards… we have a tech person that just runs interference for us. … [technology support] is very important because it enables me to keep going while they're trying to figure out what's going on with whatever problem it is. So that's huge. The tech support on a daily basis, we've had it without and we've had it with, it makes teaching much easier when you're not trying to call the Help Desk, and they're telling you to do it while you've got 21 kids going crazy in the background…. we put [site support] on our priority list here as far as our building dollars go."

Professional development was a key factor with Participants Two, Four, and Five, and Six. Participant Two shared,

> "We had a program that was called Summer Camp 2.0… There was all kinds of technology things we had to learn how to do, to use Storybird, to make screen casts, … we were actually consumers ourselves of the software, or of technology.

> … we also had to be part of a group within our school, the district had people come out and meet with us about how to use Chromebooks, … iPads, … how they can be used in the classroom. …we had to talk about how we actually did use them, and then support each other. If I did something in my classroom, I had to share it with the other people in my building so they could see and learn from me, and I could learn from them."

Participant Six echoed the need for teacher collaboration and sharing knowledge. One way to accomplish that was identified as through a district server. "We also have a shared server, and so that's really helpful, like our grade level can share smart lessons or other ideas in a shared server folder." This supports the need for anytime learning for the teachers.

Interview question three asked, "What specific supports at the building level, eg. leadership, professional development, PLCs, technical support, facilitated the effective use interactive technology in your elementary classroom?"

All of the participants identified professional development and PLCs as strong components for facilitating effective use of interactive technology. Participants One, Three, Five and Six all addressed the strength of on-going, collaborative, peer teaching. Participant One's focus was on the importance of a two-prong system. "…there are two parts. The first one is teaching people how to operate the machinery and problem solve. Secondly, not just showing it to them, but showing them what possibilities there are out there that you can use…" She continued,

> "I could see what they were doing with it, and it applied to what I was doing. And that's the most important thing is showing what those possibilities ... Because the first time I ever fell in love with a Smart Board, I went to a school, that's all they used there…. teachers are so busy, and young teachers are just overwhelmed. And they have to be

shown what they can do with it before they can do something with it. So, I think that's a big thing."

Participant Three mentioned the idea of on-going and progressive skill development;

"…Phase One and Phase Two when they started rolling out the use of Chrome Books, that was very helpful. So, teachers that had used it in the previous year shared resources and different platforms and apps and things that were useful, and shared their ideas and how they incorporate it in their different lesson plans… we had one called…Tech Nerd Camp… we took it over the summer. And they had Level One, and …Level Two, ..it was the best six-week long program. And it was mostly just online, and then we would meet I think three times over the summer."

Participant Six said that technology is

"always part of our PLC goal is how we're using technology to meet whatever our goal is… we videotape ourselves teaching and watch it together.. we do have a rubric,.. designated rubrics that are ... I'm looking for how I set up the lesson, or I'm looking at my questioning.. Then we watch, and we talk through the rubric. …we call it peer coaching. It's like a class about how to communicate and talk about... the teaching that you're seeing."

Participant Four discussed the struggle that takes place in a school when support is missing. "This year, we implemented Seesaw for our classrooms and we were supposed to have, each month, staff development available after school for 20 to 30 minutes, just quick snapshots of things, and I think that happened twice."

Interview question four asked, “What other advice would you provide to teachers, principals, district leaders, what supports and resources need to be in place for those who are trying to implement interactive technology to facilitate student learning?”

Key insight from the respondents focused on professional development that is on-going, focused on implementation of technology in the classroom, the assurance that all of the technology components are working so teachers and students are not frustrated, Participant Three stated, “it would be good to include [training] at the beginning of the year, middle of the year, end of the year something quick.

Participant Two stated, “as much as we didn't like having that requirement that we had to be part of professional development ourselves, gosh, that's what moved me forward, just that very overt, I have to speak about how I'm using technology.” Sharing “… with the school board, to make sure the school board knew what we were doing. …we brought in devices, and had the school board try out some of the stuff we were having students do.” Participant Five explained, “Our district this coming year is getting all new technology. We're getting smart TV's. We're getting new sound systems. We're getting cams. They're going to be wireless. …I can see staff getting extremely overwhelmed with that.” Administration need to make sure “they are giving us sufficient training come next August. They really need to have monthly check-in's with us, because it's gonna be a lot of stuff coming at us at once. … [administration needs to] give it us in chunks. "Now go back and try this." Check in with the next month. "How is it working? What's not working? Participant Four reiterated, “administration and district leaders really need to listen to the teachers on what we want and what we need, and that's not happening.”

Summary

In this chapter, survey data from respondents representing 21 Administrators and Technology Specialists, along with survey data from respondents representing 81 Elementary Classroom Teachers, and 6 phone interviews with Elementary Classroom Teachers in Minnesota were presented. The five research questions guiding the study were used as the organizational structure for reporting study data. For each question, tables and a brief description of the data from each table were presented.

In Cchapter 5, an analysis of the results is presented along with major trends or generalizations from the study. Finally, recommendations from the study and recommendations for further study are presented. Data and related research will be used to generalize these recommendations.

Chapter 5: Conclusions and Recommendations

The purpose of the mixed-method study was to determine how school and district leaders can provide support and resources to elementary school classroom teachers in the implementation and use of interactive technology in their classrooms. The study examined resources necessary for teachers to actively engage students in using interactive technology in instruction to increase student engagement, motivation, and ultimately learning outcomes.

In examining the literature on the effective use of interactive technology in elementary school classrooms, there was minimal research which identified the critical resources and supports that need to be in place in school districts and classrooms to assist elementary teachers in engaging students through interactive technology. The intention of the study was to expand the body of knowledge on resources and supports that need to be in place for regular elementary classroom teachers to effectively utilize interactive technology in their instruction.

The following research questions guided the study:

1. What resources and supports did select school district superintendents, technology personnel, and principals report were provided to elementary school classroom teachers to support their use of interactive instructional technology in their classrooms?
2. What did select elementary school teachers report as their frequency of use of specific methods of interactive technology in their elementary school classrooms?
3. What resources and supports did select elementary school classroom teachers report were essential to implement interactive technology in their elementary school classrooms?

4. What did select elementary school teachers identify as the level of importance of the specific district and site resources/supports needed for the integration of interactive technology in the elementary school classroom?
5. What types of interactive technologies did select elementary school classroom teachers report were used for assessment, instruction and student activities?

In order to address the research questions, the researcher created two online surveys: one for district administrative and technology personnel (of which there were 20 respondents) and one for elementary school classroom teachers (of which 81 responded). In order to enrich study findings, one-on-one phone interviews were conducted with six respondents who volunteered to expand upon survey questions with the researcher.

Chapter 5 provides conclusions of the study, a discussion of the most significant findings, study limitations, recommendations for practice, and recommendations for future research.

Results and Conclusions of the Study

Administration and technology personnel survey. From the study's electronically distributed online survey (Appendix), the researcher received 20 responses, four from district administrators and 16 from technology personnel. Below are survey results:

- On-site resource support was identified by 93.0% of the respondents as available at either the developing or demonstrating level.
- Professional development for elementary school teachers focused on interactive technology was identified at either the developing or demontrating levels by 80.0% of the respondents.

- Internet connectivity across the district was identified at the demonstrating level by 86.6% of the respondents.
- Technology to support/enhance learning was identified at either the developing or demonstrating levels by 93.3% of the respondents.
- A significant majority of respondents, 93.3%, identified support for individual and class-wide technology needs at the developing or demonstrating levels.
- Respondents who identified professional development for new teaching staff at the initiating level totaled 33.3%, while 53.0% placed their district at the developing level.
- In the support area of district-wide expectations for using technology as a component of instruction, 86.7% rated their districts at the developing or demonstrating levels.
- The availability of anytime learning for teachers and students was identified at the developing level by 53.0% of respondents, while 33.3% of respondents rated their districts at the demonstrating level.
- In the resource of school and community culture supporting the use of technology for instruction, 66.7% placed their district at the developing level and 26.7% identified their district at the demonstrating level.
- Respondents rated their school districts use of PLCs to encourage and assess the use of interactive technology as follows: 26.7% identified their districts at the initiating level, 33.3% at the developing level, and 40.0% at the demonstrating level.

Fullan (2001) espoused the importance of practice rather than theory as the key for change. It is the practice of effectiveness that enables people to build on that effective practice.

Many of the administration and technology personnel responses to the survey indicated that their districts were at the developing level, showing growth is still needed for those resources/ supports. However, very few respondents indicated their districts were at the initiating level implying a strong implementation of interactive technology was present. This supports Fullan's premise that effective practice supports further success.

Mauer and Davidson (1998) stated that the key for leadership in the effective use of instructional technology was the cornerstone in changing the schools' culture. The use of interactive technology in the classroom changes how instruction is delivered; new methods and strategies need to be implemented, thus, leadership is essential for effective implementation.

A positive finding on the Administration and Technology Personnel survey was that the essential resources and supports for elementary classroom teachers to effectively use interactive technology were in place (at the initiating level). The survey data also identified new teachers' professional development at the initiating or developing level. These findings reinforce research that professional development is needed to ensure new staff are provided the same opportunities for learning interactive technology as their more experienced colleague.

Elementary classroom teacher survey. Below the Elementary Classroom Teacher Survey results are presented in the frequency of the use of interactive technology for instruction:

- The use of technology on a daily basis for presentations and interactive student activities, was cited by 74.0% of teacher respondents.
- The use of technology either daily or several times a week to access information to deepen lessons and student engagement was cited by 90.0% of teacher respondents.

- The use of technology to support higher level learning objectives either on a daily basis or several times a week was cited by 74.0% of teacher respondents.
- Regarding students in identifying ways to use technology, 26.8% of teachers reported they did so once a week, 25.4% identified several times a week, 12.9% indicated daily, and 35.2% identified that the survey question was not applicable.
- Regarding the use of on-site technical support for collaboration and pedagogical guidance, 50.0% of respondents identified that the survey question was not applicable.

The finding aligned with research conducted by the Office of Educational Technology in their National Education Technology Plan Update report, "Reimagining the Role of Technology in Education." (2017). They found that although improvement had been made since 2010, schools are still looking at a digital divide between students using technology in active ways to support their learning and being a content consumer. Research also found that many teachers are not using technology on a daily basis to guide their next instructional step (U.S. Department of Educaton, 2017).

Below the Elementary Classroom Teacher Survey results are presented on respondents' perceptions of technology resources needed in effective use of interactive technology in their elementary classrooms:

- Respondents who identified on-site technical support as important or essential totaled 80.0%.

- Respondents who identified periodic and on-going professional development focused on use of interactive technology for instruction as important or essential totaled 83.6%.
- Respondents who identified internet connectivity to all rooms as essential totaled 92.5%.
- Respondents who indicated that technology to support/enhance learning was essential or important for all students totaled 97.0%.
- Respondents who stated that support for individual and class technology needs was essential or important totaled 97.0%.
- Respondents who identified professional development as essential or important for new teaching staff totaled 86.6%.
- Respondents who identified district-wide expectations for technology use for instruction as important or somewhat important totaled 80.6%.
    - Anytime learning for teachers and students was identified by 71.6% of the respondents as important or essential.
    - Respondents who indicated that encouragement as a resource /support from the site or district in using interactive technology for instruction was important or essential totaled 77.7%.
    - Respondents who identified that PLCs used to encourage or assess the use of interactive technology were important or essential totaled 64.3%.

It is evident from the survey results, that elementary classroom teachers identified resources/support such as ongoing and focused professional development, as well as professional development for new staff, as important or essential in their effective use of interactive

technology in the elementary classrooms. Support for individual and class technology needs as well as technology to support/enhance learning was identified by 97% of the respondents as essential or important.

telephone interviews conducted with participants corroborated these findings. Participant two shared;

> " … we also had to be part of a group within our school, the district had people come out and meet with us about how to use Chromebooks, … iPads, … how they can be used in the classroom. …we had to talk about how we actually did use them, and then support each other. If I did something in my classroom, I had to share it with the other people in my building so they could see and learn from me, and I could learn from them."

Study findings published in a report conducted by the National Education Association (NEA) in 2008; "Access, Adequacy, and Equity in Education Technology," support the findings that there is an uneven distribution of professional development in school districts and even between school buildings. Continued staff training in using technology is vital for teachers to see the potential impact of technology on student achievement. Professional development for teachers in the use of technology in the classroom needs to be addressed; the study conducted by the NEA found that the training educators receive on using technology has been more effective for administrative tasks than for instruction. Training has to be more accessible for teachers (2008). These points about the need for professional development were feinforced in the telephone interviews that were conducted by the study researcher. Participant Four explained " … we have professional development things that we can go to or attend, but often times, they're coinciding with something else or they're very few and far between."

Telephone Interviews with Elementary Classroom Teachers

A resource that was (in the telephone interviews) consistently mentioned and was supported by the Elementary Teacher Survey was the necessity of professional development, specifically, training and PLCs that focused on interactive technology. The interviewees identified this resource as essential in effectively using interactive technology for instructional purposes. A report developed through the Office of Educational Technology in 2017, focused on ensuring continued professional development, not only at the university level for preservice teachers but also in the school districts, for on-going skill development in the use of technology in the classroom (U.S. Department of Education, 2017).

Conclusion Consistencies Found Between the Administration and Technology Personnel Survey and the Elementary Classroom Teacher Survey

Below are commonalities found through an examination of the Administration and Technology Personnel and the Elementary Classroom Teacher survey results.

While the survey questions were similar, the evaluation criteria were very different between the two surveys. The Administration and Technology Personnel survey focused on both the school district and building site **level of** implementation of resources and support, while the Elementary Classroom Teacher survey focused on teachers' perceptions of the importance of resources and support. The Administration and Technology Personnel survey results identified two resources/supports at the initiating or developing level; the Elementary Classroom Teacher survey results identified the same two resources as important or essential: professional development for new staff and PLCs focused on using interactive technology for instruction**.**

Participants in the telephone interviews also identified professional development for new teachers and PLCs focused on using interactive technology for instruction as important. Participant Six shared;

> "we had smart board training…. Now that was probably like eight years ago now, but that was helpful. There were some follow up trainings, both at our school that were teacher led and then offsite led by trainers. Professional development was identified as an essential resource by Participants Two, Four, and Five, and Six."

Participant Two shared, "We had a program that was called Summer Camp 2.0… There was all kinds of technology things we had to learn how to do, to use Storybird, to make screen casts, … we were actually consumers ourselves of the software, or of technology.

Discussion of the Study Results

The study results found that administration, technology personnel, as well as elementary classroom teachers valued the use of interactive technology for instructional purposes. Both reported that internet connectivity is a critical component in the school districts surveyed and essential to effective interactive technology implementation.

The survey participants reported a willingness and interest to use technology effectively in their classrooms to provide authentic learning experiences for their students.

Research has shown that when carefully designed and thoughtfully applied, technology can accelerate, amplify, and expand the impact of instruction (U.S. Department of Education, 2017). Educators need to have the knowledge and skills to create a technology-rich environment. This can only take place with ongoing and consistent professional development (U.S. Department of Education, 2017). Technology is ever changing. Therefore, it requires broadening teacher skills to use technology in the instructional process. Implementation of technology use in

the classroom can only occur with knowledge of the pedagogical application and the resources and support needed both at the school district and building levels.

In addition, instructional delivery, application, and assessment in the elementary school classroom require a strong technology infrastructure in the school and school district. Educators need continued support and available resources in their uses of technology to enable them to provide effective classroom instruction (U.S. Department of Education, 2017).

Limitations of the Study

Limitations of the study included:

- Respondents had the ability to complete the survey from multiple devices. It is unknown if this occurred in the study.
- Only three Minnesota districts were included in the study.
- The respondents for the Administration and Technology Personnel survey were primarily technology personnel.

Recommendations from the Study

Research. The following recommendations for further research are offered below:

- It is recommended a qualitative study be conducted to ascertain specific strategies that may be of value in supporting teachers in their effective use of interactive technology in the classroom.
- It is recommended that the study be replicated involving additional categories of school district personnel, such as principals, in order to gather additional perspectives on the resources and support necessary for effective implementation of interactive technology in the classroom.

- It is recommended that a study be conducted involving secondary school teachers to determine if the resources and supports needed for implementation of interactive technology in their classrooms are different from those at the elementary school level.

Professional practice. The following are recommendations for school districts committed to addressing resources and supports needed to effectively utilize interactive technology in elementary school classrooms.

- It is recommended school leaders involve classroom teachers in the decision-making process prior to purchasing and implementing additional technology components.
- It is recommended school leaders provide continuous support for all teachers throughout the process of implementing interactive technology, noting that teachers transition in and out of districts and schools, and new teachers need the time and guidance to gain expertise comparable to colleague teachers. An increased awareness is needed to recognizes that teachers are often at different skill developmental stages.
- It is recommended school leaders create comprehensive professional development plans to enhance teaching and learning for licensed staff members, periodically incorporating the non-school days for such training.
- It is recommended school leaders imbed technology standards into their curriculum review cycles to ensure pedagogical context is being addressed using interactive technology methods.
- It is recommended school leaders provide opportunities for feedback from classroom teachers regarding issues that may arise from interactive technology implementation in their classrooms, building sites, and school district.

Summary

The study was believed to be important and timely because many classroom teachers have access to expensive technology equipment, yet, may not be utilizing that equipment effectively in classroom instruction. School leaders need to ensure that technology is used on a daily basis by the elementary classroom teachers to accelerate the effective use of technologies in student learning (TechEd, www.tech.ed.gov, 2017). The study was designed to contribute knowledge and practice to the field of education by providing information for school and district leaders regarding the support teachers required to effectively implement interactive technology to enhance classroom instruction and student learning.

The study was able to answer five guiding questions. When examining resources and supports provided by district leaders, the researcher was able to identify that district leadership and technology personnel identified several key resources/supports internet connectivity, professional development, technology to support learning, district-wide expectations for use of technology as a component of instruction, anytime learning available for teachers and students. The resources they identified as needing the greatest support in their district or school were PLCs used to encourage and assess the use of interactive technology, and professional development for new teaching staff.

When examining the frequency of teacher use of specific methods of interactive technology in their classrooms, elementary teachers reported using technology for presentations and interactive activities which support higher level learning objectives, on a daily or several times a week bases.

Elementary classroom teachers that completed the survey reported that resources / supports such as on-site technical support, professional development focused on interactive

technology, internet connectivity, technology to support/enhance learning, district-wide expectations, anytime learning for teachers and students, encouragement as a resource/support were important or essential to the effective implementation of interactive technology in their classrooms.

Elementary classroom teachers that completed the phone interviews identified the use of professional development, professional learning communities, and on-site support to develop and effectively implement the new technology in their classrooms as important.

Finally, the types of interactive technologies select elementary classroom teachers reported they used for assessment included computer based tools and instruction and student activities using interactive whiteboards, iPads, and Chromebooks.

The use of interactive technology in the elementary classroom is a constant struggle; money, time, and resources are always at a premium. Teachers often want to use technology but finding the time for the training, practice, and implementation is at a premium. However, teachers and district administrators who support access to devices, on-going training, and the study of research-based practices should see benefits in student engagement and achievement.

References

Adıgüzel, T., Gürbulak, N., & Sarıçayır, H. (2011). Smart boards and their instructional uses. *Mustafa Kemal University Journal of Social Sciences Institute, 8*(15), 457-471.

American Association of School Administrators (AASA). (2014). Instructional rounds: Improving learning, teaching and leadership. *School Administrator, 71*(2), 18-23.

Al-Qirim, N. (2011). Determinants of interactive white board success in teaching in higher education institutions. *Computers & Education, 56*(3), 827-838.

Anderson, A., Wood, E., Piquette-Tomei, N., Savage, R. S., & Mueller, J. (2011). Evaluating the impacts of just-in-time instructional support for teachers introducing a web-based reading program for primary grade children. *Journal of Technology and Teacher Education, 19*(4), 499-525.

Angeli, C., & Valanides, N. (2009). Epistemological and methodological issues for the conceptualization, development, and assessment of ICTeTPCK: Advances in technological pedagogical content knowledge (TPCK). *Computers & Education, 52*(1), 154-168.

Angeli, C., & Valanides, N. (2013). Technology mapping: An approach for developing technological pedagogical content knowledge. *Journal of Educational Computing Research, 48*(2), 199-221.

Archer, K., Savage, R., Sanghera-Sidhu, S., Wood, E., Gottardo, A., & Chen, V. (2014). Examining the effectiveness of technology use in classrooms: A tertiary meta-analysis. *Computers and Education, 78*, 140-149. doi:10.1016/j.compedu.2014.06.001

Ates¸ M. (2010). Ortaögretimco grafya derslerinde akıllı tahta kullanımı. *Marmara Cografya Dergisi, 22*, 409-427.

Beauchamp, G. (2004). Teacher use of the interactive whiteboard in primary schools: Towards an effective transition framework. *Technology Pedagogy and Education, 13*(3), 327-348.

Bebell, D., & Kay, R. (2010). One to one computing: A summary of the quantitative results from the Berkshire wireless learning initiative. *Journal of Technology, Learning, and Assessmen*t, *9*(2), 2-60 [Online journal]. Retrieved from http://ejournals.bc.edu/ojs/index.php/jtla/article/view/1607.

Becker, H., Ravitz, J., & Wong, Y. (1999). *Teacher and teacher-directed student use of computers and software (Report No. 3).* Irvine, CA: Center for Research on Information Technology and Organizations (CRITO). Retrieved from http://www.crito.uci.edu/tlc/html/findings.html.

Becker, H. J. (2000). Who's wired and who's not: Children's access to and use of computer technology. *The Future of Children, 10*(2), 44-75.

Becta (2003). *What the research says about ICT and motivation*. Retrieved from http://partners.becta.org.uk/uploaddir/downloads/page_documents/research/wtrs_motivation.pdf.

Beeland, W. D. (2002). Student engagement, visual learning and technology: Can interactive whiteboards help? *Action Research Exchange, 1*(1). Retrieved from http://chiron.valdosta.edu/ are/Artmanscrpt/vol1no1/beeland_am.pdf.

Butler Edwards, C. J., Carr, S., & Siegel, W. (2006). Influences of experiences and training on effective teaching practices to meet the needs of diverse learners in schools. *Education*, 126(3), 580-592.

Cheung, A. C., & Slavin, R. E. (2013). Effects of educational technology applications on reading outcomes for struggling readers: A best-evidence synthesis. *Reading Research Quarterly, 48*(3), 277-299. doi:10.1002/rrq.50

Chiong, C., Ree, J., Takeuchi, L. & Erickson, I. (2012, Spring). *Print books vs. e-books: Comparing parent-child co-reading on print, basic and enhanced e-book platforms*. The Joan Ganz Cooney Center. Retrieved from http://www.joanganzcooneycenter. org/ upload_kits/jgcc_ebooks_quickreport.pdf.

Clausen, J., Britten, J., & Ring, G. (2008). Envisioning effective laptop initiatives. *Learning & Leading with Technology*, *36*(2), 18-22.

Coiro, J., Knobel, M., Lankshear, C., & Leu, D. J. (2008). Central issues in new literacies and new literacies research. In J. Coiro, M. Knobel, C. Lankshear, and D. J. Leu, (Eds.), *The handbook of research on new literacies* (pp. 1-22). Mahwah, NJ: Erlbaum. (Author order determined alphabetically.)

Collins, A., & Halverson, R. (2009). *Rethinking education in the age of technology: The digital revolution and schooling in America.* New York: Teachers College.

Cranston, N. (2013). School leaders leading: professional responsibility not accountability as the key focus. *Educational Management Administration & Leadership, 41*(2), 129-142. doi:10.1177/1741143212468348

Creswell, J. W. (2008). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.

Cuban, L. (2006, October 18). Commentary: The laptop revolution has no clothes. *Education Week*, p. 29.

Cumming, T. M., & Rodriguez, C. D. (2013). Integrating the iPad into language arts instruction for students with disabilities. *Engagement and Perspectives, 28*(4), 43-53.

De Jong, M. T., & Bus, A. G. (2002). Quality of book-reading matters for emergent readers: An experiment with the same book in a regular or electronic format. *Journal of Educational Psychology, 94*(1), 145-155.

Elaziz, M. F. (2008). *Attitudes of students and teachers towards the use of interactive whiteboards in EFL classrooms*. (Unpublished master's thesis). Bilkent University, Ankara.

Empirica. (2006). *The digital divide index—A measure of social inequalities in the adoption of ICT*. Retrieved from http://www.empirica.com.

Ertmer, P. A. (1999). Addressing first and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-61.

Ertmer, P. A. (2005). Teacher beliefs: the final frontier in our quest for technology integration? *Educational Technology Research and Development*, 53(4), 25-39.

Ertmer, P. A., Gopalakrishnan, S., & Ross, E. M. (2001). Technology using teachers: Comparing perceptions of exemplary technology use to best practice. *Journal of Research on Technology Education, 33*(5), 25-39.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education, 4*(3), 255-284.

Fisher, C., Dwyer, D., & Yocam, K. (1996). *Education and technology: Reflections on computing in classrooms.* San Francisco, CA: Jossey-Bass Publishers.

Fullan, M. (2001). *Leading in a culture of change*. San Francisco: Jossey-Bass.

Glover, D., & Miller, D. (201).Running with technology: the pedagogic impact of the large-scale introduction of interactive whiteboards in one secondary school. *Journal of Information Technology for Teacher Education, 10*(3), 257-276.

Glover, D., Miller, D., Averis, D., & Door, V. (2005). The interactive whiteboard: A literature survey. *Technology, Pedagogy and Education, 14*(2), 155-170.

Guerrero, S. M. (2005). Teacher knowledge and a new domain of expertise: Pedagogical technology knowledge. *Journal of Educational Computing Research, 33*(3), 249-267. doi:Article

Guha, S. (2001). Integrating computers in elementary grade classroom instruction–Analyses of teachers' perceptions in present and preferred situations. *Journal of Educational Computing Research, 37*(3), 275-303. doi: 10.2190/EC.37.4.d

Gursul, F., & Tozmaz, G. B. (2010). Which one is smarter? Teacher or board. *Procedia Social and Behavioral Sciences, 2*, 5731-5737.

Hall, I., & Higgins, S. (2005). Primary school students' perceptions of interactive whiteboards. *Journal of Computer Assisted Learning*, *21*,102-117.

Hall, G., & Hord, S. (2005). Implementing change: Patterns, principles, and potholes (2nd ed.). Boston: Allyn & Bacon.

Harris, J., & Hofer, M. (2009). Instructional planing activity types as vehicles for curriculum-based TPACK development. In C. D. Maddux, (Ed.), *Research highlights in technology*

and teacher education 2009 (pp. 99-108). Chesapeake, VA: Society for Information Technology in Teacher Education (SITE).

Herold, B. (2017). Tech-training divide. *Education Week Technology Counts, 35*(35), 12th ser., 5-11.

Hertz, M. B. (2011). What does "technology education" mean? *Edutopia*. Retrieved from https://www.edutopia.org/blog/meaning-tech-integration-elementary-mary-beth-hertz.

Howland, J. L., Jonassen, D. H., & Marra, R. M. (2097). *Meaningful learning with technology* (3rd ed.). Prentice Hall.\

Howland, J. L., Jonassen, D. H., & Marra, R. M. (2012). *Meaningful learning with technology* (4th ed). Pearson Higher Education.

Hutchison, A., Beschorner, B., & Schmidt-Crawford, Denise. (2012). Exploring the use of the iPad for literacy learning. *The Reading Teacher, 66*(1), 15-23. https://doi.org/10.1002/TRTR.01090

International Reading Association. (2009). New literacies and 21st-century technologies: A position statement of the International Reading Association. Newark, DE: Author.

International Society for Technology in Education (ISTE). (2009). ISTE's technology facilitation and leadership standards: What every K-12 Leader should know and be able to do. Washington, DC: Author.

Jonassen, D. H., Peck, K. L., & Wilson, B. G. (1999). *Learning with technology. A constructivist perspective*. Upper Saddle River, NJ: Merrill Prentice Hall.

Kaya, H., & Aydın, F. (2011). Students' views towards interactive white board applications in the teaching of geography themes in social knowledge lessons. *Zeitschrift für die Welt der Türken-Journal of World of Turks, 3*(1), 179-189.

Kimber, K., Wyatt-Smith, C., & Wyatt Smith, C. (2006). Using and creating knowledge with new technologies: a case for students-as-designers. *Learning, Media and Technology, 31*(1), 19-34. doi:10.1080/17439880500515440

Laffey, J. (2004). Appropriation, mastery, and resistance to technology in early childhood pre-service teacher education. *Journal of Research on Technology in Education*, *36*(4), 361-382.

Lei, J., & Zhao, Y. (2008). One-to-one computing: What does it bring to schools? *Journal of Educational Computing Research, 39*(2), 97-122.

Levy, P. (2002). Interactive whiteboards in learning and teaching in two Sheffield schools: A developmental study. Retrieved from http://dis.shef.ac.uk/eirg/projects/ wboards.htm.

Lewin, C., Somekh, B., & Steadman, S. (2008). Embedding interactive whiteboards in teaching and learning: the process of change in pedagogic practice. *Education and Information Information Technologies*, *13,* 291-303.

Maich, K., & Hall, C. (2016). Implementing iPads in the inclusive classroom setting. doi.org/10.1177/1053451215585793

Matzen, N., & Edmunds, J. (2007). Technology as a catalyst for change: The role of professional development. *Journal of Research on Technology in Education, 39*(4), 417-430. Retrieved August 28, 2007, from ProQuest.

Maurer, M., & Davidson, G. (1998). *Leadership in instructional technology*. Columbus, OH: Prentice-Hall, Inc.

Mayer, R. E. (2001). *Multimedia learning*. New York: Cambridge University Press.

McIntyre, L. L., Gresham, F. M., DiGennaro, F. D., & Reed, D. D. (2007). Treatment integrity of school-based interventions with children in the journal of applied behavioral analysis 1991-2005. *Journal of Applied Behavior Analysis*, *40*(4), 659-672.

Miranda, H. P. (2007). Predictors of technology use for elementary school teachers in Massachusetts: A multilevel SEM approach. Dissertation Abstract International. Section A. *Humanities and Social Sciences*, *68*(05), 1895.

Miranda, H. P. & Russell, M. (2011). Predictors of technology use for elementary school teachers in Massachusetts: A multilevel SEM approach. *Journal of Research in Technology Education*, *43*(4), 301-323.

Miranda, H. P., & Russell, M. (2012). Understanding factors associated with teacher-directed student use of technology in elementary classrooms: A structural equation modeling approach. *British Journal of Educational Technology*, *43*(4), 652-666. doi: 10.1111/j.1467-8535.2011.01228.x

Mooij, E. S. (2000). Time on task, interaction, and information handling in multimedia learning environments. *Journal of Educational Computing Research, 21*(4), 487-502. doi:10.2190/3ke4-p9e7-l9x8-emc1

Moreno, R. (2006). Learning in high-tech and multimedia environments. *Association for Psychological Science, 15*(2), 63-67.

Mueller, J., Wood, E., Willoughby, T., Ross, C., & Specht, J. (2008). Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration. *Computers & Education*, *51*, 1523-1537. doi: 10.1016/j.compedu. 2008.02.003

Musti-Rao, S., Cartledge, G., Bennett, J. G., & Council, M. (2014). Literacy instruction using technology with primary-age culturally and linguistically diverse learners. *Intervention in School and Clinic, 50*(4), 195-202. doi:10.1177/1053451214546404

National Council for Teachers of English. (2008). *Towards a definition of 21st-century literacies*. Retrieved June 30, 2008, from www.ncte.org/about/gov/129117.html.

National Education Association (NEA). (2008). Access, adequacy, and equity in educational technology: results of a survey of america's teachers and support professionals on technology in public schools and classrooms. Washington, DC: Author.

Niess, M. L. (2011). Investigating tpack: Knowledge growth in teaching with technology. *Journal Educational Computing Research, 44*(3), 299-317. doi:10.2190/EC.44.3.c

Niess, M. L., Lee, K., & Sadri, P. (2007). *Dynamic spreadsheets as learning technology tools: Developing teachers' technology pedagogical content knowledge (TPCK).* Paper presented at the annual conference of American Education Research Association (AERA), Chicago, IL.

Northrop, L., Killeen, E., & Ng, U. S. I. (2013). A framework for building early literacy. *iPads*, pp. 531-538. doi.org/10.1002/TRTR.1155

O'Brien, D., Beach, R., & Scharber, C. (2007). "Struggling" middle schoolers: Engagement and literate competence in a reading writing intervention class. *Reading Psychology, 28*(1), 51-73.

O'Dwyer, L. M., Russell, M., & Bebell, D. (2004). Identifying teacher, school, and district characteristics associated with elementary teachers' use of technology: A multilevel perspective. *Education Policy Analysis Archives, 12*(48), 1-33.

O'Dwyer, L., Russell, M., & Bebell, D. (2005). Identifying teacher, school, and district characteristics associated with middle and high school teachers' use of technology: A multilevel perspective. *Journal of Educational Computing Research, 33*(4), 369-393.

Organization for Economic Cooperation and Development (OECD). (2002). *Quo vademus? The transformation of schooling in a networked world* [ICT conference report summary]. Retrieved from peabody.vanderbilt.edu/ICT/ICTSummary.pdf.

Padron, Y. N., Waxman, H. C., Lee, Y., & Lin, M. (2012). *Teaching and learning with technology in urban elementary school mathematics classroom serving English language learners*, *39*(1).

Park, H. S. (2008). The impact of technology use on Hispanic students' mathematics achievement within family and school contexts: Subgroup analysis between English-and non-English-speak-ing students. *Journal of Educational Computing Research, 38,* 453-468.

Philip, T., & Garcia, A. (2013). The importance of still teaching the iGeneration: New technologies and the centrality of pedagogy. *Harvard Educational Review, 83*(2), 300-319.

Pilgrim, J., Bledsoe, C., & Reily, S. (2012). New technologies in the classroom. *The Delta Kappa Gamma Bulletin, 78*(40), 16-22.

Plass, J. L., Chun, D. M., Mayer, R. E., & Leutner, D. (2003). Cognitive load in reading a foreign language text with multimedia aids and the influence of verbal and spatial abilities. *Computers in Human Behaviour, 19,* 221-243.

Preston, C., & Mowbray, L. (2008). Use of smart boards for teaching, learning and assessment in kindergarten science. *Teaching Science, 54*(2), 50-53.

Roberts, C. M. (2010). The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation. *Sage Knowledge*. Corwin Press.

Roblyer, M. D., & Doering, A. H. (2010). *Integrating educational technology into teaching* (5th ed.). Boston, MA: Allyn & Bacon.

Rogers, E.M. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.

Russell, M., Bebell, D., O'Dwyer, L. & O'Connor, K. (2003). Examining teacher technology use: Implications for preservice and in-service teacher preparation. *Journal of Teacher Education, 54,* 297-310. doi: 10.1177/ 0022987103255985

Russell, M., O'Dwyer, L. M., Bebell, D., & Tao, W. (2007). How teachers' uses of technology vary by tenure and longevity. *Journal of Educational Computing Research, 37*(4), 393-417.

Ryan, R. M., & Stiller, J. (1991). The social contexts of internalization: Parent and teacher influences on autonomy, motivation and learning. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement* (vol. 7, pp. 115-149). Greenwich, CT: JAI Press

Şad, S. N., & Özhan, U. (2012). Honeymoon with IWBs: A qualitative insight in primary students' views on instruction with interactive whiteboard. *Computers and Education, 59*(4), 1184-1191. doi:10.1016/j.compedu.2012.05.010

Sandholtz, J. H. (2001). Learning to teach with technology: A comparison of teacher development programs. *Journal of Technology and Teacher Education, 9*(3), 349-374.

Sang, G., Valcke, M., Braak, J. V., & Tondeur, J. (2010). Student teachers' thinking processes and ICT integration: Predictors of prospective teaching behaviors with educational technology. *Computers & Education, 54*(1), 103-112. doi:10.1016/j.compedu. 2009.07.010

Savery, J. R. & Duffy, T. M. (1995, September/October). Problem-based learning: an instructional model and its constructivist framework. *Educational Technology*, pp. 31-38.

Scherer, M. (2011). Transforming education with technology: A conversation with Karen Cator. *Educational Leadership, 68*(5), 17-21.

Schmid, E. C. (2008). Potential pedagogical benefits and drawbacks of multimedia use in the English language classroom equipped with interactive whiteboard technology. *Computers & Education, 51*(4), 1553-1568. doi:10.1016/j.compedu.2008.02.005

Schuck, S., & Kearney, M. (2007). *Exploring pedagogy with interactive whiteboards*. Retrieved from https://www.det.nsw.edu.au/detresources/pedagogy_sVIYVjvNJH.pdf.

Seufert, T. (2003). Supporting coherence formation in learning from multiple representations. *Learning and Instruction, 13*, 227-237.

Shenton, A., & Pagett, L. (2007). From 'bored' to screen: The use of the interactive whiteboard for literacy in six primary classrooms in England. *Literacy, 41*(3), 129-136.

Slavin, R E. (2007). *Educational research: In an age of accountability.* New York: Pearson Education.

Slay, H., Siebörger, I., & Hodgkinson-Williams, C. (2008). Interactive whiteboards: Real beauty or just "lipstick"? *Computers & Education, 51*(3), 1321-341. doi:10.1016/j.compedu. 2007.12.006

Slavin, R E. (2007). *Educational research: In an age of accountability.* New York: Pearson Education.

Smith, F., Hardman, F., & Higgins, S. (2006). The impact of interactive whiteboards on teacher-pupil interaction in the National Literacy and Numeracy Strategies. *British Educational Research Journal, 32*(3), 443-457.

Smith, G. E., & Throne, S. (2007). *Differentiating instruction with technology in K-5 classrooms*. Eugene, OR.: International Society for Technology in Education.

Smith, H. J., Higgins, S., Wall, K., & Miller, J. (2005). Interactive whiteboards: Boon or bandwagon? A critical review of the literature. *Journal of Computer Assisted Learning, 21*, 91-101.

Somyürek, S., Atasoy, B., & Özdemir, S. (2009). What makes a board smart? *Computers & Education, 53*(2), 368-374.

Storz, M., & Hoffman, A. (2013). Examining response to a one-to-one computer initiative: Student and teacher voices. *Research in Middle Level Education, 36*(6), 1-18. Retrieved from http://www.eric.ed.gov/PDFS/EJ995733.pdf.

Strudler, N., & Hearrington, D. (2009). Quality support for ICT in schools. In J. Voogt & G. Knezek (Eds), *International handbook of information technology in primary and secondary education* (pp. 579-596). New York: Springer.

Surry, D.W., & Farquhar, J. D. (1997). Diffusion theory and instructional technology. *Journal of Instructional Science and Technology, 2,* 1. Retrieved from http://www.ascilite. org.au/ajet/e-jist/ docs/vol2no1/article2.htm.

Sweller, J. (1999). *Instructional design in technical areas*. Camberwell, Australia: ACER Press.

Takacs, Z. K., Swart, E. K., & Bus, A. G. (2015). Benefits and pitfalls of multimedia and interactive features in technology-enhanced storybooks: A meta-analysis. *Review of Educational Research*, pp. 1-42. doi: 10.3102/0034654314566989

TechEd. (2017). Retrieved from www.tech.ed.gov.

Technology integrationalist. (2015). Retrieved from https://boone.k12.ia.us/new/wp-content/uploads/2015/01/ Technology_Leader, 2015.

Uluyol, Ç., & Şahin, S. (2016). Elementary school teachers' ICT use in the classroom and their motivators for using ICT. *British Journal of Educational Technology*, *47*(1), 65-75. doi: 10.1111/bjet.12220

U.S. Department of Education, Office of Educational Technology. (2017). *Reimagining the role of technology in education: 2017 national education technology plan update*. [Report.] Retrieved from https://tech.ed.gov/files/2017/01/Higher-Ed-NETP.pdf.

Vanderlinde, R., & Van Braak, J. (2010). The e-capacity of primary schools: Development of a conceptual model and scale construction from a school improvement perspective. *Computers & Education*, *55,* 541-553.

Volman, M., & Van Eck, E. (2001). Gender equity and information technology in education: The second decade. *Review of Educational Research, 71*(4), 613-634. doi:10.3102/ 00346543071004613

Wall, K., Higgins, S., & Smith, H. (2005). 'The visual helps me understand the complicated things': Pupil views of teaching and learning with interactive whiteboards. *British Journal of Educational Technology, 36*(5), 851-867.

Wang, S., & Sleeman, P. J. (1994). The effectiveness of computer-assisted instruction...a theoretical explanation. *International Journal of Instructional Media, 21*(1), 61-77.

Warschauer, M. (2007). Information literacy in the laptop classroom. *Teachers College Record*, 109(11), 2511-2540.

Watson, W. R., Watson, S. L., & Reigeluth, C. M. (2013). Education 3.0: breaking the mold with technology. *Interactive Learning Environments*, *23*(3), 332-343. http://doi.org/10.1080/ 10494820.2013.764322

Waxman, H. C., & Padron, Y. N. (2002). Research-based teaching practices that improve the education of English language learners. In L. Minaya-Rowe (Ed.), *Teacher training and effective pedagogy in the context of student diversity* (pp. 3-38). Greenwich, CT: Information Age.

Waxman, H. C., Padron, Y. N., & Arnold, K. A. (2001). Effective instructional practices for students placed at risk of failure. In G. D. Borman, S. C. Stringfield, & R. E. Slavin (Eds.), *Title I: Compensatory education at the crossroads* (pp. 137-170). Mahwah, NJ: Erlbaum.

Waxman, H. C., Padron, Y. N., & Garcia, A. (2007). Educational issues and effective practices for Hispanic students. In S. J. Paik & H. J. Walberg (Eds.), *Narrowing the achievement gap: Strategies for educating Latino, Black and Asian students* (pp. 131-151). New York: Springer.

Wenglinsky, H. (2005). *Using technology wisely: The keys to success in schools*. New York: Teachers College Press.

Williams, J., & Redish, T. (2009). ISTE® Technology facilitation and leadership standards. Washington, DC: ISTE.

Wood, E., Mueller, J., Willoughby, T., Specht, J., & Deyoung, T. (2005). Teachers' perceptions: Barriers and supports to using technology in the classroom. *Education, Communication & Information*, *5*(2), 183e206.

Appendix A: Approval from North Branch School District

From: DEB HENTON <dhenton@isd138.org>
Date: Monday, December 18, 2017 at 7:34 PM
To: Miriam White <MWhite@bemidjistate.edu>
Cc: Lori Zimmerman <lzimmerm@isd138.org>, Mary Mehsikomer <mary.mehsikomer@ties.k12.mn.us>, "dmarcussen@isd138.org" <dmarcussen@isd138.org>, "lbednarc@isd138.org" <lbednarc@isd138.org>, "rweinand@isd138.org" <rweinand@isd138.org>
Subject: Re: Miriam White, Doctoral Candidate, St. Cloud State University

Dear Ms. White,

North Branch is happy to participate. Dr. Zimmerman will be your key contact on this project and I know will provide you what you need to complete this study.

Best wishes on this important work!

Deb

Appendix B: Approval from Mounds View School District

Mounds View
PUBLIC SCHOOLS

March 12, 2018

Miriam White
9544 Trengove Rd. NW
Bemidji, MN 56601

Dear Miriam:

I am writing this letter to confirm that our district, Mounds View Public Schools, has reviewed and approved your application to conduct educational research in our schools.

It is our understanding that you will be implementing the study, ***Effective Use of Interactive Technology***, which looks at administrator, technology specialists and elementary teacher perception of their supports and resources for implementation of interactive technology in the elementary classroom.

We understand that you will submit, for our review, a sample email for elementary teachers and administrators/technology coordinators which describes the study and contains the consent agreement. You will also supply the links to each survey. MoundsView Schools will add information to this email that informs our staff that your research project is approved by the district and that participation is voluntary. Mounds View will then send the email with a link to the survey to our staff, on an agreed upon date.

We note that you will take all necessary precautions to make sure that the data collected and included in your summary will not contain any identifying information of the school or participants involved in the study and that strict measures will be in place to ensure the confidentiality of participants in data collection and storage.

We appreciate your interest in our district and look forward to a final report of findings from your research. Mounds View School's Technology Department is very interested in seeing a summary of your results as well.

If I can be of further assistance during your work in Mounds View please feel free to contact me.

of Assessment and Evaluation
Mounds View Schools
651-621-6042
CC: Chris Lennox, Superintendent
Karl Brown, Technology Director
Angie Peschel, Curriculum and Instruction Director

Appendix C: Approval from District 191

March 2, 2018

Miriam White
9544 Trengove Rd. NW
Bemidji, MN 56601

Dear Miriam,

This letter is to notify you that your requested research proposal Effective Use of Interactive Technology in the Elementary Classroom has been approved as submitted. Please notify our office of any changes that you propose to make prior to implementing them. We wish you the best of luck with your study and look forward to reviewing a copy of your findings. Please communicate with Stacie Stanley as you proceed with your study. She can be reached at 952-707-2008.

Please contact me with any questions, if necessary.

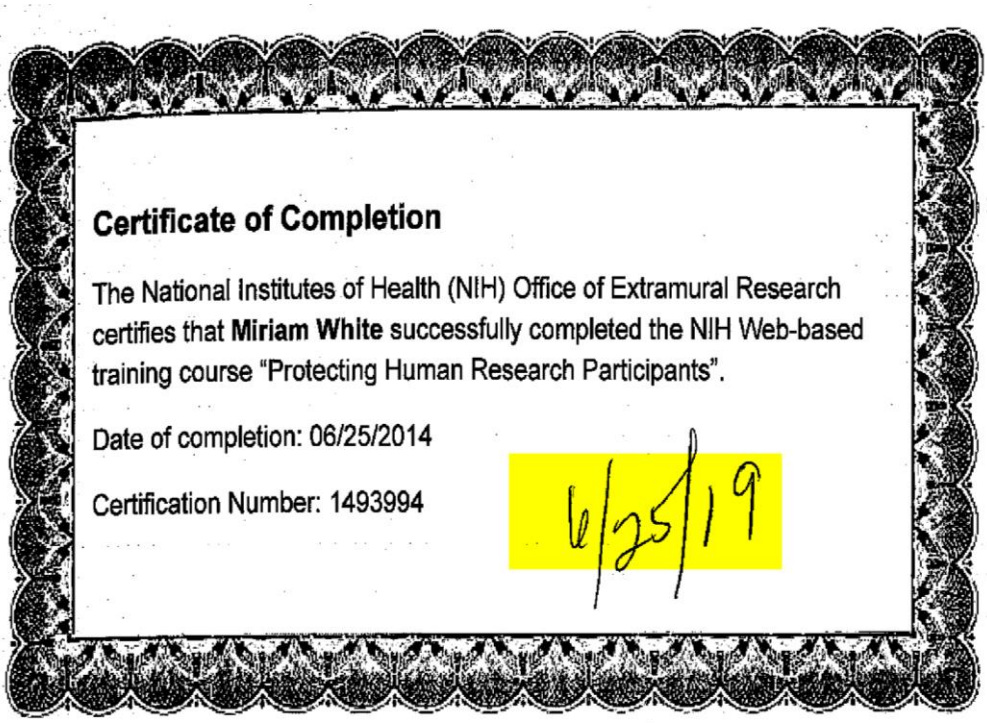
Sincerely,

David Watkins

David Watkins

mlp

Appendix D: CITI Certification



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Miriam White** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 06/25/2014

Certification Number: 1493994

6/25/19

Appendix E: IRB Protocol

ST. CLOUD STATE UNIVERSITY
EDUCATION FOR LIFE.

Institutional Review Board Protocol
For
Conduct of Research Involving Human Subjects

PROJECT

Project Title: **Effective Use of Interactive Technology**

Project Start Date: January 15, 2018 Project End Date: March 23, 2018

RESEARCHER(S)

Principal Investigator(s) *Also referred to as PI(s)*	**Status (select one)**	**Email**	**Phone Number**	**IRB Training Completed**
Miriam White	☐ faculty/staff ☐ undergraduate ☐ graduate masters ☒ graduate doctoral	**mjwhite@stcloudstate.edu**	**218-760-0481**	☒ Yes
	☐ faculty/staff ☐ undergraduate ☐ graduate masters ☐ graduate doctoral			☐ Yes
	☐ faculty/staff ☐ undergraduate ☐ graduate masters ☐ graduate doctoral			☐ Yes

Faculty Mentor/Course Instructor (if Principal Investigator is a student): **Dr. Kay Worner**

☒ Yes, ALL Principal Investigator(s) completed SCSU's required CITI IRB training, https://www.citiprogram.org/

If you collaborate with an individual from another institution, we may be able to use an Authorization Agreement with anther institution's IRB. Contact ResearchNow@stcloudstate.edu for more information.

SPONSORS

Is there external funding source(s) for this research project? ☒ No ☐ Yes ☐ Pending

Funding Agency/Sponsor: Account #:

PROTOCOL SUBMISSION CHECKLIST

To submit a complete packet to the IRB, INCLUDE all of the following:
☒ Complete, signed IRB protocol form
☒ Data collection instrument(s)
☒ Consent form(s)
☐ *If applicable,* support letter for participant recruitement
☐ *If applicable,* debriefing statement or handouts
☒ Submit **completed IRB protocol with all attachments** to Research & Sponsored Programs (AS 210) or scan packet to ResearchNow@stcloudstate.edu.

CERTIFICATION STATEMENT

PI Initial here	**As principal investigator**, I certify that the information provided in this protocol represents a complete and accurate description of the proposed research, this research will not begin until IRB approval received, and this research will be conducted in compliance with IRB recommendations and requirements.
PI Initial here	**As principal investigator**, I understand that modifications, significant new findings which develop during the course of the study or increase the risk to participant, or reporting to the IRB any adverse or unexpected events, and that protocols approved as expedited or full require an annual/final report (*protocols approved as exempt do not require continuing review/final report process*). To submit a Continuing Review/Final, please complete the Continuing Review Form
Faculty Mentor Initial here	**As faculty advisor**, I certify that I have reviewed this research protocol and that I attest to the scientific merit of this research study. I will advise and provide continued guidance to support the research/study as appropriate for the student's academic development.

Signature of Principal Investigator	Date
Signature of Faculty Mentor/Course Instructor	Date

TYPE OF REVIEW REQUESTED

Select **ONE** category that best aligns with your research.

Common Categories for Exempt Review

☒ **1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.**

☐ 2) **Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior**, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

☐ **3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under category 2, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.**

4) **Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified**, directly or through identifiers linked to the subjects.

STOP: For Exempt Category 4, please complete the Use of Existing Data Protocol

☐ 5) **Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine**:
(i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

☐ 6) **Taste and food quality** evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Common Categories for Expedited Review

☐ **1) Clinical studies of drugs and medical devices only when condition (a) or (b) is met.**
(a) Research on drugs for which an investigational new drug application (21 CFR Part 312) is not required. (*Note: Research on marketed drugs that significantly increases the risks or decreases the acceptability of the risks associated with the use of the product is not eligible for expedited review.*)
(b) Research on medical devices for which (i) an investigational device exemption application (*21 CFR Part 812*) is not required; or (ii) the medical device is cleared/approved for marketing and the medical device is being used in accordance with its cleared/approved labeling.

☐ 2) **Collection of blood samples by finger stick, heel stick, ear stick, or venipuncture** as follows:
(a) from healthy, nonpregnant adults who weigh at least 110 pounds. For these subjects, the amounts drawn may not exceed 550 ml in an 8 week period and collection may not occur more frequently than 2 times per week; or
(b) from other adults and children [2], considering the age, weight, and health of the subjects, the collection procedure, the amount of blood to be collected, and the frequency with which it will be collected. For these subjects, the amount drawn may not exceed the lesser of 50 ml or 3 ml per kg in an 8 week period and collection may not occur more frequently than 2 times per week

☐ 3) **Prospective collection of biological specimens** for research purposes by noninvasive means.
Examples: (a) hair and nail clippings in a nondisfiguring manner; (b) deciduous teeth at time of exfoliation or if routine patient care indicates a need for extraction; (c) permanent teeth if routine patient care indicates a need for extraction; (d) excreta and external secretions (including sweat); (e) uncannulated saliva collected either in an unstimulated fashion or stimulated by chewing gumbase or wax or by applying a dilute citric solution to the tongue; (f) placenta removed at delivery; (g) amniotic fluid obtained at the time of rupture of the membrane prior to or during labor; (h) supra- and subgingival dental plaque and calculus, provided the collection procedure is not more invasive than routine prophylactic scaling of the teeth and the process is accomplished in accordance with accepted prophylactic techniques; (i) mucosal and skin cells collected by buccal scraping or swab, skin swab, or mouth washings; (j) sputum collected after saline mist nebulization.

☐ 4) **Collection of data through noninvasive procedures** (*not involving general anesthesia or sedation*) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. (*Studies intended to evaluate the safety and effectiveness of the medical device are not generally eligible for expedited review, including studies of cleared medical devices for new indications*.)
Examples: (a) physical sensors that are applied either to the surface of the body or at a distance and do not involve input of significant amounts of energy into the subject or an invasion of the subject=s privacy; (b) weighing or testing sensory acuity; (c) magnetic resonance imaging; (d) electrocardiography, electroencephalography, thermography, detection of naturally occurring radioactivity, electroretinography, ultrasound, diagnostic infrared imaging, doppler blood flow, and echocardiography; (e) moderate exercise, muscular strength testing, body composition assessment, and flexibility testing where appropriate given the age, weight, and health of the individual.

☐ 5) **Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis)**. (*NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(4). This listing refers only to research that is not exempt.)*

☐ 6) **Collection of data from voice, video, digital, or image recordings** made for research purposes.

☐	7)	**Research on individual or group characteristics or behavior** (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (*NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.*)
	8)	**Continuing review of research previously approved** by the convened IRB as follows: a. where (i) the research is permanently closed to the enrollment of new subjects; (ii) all subjects have completed all research-related interventions; and (iii) the research remains active only for long-term follow-up of subjects; or b. where no subjects have been enrolled and no additional risks have been identified; or c. where the remaining research activities are limited to data analysis. STOP: For Continuing Review, please complete the Continuing Review/Final Report Form
	9)	**Continuing review of research, not conducted under an investigational new drug application or investigational device** exemption where categories two (2) through eight (8) do not apply but the IRB has determined and documented at a convened meeting that the research involves no greater than minimal risk and no additional risks have been identified. STOP: For Continuing Review, please complete the Continuing Review/Final Report Form

PROJECT DESCRIPTION

1. Project Summary/Abstract (Limited to 250 words): The study explores three school districts identified through data obtained from Technology and Information Educational Services (TIES), a Minnesota-based educational technology collaborative owned by 48 member districts. A survey of district-wide support services in interactive technology will be conducted at these sites with district administration, technology coordinators, and elementary classroom teachers. Surveys and interviews will take place at the beginning of the new year; 2018. The first data collection instrument in the study was a ten question, online survey which contained ten forced-choice questions focused on district leaders' perceptions on their supports and resources for implementation of interactive technology in the elementary classroom. The second survey instrument in the study is a twenty question, online survey which contained ten forced-choice questions focused on elementary classroom teachers' perceptions on districts support and resources provided to enable them to integrate interactive technology into their instruction. There were also three questions which allow elementary classroom teachers to choose from a variety of options related to different interactive devices that they use in their instructional delivery, the other seven questions address teachers perceptions of the importance of supports and resources needed to effectively use interactive technology in their instruction. The second data collection instrument focused on one-on-one interview opportunities provided to twenty-seven study respondents who volunteered to expand upon survey questions with the researcher in person. Total study participants surveyed included: district administrators, district technology specialist, school technology integrationists, and classroom elementary teachers.

2. Purpose of the research (Limited to 1 sentence): **The purpose of the study is to ascertain how school administration can support and guide teachers to be more effective in their use of interactive technology in the elementary classroom.**
3. Research question(s), if applicable include hypothesis: The study was focused on five critical questions:

   1. What resources did select school district superintendents, technology personnel, principals, report were provided to elementary classroom teachers to support use interactive instructional technology in their classrooms?

   2. What did select elementary teachers identify as the level of importance of the specific district and site resources/supports needed for the integration of interactive technology in the elementary classroom?

   3. What did select elementary teachers report as their frequency of use of specific methods of interactive technology in their elementary classrooms?

   4. What resources and supports did select elementary classroom teachers report were essential to implement interactive technology in their elementary classrooms

   5. What types of interactive technologies did select elementary teachers report were used were used for assessment, instruction and student activities?
4. Research design, if applicable, include independent/dependent variables: **The research methodology employed in the study will be a mixed method design, employing both quantitative and qualitative approaches. The researcher will gather quantitative data from five stakeholder groups, including: district leaders, district technology specialists, elementary school technology integrationists, elementary school leaders, and elementary classroom teachers. The respondents will be surveyed through administration of online-based research tool, SurveyMonkey. The researcher will gather qualitative data from a smaller subset of the sample group to provide depth of understanding about the quantitative responses of sample group members. Texas and Massachusetts School Technology and Readiness Chart (STaR Chart) was used as the template for developing the survey questions and interview questions.**
5. Describe/List in experiential fashion what activities/behaviors participants will be required to complete during the research project: **survey and interview questions**

PARTICIPANTS

6. Description of potential participants: **School administrators, technology coordinators, technology integrationalists, classroom teachers.**

   Number of Participants: **approximately 300**

   Age(s): ☐ 0-7 ☐ 8-17 ☒ 18 or above

   Describe demographic characteristics of potential participants: **middle income professionals**

   Urban/suburban

7. Potential participants will be ***limited*** to specific populations:

Yes	**No**	

☐	☒	Children (under age 18)
☐	☒	Prisoners
☐	☒	Pregnant women
☐	☒	Economically/educationally disadvantaged
☐	☒	Cognitively Impaired; having trouble remembering, learning new things, concentrating, or making decisions that affect everyday life. Cognitive impairment ranges from mild to severe.
☐	☒	Non-English speaking
☐	☒	Students of specific/targeted organization where information collected could affect the participants academic standing or reputation if the participant is identified
☐	☒	Employees of a specific/targeted organization where information collected could affect the participants financial standing, employability, or reputation if the participant is identified
☐	☒	Other:
If you checked "YES" to any, provide rational for limiting/targeting a specific population and describe safeguards that will be used to protect potential participants:		

PARTICIPANT RECRUITMENT AND COMPENSATION

8. Techniques that will be used to identify, recruit and access potential participants (check all that apply, and ***at least one MUST be yes*** to explain how potential participants will be recruited):
9.

Yes	**N/A**	**Source**	**Support Letter Required by IRB**
☒	☐	Publically available listserves, directories, memberships, etc.	No
☐	☒	Non-public listserves, directories, memberships, etc. List Supporting Organization(s):	Support Letter(s) Attached ☐
☐	☒	Open advertising via internet/website announcement, bulletin board notices, telephone, letters or other	Advertisement or Script Attached ☐
☐	☒	Professor(s) allowing you to distribute materials in their classes; List Professor(s):	Support Letter(s) Attached ☐
☐	☒	Independent school(s)/Institutions of higher education willing to provide access to students; List School/College(s):	Support Letter(s) Attached ☐
☐	☒	Medical organization(s) willing to provide access to clients/patients: List Agency/Organization(s):	Support Letter(s) Attached ☐
☐	☒	Other, please explain:	Support Letter(s) Attached ☐

10. Will participants be compensated for participating in the research? ☐Yes ☒No
If yes, please provide additional information regarding compensation model:

Compensation Type	**Compensation Details**
☐ **Monetary**	Distribution Model: ☐ Completion of research procedures, OR ☐ Lottery/Give-away

Amount:	
☐ **Non-monetary**	Describe:
☐ **Extra Credit**	Describe other extra credit opportunities available to participants:

DATA AND PROCEDURES

11. Describe the data to be collected: The methodology employed in the study will be a mixed method approach, using both qualitative and quantitative measures. Three data collection tools will be used in the study to gather information on respondents' perceptions of the resources and supports provided to ensure implementation of interactive technology in the elementary classroom. The first data collection instrument in the study is a ten question, online survey which contains ten forced-choice questions focused on district leaders' perceptions on their supports and resources for implementation of interactive technology in the elementary classroom. The second survey instrument in the study is a twenty question, online survey which contains ten forced-choice questions focused on elementary classroom teachers' perceptions on districts support and resources provided to enable them to integrate interactive technology into their instruction. There is also three questions which allow elementary classroom teachers to choose from a variety of options related to different interactive devices that they use in their instructional delivery, the other seven questions address teachers perceptions of the importance of supports and resources needed to effectively use interactive technology in their instruction. The third data collection instrument focuses on one-on-one interview opportunities provided to study respondents who volunteered to expand upon survey questions with the researcher in person. Total study participants surveyed included: district administrators, district technology specialist, school technology integrationists, and classroom elementary teachers.
12.
13. How will data be collected (select all that apply):

Yes	N/A	Data collection Process
☒	☐	Surveys or data collection instrument (reminder: submit copy with IRB protocol)
☒	☐	Interview guide (reminder: submit copy with IRB protocol)
☐	☒	Other, please describe the research procedures and list tasks/activities participants will be asked to complete please explain

14. How will data collected be anonymous or confidential? (select only one):
☒ Anonymous; no names/identifiers will be collected, AND no signed consent form

☐ Confidential; identifiers collected will be not-linked to participant responses (i.e. signed consent is only identifiable data, identifiable data stored in a separate data set for raffles/drawings/give-a-ways, participant follow-up)

☐ For confidential data, explain IN DETAIL the coding process and when the key will be destroyed

15. How will data be storage and accessed?

Where will data be securely stored (password protected computer, locked file cabinet [include location], encrypted/secure file space, etc.)? **password protected computer**

If applicable, who will have access to the data key? **just myself**

Who will have access to the data set? **just myself**

16. How will results data be presented?

Yes	N/A	
☒	☐	Data will be presented in aggregate form, with no more than 2 demographics presented together
☐	☒	Direct quote will be presented If direct quotes will be presented: **Yes** / **No** ☐ / ☐ Participants will be able to review transcript, and make additions/omissions to quotes ☐ / ☐ De-identified quotes will be use; explain de-identification process:
☐	☐	Other, please explain

17. The raw data and/or coding key from this research will be destroyed *(Check ONLY one)*:

☐ when the study is complete
☒ when my degree is awarded
☐ within three years
☐ other:

RISKS AND BENEFITS

18. What are the anticipated benefits associated with this research? **Being able to share with other districts that are struggling to have a strong system inplace to support teachers in implementing interactive technology in the classroom to deepen the learning experience for students.**

19. What are the potential risks associated with this research? **None**

20. Does the research involve:

Yes	No	
☐	☒	Physical pain, discomfort, or injury from procedures or drugs
☐	☒	Undesired and/or unexpected psychological changes *(e.g. depression, anxiety, emotional discomfort, confusion, hallucination, stress, guilt, embarrassment, loss of self-esteem)*
☐	☒	Invasion of privacy/absence of informed consent *(e.g. covert observation, review of private medical or educational records, etc.)*
☐	☒	Sensitive information *(e.g. alcohol/drug use, sexual orientation, illegal activities, suicidal thoughts, physical/mental illness, violence, depression, gang related activities, psychological/physical abuse, pro-life/pro-choice, relationship issues, etc.)* that could result in social and economic harm *(e.g. civil/criminal liability or damage to financial standing, employability, insurability, reputation, etc.)* if a breach in confidentiality occurred.

☐	☒	Deceptive techniques *(e.g. giving false feedback about performance, staging an event or situation, concealing the purpose of the research, etc.)* ***A debriefing statement is required; see the handout on deception and the debriefing process.*** **If yes**, how will subjects be misled *(i.e. what information will be withheld or what false information will be provided)*? Describe when and how this deception will be revealed to subjects and provide a copy of the oral or written debriefing statement.
If you checked "YES" to any, what precautions will be taken to minimize or prevent potential risks, inconveniences, and discomforts *(e.g. anonymous data collection, presence of trained personnel who can respond to emergencies, etc.)*?		

INFORMED CONSENT PROCESS

21. The informed consent process begins when you first approach potential subjects and continues throughout your research. Potential participants must understand the nature of the study and the risks and benefits involved if they are to make an informed decision about their participation

Yes	N/A	All projects require consent, which form(s) will be used?
☒	☐	Implied Consent; a cover letter/page accompanying a confidential/anonymous survey to adults
☒	☐	Informed Consent; a signature form for a study with adult subjects
☐	☒	Parental/guardian Consent; a signature form for a study with subjects under the age of 18
☐	☒	Child Assent; a signature form for a study with subjects who are between the ages of 8 and 18 If study includes subjects under the age of 18, explain the procedures that will be used to obtain parental/guardian and child/minor assent (when applicable):

22. Develop your consent form, REQUIRED to be submitted with your IRB protocol. **Download the fillable consent template, complete by replacing [text brackets] with details about your study**.

Appendix F: IRB Approval

Institutional Review Board (IRB)

720 4th Avenue South AS 210, St. Cloud, MN 56301-4498

Name: Miriam White

Email: mjwhite@stcloudstate.edu

IRB PROTOCOL DETERMINATION: Expedited Review-1

Project Title: Effective Use of Interactive Technology

Advisor Kay Worner

The Institutional Review Board has reviewed your protocol to conduct research involving human subjects. Your project has been: **APPROVED**

Please note the following important information concerning IRB projects:

- The principal investigator assumes the responsibilities for the protection of participants in this project. Any adverse events must be reported to the IRB as soon as possible (ex. research related injuries, harmful outcomes, significant withdrawal of subject population, etc.).

- For expedited or full board review, the principal investigator must submit a Continuing Review/Final Report form in advance of the expiration date indicated on this letter to report conclusion of the research or request an extension.

-Exempt review only requires the submission of a Continuing Review/Final Report form in advance of the expiration date indicated in this letter if an extension of time is needed.

- Approved consent forms display the official IRB stamp which documents approval and expiration dates. If a renewal is requested and approved, new consent forms will be officially stamped and reflect the new approval and expiration dates.

- The principal investigator must seek approval for any changes to the study (ex. research design, consent process, survey/interview instruments, funding source, etc.). The IRB reserves the right to review the research at any time.

If we can be of further assistance, feel free to contact the IRB at 320-308-4932 or email ResearchNow@stcloudstate.edu and please reference the SCSU IRB number when corresponding.

IRB Chair:

Dr. Benjamin Witts
Associate Professor- Applied Behavior Analysis
Department of Community Psychology,Counseling, and Family Therapy

IRB Institutional Official:

Dr. Latha Ramakrishnan
Interim Associate Provost for Research
Dean of Graduate Studies

OFFICE USE ONLY

SCSU IRB# 1762 - 2233	**Type:** Expedited Review-1	**Today's Date:** 3/30/2018
1st Year Approval Date: 3/30/2018	**2nd Year Approval Date:**	**3rd Year Approval Date:**
1st Year Expiration Date: 3/29/2019	**2nd Year Expiration Date:**	**3rd Year Expiration Date:**

Appendix G: Survey Questions—Administrators and Technology Coordinators

Based on your perceptions, please rate the following items as either: Initiated (limited support/resources) Developing (regular access to support/resources) or Demonstrated (advanced implementation of support/resources) with regard to resources and/or support for teachers' use of interactive technology in their classrooms:

1. On-site technical support
    a) Initiated
    b) Developing
    c) Demonstrated

2. Professional development for teachers, both periodic and on-going, focused on interactive technology for instruction
    a) Initiated
    b) Developing
    c) Demonstrated

3. Internet connectivity in all rooms.
    a) Initiated
    b) Developing
    c) Demonstrated

4. Technology to support/enhance learning for all students, including special needs students
    a) Initiated
    b) Developing
    c) Demonstrated

5. Support for individual and class-wide technology needs (e.g. equipment, content access)
    a) Initiated
    b) Developing
    c) Demonstrated

6. Provision of professional development in instructional technology for new teaching staff.
    a) Initiated
    b) Developing
    c) Demonstrated

7. District-wide expectations that teachers will use technology as a component of instruction.
    a) Initiated
    b) Developing
    c) Demonstrated

8. Anytime learning (e.g. just-in-time support, online content) is available to teacher and students through a variety of delivery systems to support the use of techonology in each classroom
    a) Initiated
    b) Developing
    c) Demonstrated

9. Encouragement of the development of a school and community culture that supports integration of technology instruction.
    a) Initiated
    b) Developing
    c) Demonstrated

10. PLCs to encourage and assess the use of interactive technology to enhance student learning.
    a) Initiated
    b) Developing
    c) Demonstrated

Appendix H: Survey Questions—Elementary Classroom Teachers

Based on your perceptions, identify how frequently you use each interactive technology activity in your classroom.

1 I use technology for presentation and interactive student activities (communication, production, collaboration).
   a. Daily
   b. Several times a week
   c. Once a week

2 I use technology to access information to deepen lessons and student engagement
   a. Daily
   b. Several times a week
   c. Once a week

3 I use technology to support higher level learning objectives.
   a. Daily
   b. Several times a week
   c. Once a week

4 I encourage students to choose and use technology appropriate to assigned tasks.
   a. Daily
   b. Several times a week
   c. Once a week

5 I involve students in identifying a range of ways of using technology to achieve curricular objectives.
   a. Daily
   b. Several times a week
   c. Once a week

6 I use on-site technical support for collaboration and pedagogical guidance.
   a. Daily
   b. Several times a week
   c. Once a week

7 I collaborate and share with my colleagues new instructional technology resources I find that support student learning
   a. Daily
   b. Several times a week
   c. Once a week

For each question 8-10 please select all interactive devices that you **utilize** in your classroom.

8 Technologies I use to create flexible assessments for all students
   a. computer-based tools,
   b. digital recording devices,
   c. electronic portfolios
   d. other

9 Types of interactive technology devices I use in my elementary classroom for instruction.
   a) Interactive whiteboard
   b) iPads
   c) Chromebooks
   d) Other 1:1 devices

10 Type of interactive technology devices my students use in my elementary classroom.
   a) Interactive whiteboard
   b) iPads
   c) Chromebooks
   d) Other 1:1 devices

For questions 11-20 please rate your perceptions of the **importance** of the specific district and site resources/supports needed for the integration of interactive technology in elementary classrooms.

11 On-site technical support.
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

12 Professional development for teachers, both periodic and on-going, focused on interactive technology for instruction
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

13 Internet connectivity in all rooms.
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

14 Technology to support/enhance learning for all students, including special needs students
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

15 Support for individual and class-wide technology needs (e.g. equipment, content access)
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

16 Provision of professional development in instructional technology for new teaching staff.
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

17 District-wide expectations that teachers will use technology as a component of instruction.
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

18 Anytime learning (e.g. just-in-time support, online content) is available to teacher and students through a variety of delivery systems to support the use of techonology in each classroom
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

19 Encouragement of the development of a school and community culture that supports integration of technology instruction.
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

20 PLCs used to encourage and assess interactive technology to enhance student learning.
   a. Essential
   b. Important
   c. Somewhat important
   d. Not important

Appendix I: Interview Questions—Elementary Classroom Teachers

1. What do you believe are the three most important district or site resources that have helped you successfully implement interactive technology in your elementary classroom?
2. What do you believe are the three most important district or site supports (human or technical) that have helped you successfully implement interactive technology in your elementary classroom?
3. What specific supports at the building level, eg. leadership, professional development, PLCs, technical support, facilitated the efffective use interactive technology in your elementary classroom?
4. What other advice would you provide to teachers, principals, district leaders, what supports and resources need to be in place for those who are trying to implement interactive technology to facilitate student learning?

Appendix J—Information Letter and Consent Form for Invitation to be Interviewed

Date
Dear…

Your district was recommended to me by Mary Mehsikomer from TIES as one that has strong implementation of interactive technology in elementary classrooms. Because of that recommendation, this letter is sent to you and two other districts as an invitation to participate in a study that I am conducting as part of my doctoral degree in Educational Administration at St. Cloud State University.

The topic of the study is resources and support for effective implementation of interactive technology in elementary classrooms. To obtain data regarding the use of and support for interactive technology, two groups of district employees will each take a short 10 question multiple choice online survey: one group includes the superintendent, technology directors, integrationist-instructional techs, and elementary principals; the second group is elementary classroom teachers. Classroom teachers will have an additional 10 questions in their survey asking about how they use the technology and how often they use it. Teachers can also self- identify if they wish to participate in a three-question interview asking the benefits and challenges they experience in using interactive technology as a tool for student engagement and learning. Confidentiality of all participants will be maintained.

The study results should be useful to you and to other districts, school leaders and classroom teachers regarding the implementation, use and support of interactive technology in the classroom. I believe because you are actively involved in the management and operation of technology implementation and maintenance, you are best suited to speak to the various components needed to successfully implement such interactive technology as a teaching and a learning tool.

If you have any questions regarding this study, or would like additional information to assist you in making a decision about participation, please contact me at 218-760-0481 or by email mjwhite@stcloudstate.edu. You can also contact my advisor Dr. Kay Worner at 612-810-7986 or ktworner@stcloudstate.edu.

I assure you my study has been reviewed and received ethics clearance through the Institutional Review Board (IRB) at St. Cloud State University. The final decision about participation is yours to make. If you have comments or concerns about your participation in the study please contact the chair of IRB. (name)

Thank you in advance for your consideration of the invitation to participate in this study. I look forward to hearing from you.

Miriam White **(Signature)**

Miriam White
Doctoral Candidate
St. Cloud State University

Dr. Kay Worner
Advisor and Committee chair
St. Cloud State University

Consent Form

I have read the information presented in the information letter about a study being conducted by **Miriam White** of the Department of **Educational Leadership** at St. Cloud State University. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted.

I am aware that I have the option of allowing my interview to be tape recorded to ensure an accurate recording of my responses.

I am also aware that excerpts from the interview may be included in the dissertation and/or publications to come from this research, with the understanding that the quotations will be anonymous.

I was informed that I may withdraw my consent at any time without penalty by advising the researcher.

This project had been reviewed by, and received ethics clearance through, the IRB Board at St. Cloud State University. I was informed that if I have any comments or concerns resulting from my participation in this study, I may contact the Chair of the Research Ethics Review Board at **(Insert Phone # and E-mail).**

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

☐ YES ☐ NO

I agree to have my interview tape recorded.

☐ YES ☐ NO

I agree to the use of anonymous quotations in any thesis or publication that comes of this research.

☐ YES ☐ NO

Participant's Name (please print) _____

Participant's Signature _____ Date ____ _____

Researcher's Signature _____ Date _____

Researcher's Title _____ Department _____

Faculty Advisor Signature _____ Date _____

Faculty Advisor Title _____Department_____

Appendix K: Information Letter and Consent Form for Invitation to Complete a Technology Survey

Dear Administrators:

You are invited to participate in a research study regarding resources and support for effective implementation of interactive technology in elementary classrooms.

Administrators: in the study refers to superintendents, assistant superintendents, head principals, associate principals, assistant principals, as well as deans of students.

If you agree to be part of the research study, you will be asked to answer 10 survey questions about your perceptions with regards to resources and/or support for teachers' use of interactive technology in their classrooms.

Benefits of the research: The benefits of the study include providing insight to administration about the perceptions of elementary classroom teachers regarding resources and support for effective implementation of interactive technology in elementary classrooms. Furthermore, the study's findings may provide recommendations that lead to professional growth and development in the effective use of interactive technology in elementary classrooms.

Risks and discomforts: There is no foreseeable risks or discomfort for participants.

Confidentiality: Data collected will remain confidential. Data will be reported and presented in aggregate form with no more than two descriptors presented together. For interviews, responses will be kept strictly confidential, your name will not be disclosed nor will identified direct quotes be used. During the interview, you may refuse to answer any question. All data will be kept on a computer secured with a password and destroyed upon completion of the dissertation.

Participating in the study is completely voluntary. Your decision whether to participate will not affect your current or future relations with St. Cloud State University, or the researcher. If you decide to participate, you are free to withdraw at any time without penalty.
Your completion of the survey indicates that you are at least 18 years of age as well as your consent to participate in the study.

If you have questions about the research study, you may contact Miriam White at mjwhite@stcloudstate.edu or Dr. Kay Worner, faculty advisor, at ktworner@stcloudstate.edu. Results of the study will be published at the St. Cloud State University Repository.

Appendix L: Information Letter and Consent Form for Invitation to Complete a Technology Survey

Dear Technology Coordinator and Technology Integrationalists:

You are invited to participate in a research study regarding resources and support for effective implementation of interactive technology in elementary classrooms.

Technology support: in the study technology support refers to technology specialists at district and site locations as well as other technology support personnel.

If you agree to be part of the research study, you will be asked to answer 10 survey questions about your perceptions with regards to resources and/or support for teachers' use of interactive technology in their classrooms.

Benefits of the research: The benefits of the study include providing insight to administration about the perceptions of elementary classroom teachers regarding resources and support for effective implementation of interactive technology in elementary classrooms. Furthermore, the study's findings may provide recommendations that lead to professional growth and development in the effective use of interactive technology in elementary classrooms.

Risks and discomforts: There is no foreseeable risks or discomfort for participants.

Confidentiality: Data collected will remain confidential. Data will be reported and presented in aggregate form with no more than two descriptors presented together. For interviews, responses will be kept strictly confidential, your name will not be disclosed nor will identified direct quotes be used. During the interview, you may refuse to answer any question. All data will be kept on a computer secured with a password and destroyed upon completion of the dissertation.

Participating in the study is completely voluntary. Your decision whether to participate will not affect your current or future relations with St. Cloud State University, or the researcher. If you decide to participate, you are free to withdraw at any time without penalty.
Your completion of the survey indicates that you are at least 18 years of age as well as your consent to participate in the study.

If you have questions about the research study, you may contact Miriam White at mjwhite@stcloudstate.edu or Dr. Kay Worner, faculty advisor, at ktworner@stcloudstate.edu. Results of the study will be published at the St. Cloud State University Repository.

Appendix M: Information Letter and Consent Form for Invitation to Complete a Technology Survey and be Interviewed

Dear Elementary Teacher:

You are invited to participate in a research study regarding resources and support for effective implementation of interactive technology in elementary classrooms.

Elementary Classroom Teacher, in the study, refers to k-6 classroom teachers. This does not include specialists such as art, music, physical education, or special education teachers.

If you agree to be part of the research study, you will be asked to answer 20 survey questions about your perceptions with regards to how frequently you use each interactive technology activity in your classroom, the selection of interactive devices that you utilize in your classroom, and to rate the importance of the specific district and site resources and/or support needed for integration of interactive technology in your elementary classrooms. You will also be asked if you would like to participate in a voluntary follow-up 4 question phone interview.
At the end of the survey, if you agree to do a phone interview you will share your email address to set up a time that is convenient for you.

Benefits of the research: The benefits of the study include providing insight to administration about the perceptions of elementary classroom teachers regarding resources and support for effective implementation of interactive technology in elementary classrooms. Furthermore, the study's findings may provide recommendations that lead to professional growth and development in the effective use of interactive technology in elementary classrooms.

Risks and discomforts: There is no foreseeable risks or discomfort for participants.

Confidentiality: Data collected will remain confidential. Data will be reported and presented in aggregate form with no more than two descriptors presented together. For interviews, responses will be kept strictly confidential, your name will not be disclosed nor will identified direct quotes be used. During the interview, you may refuse to answer any question. All data will be kept on a computer secured with a password and destroyed upon completion of the dissertation.

Participating in the study is completely voluntary. Your decision whether to participate will not affect your current or future relations with St. Cloud State University, or the researcher. If you decide to participate, you are free to withdraw at any time without penalty.
Your completion of the survey indicates that you are at least 18 years of age as well as your consent to participate in the study.

If you have questions about the research study, you may contact Miriam White at mjwhite@stcloudstate.edu or Dr. Kay Worner, faculty advisor, at ktworner@stcloudstate.edu.
Results of the study will be published at the St. Cloud State University Repository.

Appendix N: Information Letter and Consent Form for Invitation to Complete a Technology Interview

Dear Elementary Teacher:

You are invited to participate in a research study regarding resources and support for effective implementation of interactive technology in elementary classrooms.

Elementary Classroom Teacher, in the study, refers to k-6 classroom teachers. This does not include specialists such as art, music, physical education, or special education teachers.

Procedure: If you agree to be part of the interview portion of the research study, you will be asked to answer 4 questions about your perceptions with regards to the important resources and supports at the district and site level needed to successfully implement interactive technology in your classroom, and your advice to other teachers and administration who are working to implement interactive technology to facilitate student learning.

The interview will be recorded and transcribed so your thoughts and opinions are accurately documented. You will have the opportunity to review, revise or omit any or all of what has been transcribed.

Benefits of the research: The benefits of the study include providing insight to administration about the perceptions of elementary classroom teachers regarding resources and support for effective implementation of interactive technology in elementary classrooms. Furthermore, the study's findings may provide recommendations that lead to professional growth and development in the effective use of interactive technology in elementary classrooms.

Risks and discomforts: There is no foreseeable risks or discomfort for participants.

Confidentiality: Data collected will remain confidential. Data will be reported and presented in aggregate form with no more than two descriptors presented together. For interviews, responses will be kept strictly confidential, your name will not be disclosed nor will identified direct quotes be used. During the interview, you may refuse to answer any question. All data will be kept on a computer secured with a password and destroyed upon completion of the dissertation.

Participating in the study is completely voluntary. Your decision whether to participate will not affect your current or future relations with St. Cloud State University, or the researcher. If you decide to participate, you are free to withdraw at any time without penalty.
Your completion of the survey indicates that you are at least 18 years of age as well as your consent to participate in the study.

If you have questions about the research study, you may contact Miriam White at mjwhite@stcloudstate.edu or Dr. Kay Worner, faculty advisor, at ktworner@stcloudstate.edu.
Results of the study will be published at the St. Cloud State University Repository.

Acceptance to Participate in the research study regarding resources and support for effective implementation of interactive technology in elementary classrooms. You may withdraw from the study at any time without penalty.

Appendix O: Phone Interview Transcripts

Miriam: Thank you for being willing to meet with me.

Speaker 1: Okay.

Miriam: The first question I have for you is what do you believe are the three most important district or site resources that have helped you successfully implement interactive technology in your elementary classroom?

Speaker 1: Okay, so I had a question about that. Are you meaning technological tools that I learn in the classroom? Is that what you're asking?

Miriam: Honestly I'm open to any and all.

Speaker 1: All right. Let's kind of put question one as something I use on a daily basis. So, it would be my Smart Board, and my document camera, and my laptop, and actually I have four, because without the Smart Board, I have to have notebook software.

Miriam: Yes.

Speaker 1: So those are the four things I use daily most of the day.

Miriam: Okay. And can you talk about how ... give me a little more insight into how ... If we can branch from that a little bit into the use of them.

Speaker 1 Oh, okay. Well, we, and actually I, designed all the lessons that go with it, and I use it for teaching my math group. We have different groups in math, so mine is one the higher groups, so I use it to teach that. I use it to teach whole group reading to my whole class as a lesson or do phonics. I use it for unit study, and in that I include video clips and web-based information, so that the kids can get kind of a glimpse at different ways to see things technologically.

Miriam: That's okay. That's pretty

Speaker 1 That's pretty much what I ... And then I use it for writing workshop, because whenever I'm introducing a whole group lesson, I go back to my Smart lessons, and I introduce the concept to my class so that they can visually see what I'm talking about.

Miriam: Very nice. So, the second question I have for you is what do you believe are the three most important district or site supports, human or technical, that have helped you successful implement interactive technology in your elementary classroom?

Speaker 1: Well, Notebook software, any kind of software that runs a Smart Board or Prometheus is absolutely necessary, because it makes it interactive. I teach first grade, so it has to be a lot of up and down, having them touch it, move things around. So my lessons are very hands-on.

Miriam: Can I ask you a question?

Speaker 1: Sure.

Miriam: Now, do you have an Apple computer? Or do you have a PC?

Speaker 1: The district gives us a PC, and it's a tower, and it's attached to my Smart Board. What I'm talking to you on right now is an Apple because I'm an Apple person. This is my laptop.

Miriam: I have an Apple, and when I teach kids how to use Smart Boards at the college here, it does not like Adobe. And so I was wondering.

Speaker 1: Just a second. Hang on a minute. Thank you. They're having some kind of thing after school. I'm sorry, can you say that again?

Miriam: Oh, you're fine. It doesn't like Adobe. And I was gonna ask you what you use to mitigate that problem.

Speaker 1: Okay, well the Flashplayer doesn't work with Notebook, and that's the program that runs Smart Boards. They've eliminated the Adobe Flashplayer from their programs, but it doesn't keep it from running.

Miriam: No, I know. It's just some of the fun stuff.

Speaker 1: Well, anything technological is kinky. You just have to look at it and figure out how it's gonna work with what you have, which is why I do a lot of ... I did a lot of prep for the Smart Board in the summer, where I actually went our and pulled the lessons together and used things that worked and threw away things that didn't.

Miriam: Nice. Very cool.

Speaker 1: I think it's real important for young people, and I've had student teachers, that they learn to create something that's going to work for them with whatever they have to use, because every district is different.

Miriam: Right. Yep. Very cool. And I think I stopped you at the first one. So if you can keep going.

Speaker 1: For what? I forget what we were talking about.

Miriam: Sorry.

Speaker 1: It's 3:45, you know.

Miriam: Yeah. What do you believe are the three most important district or site supports? So your first one was your Smart Board.

Speaker 1: All right, based on that, this is a school of 1,000-

Miriam: Did I lose you?

Speaker 1: No, I'm here. Hello?

Miriam: Can you hear me?

Speaker 1: Yeah.

Miriam: Okay.

Speaker 1: Okay. This is a school of 1,000 kids from one through five. I'm one of nine first grade teachers.

Miriam: Whoa.

Speaker 1: So, this is a very large school, and we all have Smart Boards. So in our building, we have a tech person that just runs interference for us. So, that, in a school this large, is very important because it enables me to keep going while they're trying to figure out what's going on with whatever problem it is. So that's huge.

Miriam: Yeah.

Speaker 1: The tech support on a daily basis, when we've had it without and we've had it with, it makes teaching much easier when you're not trying to call the Help Desk, and they're telling you to do it while you've got 21 kids going crazy in the background. So, that's something that we put on our priority list here as far as our building dollars go. So, that would be my second thing I think, just to keep the day running smoothly. The third thing, I think, and this is something the district doesn't do, they don't trust the teachers just to problem solve. For us, it's more like you have to call the Help Desk, or you have to call Gene, who's our tech support. I can change a light bulb but they don't let me. So I'm looking at my LCD player and I can see the bulb's out, but they have to go through a whole bunch of red tape. So, I think enabling teachers to ... teaching them so they can function on their own without being so dependent on someone else for technology. There are so many teachers I know that are not technologically able even now, because we're not allowed to be.

Miriam: Yep. No, I hear you there. So, next question is what specific supports at the building level, like leadership, professional development, PLCs, technical support, facilitate the effective use of interactive technology in your elementary classroom?

Speaker 1: I'd say my number one thing, and I've said this for many years, is professional development. And within that, there are two parts. The first one is teaching people how to operate the machinery and problem solve. Secondly, not just showing it to them, but showing them what possibilities there are out there that you can use, because the first time I ever fell in love with a Smart Board, I went to a school, that's all they used there. It was a primary school. And I could see what they were doing with it, and it applied to

what I was doing. And that's the most important thing is showing what those possibilities ... Because teachers are so busy, and young teachers are just overwhelmed. And they have to be shown what they can do with it before they can do something with it. So, I think that's a big thing.

We're big on PLCs in my district. We meet every Wednesday and we create site goals, and I think we really haven't done a tech goal, but I have a lot of young kids in my unit this year that are coming to ask for my advice on different things. And so again, I think you put them out here, and they know all the mechanical parts of it, but they can't see what you can do with it. So that's huge. And you have to have an administration that supports technology and has a vision for technology, which affects how your building operates on a technological level, because if the office doesn't care about it then it's not happening.

Miriam: Yep.

Speaker 1: Unless you have a teacher like me that really pushes for it.

Miriam: I like that. The last question is what other advice would you provide to teachers, principals, district leaders about what supports and resources need to be in place for those who are trying to implement interactive technology to facilitate student learning?

Speaker 1: Well, they have to be willing to spend the money on getting the equipment, and they have to believe that their teachers can do something with them. But teachers also have to have professional development on what they can do with it. We just don't have time. And I'm a techo-geek, so I do stuff like this because I like it, but most teachers don't have time nor the interest in doing it. We have to get them excited about it, but the only way we're gonna do that is if the administration supports the current ... Technology's changing every day. It changes every minute. And you have to look at what the future is and have a vision for what that might look like in five years in your building. And it can't be because I don't wanna spend the money, it has to be what we need to do to educate the kids that we have right now, because their lives are all about tech, they don't know anything different.

Miriam: Yeah. I totally agree with you.

Speaker 1: So you've gotta get on board and jump in the next century.

Speaker 2: Okay, can you hear me now.

Miriam: I can hear you just fine.

Speaker 2: Great, and I can hear you.

Miriam: Good deal. Okay, and I know it's recording, so question number one again. What do you believe are the three most important district or site resources that have helped you successfully implement interactive technology in your elementary classroom?

Speaker 2: Sure. Having one-to-one devices, so that students have instant access, makes it easier for me to plan. I don't have to schedule things way out in advance, that kind of thing. We are using Chromebooks, and that's super helpful, because it's a quick on and off. Laptops take so long to connect up, and to turn on, and to shut down. And I, just like a few years ago, started to use Google Suites a lot, and so just that students had that everything in one spot is really very helpful to them, especially elementary students.

Miriam: Beautiful. The second question is what do you believe are the three most important district or site supports, human or technical, that have helped you successfully implement interactive technology in your elementary classroom?

Speaker 2: Right. One of the requirements we had when we first started, the district started going towards trying to build up to one-to-one devices for students is the requirement that we teachers who wanted to participate had to be in professional development. So we built up our skill right along with, hopefully ahead of, the students. And there's been several different ways to do that. We had a program that was called Summer Camp 2.0, where ... and it was in the summer. There was all kinds of technology things we had to learn how to do, to use Storybird, to make screen casts, before we even called them screen casts, and just make all kinds of things so that we were actually consumers ourselves of the software, or of technology.

And then we also had to be part of a group within our school, that the district had people come out and meet with us about how to use Chromebooks, how to use iPads, that was the first thing that we used, how they can be used in the classroom. And then we had to talk about how we actually did use them, and then support each other. If I did something in my classroom, I had to share it with the other people in my building so they could see and learn from me, and I could learn from them.

And we also have an on-site staff person right in our building. When we first started, you had to call the help desk, and they may or may not know what I was talking about. But now I can call the person right in the building, and she can pop down and help me with whatever troubleshooting I can't figure out.

Miriam: Nice.

Speaker 2: So those have been super helpful.

Miriam: Those sound great. Question number three, what specific supports at the building level, e.g. leadership, professional development, PLCs, technical support, which you've talked about all of them, facilitate the effective use of interactive technology in your elementary classroom? And you have addressed all them, but if you want to go a little more ... You've done an excellent job, but-

Speaker 2: Yeah. Well, you know, always having administrators who really find the value for students, and in our district, we spent a lot of time making sure that we had our language right, in that the kids aren't playing with the technology. They're using it, and we heard that repeatedly from our administration, "How are they using it?" And then also the support of, one thing I did a few years ago is I joined the Minnesota Coding Teachers Consortium, or Cohort, people from all across the state, and that, my school committed funds for me to go, but also allowed me to be out of the building for many days to go to those meetings, and super helpful just knowing you've got that support.

Miriam: Okay. I was going to ask you to repeat the name of that ...

Speaker 2: Oh, gosh. I got to look it up again. It's Minnesota Teachers That Code ... I got to look it up myself. Here, I'm going to ... Hold up really quick. Andrea Vasquez has been ... She's somewhere in the state. She was the person that started it, and gosh, there were people from all across the state, and we got together multiple times. TIES was a big support of it. If I can even find what that name is. It's a super long name, and then I haven't talked about it for a while. I'll keep looking while we talk.

Miriam: Okay.

Speaker 2: All right, it's Coding in the Classroom Leadership Cohort.

Miriam: Oh.

Speaker 2: That's what it was called.

Miriam: Yeah, very cool. Okay. Thank you. Now, did I interrupt you and you were going to finish a thought?

Speaker 2: No, I don't think so.

Miriam: Okay. Okay, sorry. And then finally, the last question is what other advice would you provide to teachers, principals, district leaders? What supports and resources need to be in place for those who are trying to implement interactive technology to facilitate student learning?

Speaker 2: You know, as much as we didn't like having that requirement that we had to be part of professional development ourselves, gosh, that's what moved me forward, just that very overt, I have to speak about how I'm using technology. And it wasn't that I had to do fantastic, wonderful things. It's just that I had to be prepared to talk about what it was. Our district had three of us teachers who were in the initial pilot talk with the school board, to make sure the school board knew what we were doing. And then we brought in devices, and had the school board try out some of the stuff we were having students do.

Miriam: Oh, I like that.

Speaker 2: That was kind of a nice wow for them. They kind of had a fun time using ... It was iPads that night, but they used iPads in ways that they hadn't before. And they could see how we were having students use them, so that was really helpful, and we talked about all the three different grade band levels.

Miriam: Yeah. Well, especially when you're looking at something that's expensive, to have those guys on board.

Speaker 2: Yes, and I think that year, the district had spent $150,000 on technology, and that's huge.

Miriam: Yeah.

Speaker 2: So, just having their support was good.

Miriam: Yeah. Oh, very cool. And I know I interrupted you again, but I was ... Like, I thought that was a great piece about the district, the school board, and getting them to see what you're doing.

Speaker 2: Mm-hmm (affirmative). Yeah. And having a person within the district. Susan Herder was our initial district person in Mounds View. She embraced technology. She understood it from the very ... You know, definitely led us, "Come, come, follow me," and she's a very dynamic person, and so she was there to kind of hold our hands and let us know, "You can do it." So that was really helpful.

Miriam: Oh, very cool. Well, I so appreciate you being willing to do this again.

Speaker 2: Sure.

Miriam: I can't tell you how much I appreciate it, so thank you, and I will get you a transcript of our conversation, for sure by Thursday, Friday, but possibly before, so-

Speaker 2: All right.

Miriam: Okay?

Speaker 2: Great.

Miriam: So, thank you very much.

Speaker 2: All right. Have a good night.

Miriam: Oh, you too. Bye.

Speaker 2: Bye bye.

Miriam White: Do you hear me?

Speaker 3: Yes, I can.

Miriam White: Oh, perfect. How are you doing?

Speaker 3: I'm doing fine, thank you.

Miriam White: So, you're Kathie.

Speaker 3: Yes.

Miriam White: My name's Miriam White, and I so appreciate you being willing to do this for me.. You have them in front of you probably?

Speaker 3: Yes, I do.

Miriam White: Okay. So I'm gonna read it, and then we can have a conversation and stuff also. Typically, it's been taking about 15 minutes, if that's okay with you.

Speaker 3: I have a meeting in-

Miriam White: 15 minutes?

Speaker 3: Yeah, I have to meet at 12:15 with someone else.

Miriam White: Okay. So, we'll get this going. The first question that I have is what do you believe are the three most important district or site resources that have helped you successfully implement interactive technology in your elementary classroom?

Speaker 3: The first one I would say would be human resources. We have a technology department for our district, and those people have come to our school and provided in-services, and so first of all I'd say the people. The second would be the in-services that they've provided. We had some after school or before school training sessions that would be maybe once a month, and we'd have kind of a site director, and he would be in charge of facilitating group conversations, and he'd show us different apps and different resources that were available for us to use, and particularly when we started using Chromebooks. And then another, our district partners with TIES to do conferences, and in the summer I took workshops on Google Classroom and just different applications that can be used with Chromebooks in the classroom. So I would say those three.

Miriam White: Very nice. Thank you. The second question is what do you believe are the three most important district or site supports, human or technical, that have helped you successfully implement interactive technology in your classroom?

Speaker 3: It's kind of the same answer I gave. I don't really know what would be different.

Miriam White: If you can build on some of the components

Speaker 3: We also have our media technology person, she kind of has both roles, and so she's a great resource if ever I have any questions. We also have, she and another technology teacher at our school, they're great resources. So I'd say with our district staff and then our site-based staff that support technology are very helpful.

Miriam White: Very nice. What specifics supports at the building level, such as leadership, professional development, PLCs, technical support help facilitate the effective use of interactive technology in your classroom?

Speaker 3: In our PLC, it's not so much that we don't really focus so much on technology. I would say from our building level, we have trainings with staff development, and sometimes we've incorporated use of technology, but not as much as say balanced literacy or math or our social curriculum, things like that. So it's more been an optional professional development, they've offered workshops, or like I said, before or after school. I think they called it a technology PLC that we met outside of our normal grade level one, and that was very helpful. And they called it Phase One and Phase Two when they started rolling out the use of Chrome Books, and that was very helpful. So, teachers that had used it in the previous year shared resources and different platforms and apps and things that were useful, and shared their ideas and how they incorporate it in their different lesson plans. So I think that was probably the most beneficial, those extra trainings. And we had one called ... what was it called? Tech Nerd Camp or something, we took it over the summer. And they had Level One, and then they had Level Two, and it was, oh, it was the best six-week long program. And it was mostly just online, and then we would meet I think three times over the summer. That was really helpful.

Miriam White: Oh, cool. Did they give you homework to do and stuff? Or how did they-

Speaker 3: Yeah, mm-hmm (affirmative). Yeah, we had to create a blog, and then it was all video-based, so we would watch the training videos, and then it would walk us through how to create a blog and how to create a website. Sorry, that's my alarm. Yeah, so that was really helpful. It was a lot of work, and we ... I think we got just enriched just a credit or clock hours for that.

Miriam White: Okay. The next one is what other advice would you provide to teachers, principals, district leaders about the supports and resources that you need to have in place for those who are trying to implement interactive technology to facilitate student learning?

Speaker 3: Yeah. I think it's key for them to offer courses like were offered through Moundsview, very helpful. And it was good that it wasn't mandatory, but it was strongly encouraged. They had different levels, and I participated in everything. And so, like the summer ones, they can't require that, that was very helpful for me. And they encouraged at least one person per team to take that, and then that person can kind of be a reference or point of contact for each PLC. So that's why I did it, and also because I wanted to make sure I was trained and could help my students best

use technology. And then I think ongoing professional development as part just the school-wide development, whatever they're training their teachers in, I think it would be good to include at the beginning of the year, middle of the year, end of the year something quick. And then have a contact person that we can reach out to train them.

Miriam White: I like that. Thank you. So, not too bad, right?

Speaker 3: Nope, not too bad.

Speaker 3: Bye-bye.

Miriam: Hello

Speaker 4: Hello. Is this Miriam?

Miriam: It is Miriam. How are you doing?

Speaker 4: Good.

Miriam: Good, was it easy to get hooked up?

Speaker 4: Yeah, it was fine.

Miriam: Good. Okay, so not to waste your time, 'cause I know you don't have a lot. I really appreciate you doing this for me. Were you able to look at the questions that I sent you?

Speaker 4: Yeah, just a little bit. Yup.

Miriam: Okay, that's okay. I'm gonna start with question number one. What do you believe are the three most important district or site supports (human or technical) that have helped you successfully implement interactive technology in the elementary classroom?

Speaker 4: We have a technology integrationist, which has been really helpful. Unfortunately, her position has been whittled down and whittled down, so it's becoming less helpful just because of her availability.

Miriam: Yeah.

Speaker 4: Then, it's kind of a pain, but it's helpful at the same time. We have a help desk ticket, so if we're having problems with our technology, we can go in and fill out a help desk ticket, which has been helpful, because then you don't have those phone calls going back and forth, and back and forth that we used to have to deal with.

Miriam: Mm-hmm (affirmative).

Speaker 4: Then, professional development time is very, very limited, but when we have it, it's very helpful.

Miriam: Okay. Very nice. I'll start with number one again now. What do you believe are the three most important district or site resources that have helped you successfully implement interactive technology in your elementary classroom?

Speaker 4: In each classroom we have intervention iPads, so-

Miriam: Oh, can you explain those?

Speaker 4: Yeah. Right now I have five iPads that are designated to my classroom. They're technically designated as a set for the grade level, but we, as a grade level, chose to break them up so that each classroom has five iPads, and then those iPads can be used for interventions with our students or extensions for their learning as well. A lot of

differentiation is allowed with that. I have kids working at their own independent levels every day.

Miriam: The programs that you use on the iPad, are they able to keep the data for you on how they're going?

Speaker 4: Some of them are. A lot of them that I find the most useful in keeping track of that data, are connected to a website, so they're not just at the app on the iPad. Like Raz Kids or Both are really helpful.

Miriam: Oh, I love Raz Kids. Okay, thank you. Number three. What specific supports at the building level, such as leadership, professional development, PLC's, technical support, facilitate the effective use of interactive technology in your elementary classroom?

Speaker 4: This one I had a hard time answering because there's really no support. Like I said, we have professional development things that we can go to or attend, but oftentimes, they're coinciding with something else or they're very few and far between. This year, we implemented Seesaw for our classrooms and we were supposed to have, each month, staff development available after school for 20 to thirty minutes, just quick snapshots of things, and I think that happened [inaudible 00:05:07].

Miriam: Twice?

Speaker 4: Yup.

Miriam: Oh. Yeah.

Speaker 4: Only one of those was I able to attend. There's a lot of things on Seesaw that I think are gonna be valuable, but I don't know how to use them, and so, what I'm doing is pretty basic, with that you would normally do with your Facebook. I think there's just so much more available that I haven't been able to tap into some of those things. I think our district is really lacking in that.

Miriam: Okay. Sounds good. Number four, what other advice would you provide teachers, principals, district leaders, what support and resources need to be in place for those who are trying to implement interactive technology to facilitate student learning?

Speaker 4: We are not given the opportunities for the professional development that we need, so we need those embedded and in place. Oftentimes, we're given a device with lots of apps or things on there, but no training on how to use them.

Miriam: Mm-hmm (affirmative).

Speaker 4: We have probably 50 apps on our iPad and I know how to use maybe five.

Miriam: Oh. Mm-hmm (affirmative).

Speaker 4: A lot of what's on the iPad are those ... the free trial, play this [crosstalk 00:06:34].

Miriam: Yeah. Yeah.

Speaker 4: My kids do those things, and then it's like, they can't go anywhere else with it because that was the free trial, so they get to play it once. Then the next kid can't even play it because it's limited to one time a day.

Miriam: Oh, serious.

Speaker 4: I think, administration and district leaders really need to listen to the teachers on what we want and what we need, and that's not happening.

Miriam: Got it. Very nice. Well, I know all three of the districts that I am doing this with do want this feedback, so I will be sending them the results of my survey and of my interviews. No names are involved, so don't worry about that. It's all ... oh, shoot. What is that word?

Speaker 4: Confidential?

Miriam: Yes. Thank you. I couldn't think. It is Monday for me. Thank you for your time. I really appreciate it. Later, probably tomorrow, I will send you a transcript of our interview and then if you can just look it over and make sure it looks accurate, and then just say yes it looks accurate, and then I can use that information. Okay?

Speaker 4: Yup.

Miriam: Have a good day.

Speaker 4: Mine will be great. Thank you, bye.

Miriam: How are you?

Speaker 5: I'm good.

Miriam: Good. Were you able to look over the questions?

Speaker 5: I was and I made some notes this morning.

Miriam: Okay, very cool. I'm going to start with, just asking you ... One second. There we go. Okay, the first question I'm gonna ask you is, what do you believe are the three most important district or site resources, that have helped you successfully implement interactive technology in your elementary classroom?

Speaker 5: Access to devices on a consistent basis this year. Devices that work with the apps that I want to use. The school helped me purchase a smart board several years ago. Part of it was paid for with a grant, but the school also paid for, so just allowing me to get that into my classroom also helped me a lot. Those are kind of the three things.

Miriam: Very cool. Second question. What do you believe are the three most important district or site supports, human or technical, that have helped you successfully implement interactive technology in your elementary classroom?

Speaker 5: Professional development time to actually explore a site. Knowledgeable staff, whether either they, person from the technology department or other staff members who are knowledgeable in technology, having time to just sit down and go over things with those people, and then PLC meeting times, where we have shared apps, or sites that we are using and giving each other time to maybe do a small mini session on how to use it and have a Q & A session with that has been helpful.

Miriam: When you have the first one you talked about, how was that set up?

Speaker 5: We had after school times and the end of the school year we're going to have breakout sessions. It was a half an hour session, where it was a small presentation. And then, you would bring along your laptop, so then they would present the information, how to use that resource, and then you were able to sit and just kind of play around with it, but then someone was there to help answer questions. You had kind of immediate feedback instead of getting all of this information, and then, now go.

Miriam: Yeah.

Speaker 5: Gonna try, and do it. No one is around to help you.

Miriam: Yeah.

Speaker 5 I would say that has been really helpful this year.

Miriam: That's once a month

Speaker 5: No. It has not been that consistent.

Miriam: Okay.

Speaker 5: It's been about twice ... I would say it'll be by the ... Cause we have one more coming up. It'll be three times that they've done that this year.

Miriam: Okay. Okay.

Speaker 5: Yeah.

Miriam: What specific supports at the building level, like leadership, professional development, PLC's, technical support, facilitate the effective use of interactive technology in your elementary classroom.

Speaker 5: That's kind of what I just ...

Miriam: Yeah.

Speaker 5: With the question you asked me. I mean it was the PLC's and the professional development time. The professional development time really was beneficial, because like I said, it was a short presentation. Now go and do it. I'm here to answer questions and then, there was usually somebody there also. I made sure that there was somebody else there that I worked with, that was going as well. We kind of both heard the same information, but [crosstalk 00:03:57] people don't always hear the same thing.

Miriam: Yep.

Speaker 5: We could kind of bounce ideas off of each other. One of the guys that worked next door to me, we were at these [inaudible 00:04:06] at the same time. Him and I have really used resource that came with our new math curriculum this year. That's actually ... I'm going to be doing one of the break out sessions, the end of the year, because I have used that a lot. It was just nice, because he used it a lot. We could kind of bounce ideas off of each other. "How are you using it? What do you do when this happens?" That was really beneficial, just to have somebody that I knew on a daily basis basically, that I could connect with.

Miriam: Yeah. Last question. What other advice would you give teachers, principals, district leaders ... What supports and resources need to be in place for those who are trying to implement interactive technology to facilitate student learning?

Speaker 5: Our district this coming year is getting all new technology. We're getting smart TV's. We're getting new sound systems. We're getting [inaudible 00:05:07] cams. They're going to be wireless. I sat in on one of the, kind of a short presentation thing. I can see staff getting extremely overwhelmed with that.

Miriam: Yeah.

Speaker 5: It's going to a lot of new stuff. They need to make sure that they are giving us sufficient training come next August. They really need to have monthly check-in's with us, because it's gonna be a lot of stuff coming at us at once. We need to make sure that whatever it is they're giving to us, to kind of give it us in chunks. "Now go back and try this." Check in with the next month. "How is it working? What's not working? What do we need to do to make sure that you're using those resources?"

I'm very excited. I mean, we can record lessons and then share with another teacher, or record a lesson and have a student watch it if they miss that day. I mean, there's gonna be some cool stuff, but if we don't have the right training, we're not going to be using it. It's not going to feasible. We had Apple TV come in several years ago. We got iPads. The iPads, wouldn't link up to the wifi here, so I just quit using it. They have to make sure that they check ahead of time. We didn't have enough wifi spots in the building. By the time they kind of got all of that in place, I was onto using something else.

Miriam: Do you know why they won't link up?

Speaker 5: We didn't have enough wifi spots in the building.

Miriam: Oh.

Speaker 5: Yeah. By the time they kind of got all of that in place, I was onto using something else.

Miriam: Yeah.

Speaker 5: I just haven't used it. I know the teachers were very frustrated, because they wanted to use it. It just wasn't working. They just need to make sure that when they roll out all of this new technology, that it works.

Miriam: Yeah. Yeah, that's a lot of money you're putting into it.

Speaker 5: It is. Yeah. The other thing I was thinking about was, kind of when we started getting iPads, it was like, every time I go to a meeting, "Here's a new app to try. Here's a new site to try." They need to limit that. Limit it to three to five maybe over the course of the entire year. Maybe three would be better. Have us just keep coming back and visiting those. What are you using? How are you using it? What can be do to support you, so that you can feel like you can comfortably use it in your classroom, because boy, they just kind of like to overwhelm with a bunch of stuff. I'm a little worried coming up next fall.

Miriam: Yeah.

Speaker 5: I would just think, you know, do the research before you roll it out.

Miriam: Yep. Very good. They have asked for my research findings, once I'm done. I will be sharing all of this with them too. Very cool. Thank you.

Speaker 5: You're welcome.

Miriam: Hello? Hello? Hello, Kelli?

Speaker 6: Yes, hello.

Miriam: How are you?

Speaker 6: Good, how are you?

Miriam: Good. Thank you so much for agreeing to do this for me. I really appreciate it.

Speaker 6: Yeah, no worries.

Miriam: Did you have a pretty good day today?

Speaker 6: I did. Yeah. It was pretty good for a Monday.

Miriam: There you go. Well, I'm gonna start with the first question, okay?

Speaker 6: Okay.

Miriam: What do you believe are the three most important district or site resources that have helped you successfully implement interactive technology in your elementary classroom?

Speaker 6: Three ... Well, we had smart board training when we got smart boards. Now that was probably like eight years ago now, but that was helpful. There were some follow up trainings, both at our school that were teacher led and then offsite led by trainers. That was helpful. We have a tech liaison person in our building most days. That may be a number two thing. Not really sure I have a great number three resource. There is a district tech person who sometimes gives us ideas. Like this year we have a new math curriculum he had some ideas for. But first grade, we don't have Chromebooks or anything, so we weren't really able to use a lot of his ideas. But, you know, that's there, I guess. That could be my number three thing.

Miriam: There you go. What do you believe are the three most important district or site supports, human or technical, that have helped you successfully implement interactive technology in your classroom?

Speaker 6: Okay, supports. Well, I guess this is gonna be pretty similar. I think the teacher led sessions, where people showed things that they really used in their own classrooms, especially with the implementation of the smart boards was really helpful. We also have a shared server, and so that's really helpful, like our grade level can share smart lessons or other ideas in a shared server folder.

Miriam: In the shared server folder, are they set up by grade levels or by subject, or both?

Speaker 6: Yeah, so we have a grade level one and then within our grade level one we have different subjects that we can all add to, or sometimes, people even keep their own so you could access it from other spots, too.

Miriam 2: Okay. Okay. Now-

Speaker 6: Was that only two?

Miriam: That's what I was thinking.

Speaker 6: Probably the person, the onsite person is the most helpful for helping you with technology problems.

Miriam: Okay. Very cool. What specific supports at the building level, such as leadership, professional development, PLC's, technical support, facilitates the effective use of interactive technology in your elementary classroom?

Speaker 6: Well, that is always part of our PLC goal is how we're using technology to meet whatever our goal is. This year our goals, our main goals have been within reading, so we have shared some reading lessons. Yeah, I guess through our PLC's and then we also do some, where we videotape ourselves teaching and watch it together. And so, we are often using technology in that as well.

Miriam: When you're doing the videotaping of your lessons, how do you guys talk about it, then? How do you set that up?

Speaker 6: Well, we do have a rubric, and so, it might depend, there's some designated rubrics that are ... I'm looking for how I set up the lesson, or I'm looking at my questioning. Sometimes our whole team will have a goal for a cycle, like we're all gonna look at how we're questioning. Sometimes that specific person might say, "Hey, I'm looking for more ideas in this realm, how I'm wrapping it up.", or something. Then we watch, and we talk through the rubric. We did before your second year of teaching ends, you have to take a, we call it peer coaching. It's like a class about how to communicate and talk about your ... the teaching that you're seeing.

Miriam: Oh, cool. Okay. The third, nope, the fourth question. What other advice would you provide to teachers, principals, district leaders about the supports and resources needed to be in place for those who are trying to implement interactive technology to facilitate student learning?

Speaker 6: Yeah, well I guess, I mean, probably the two main things is sometimes being in primary, 'cause I teach first grade, we don't always get a lot of the technology on the first pass through, at least. And so, sometimes the trainings have ended, and then we're not able to ... like if you took a training in something, but you didn't have that technology, you maybe don't remember what it's for two years later.

Miriam: Yeah, yeah.

Speaker 6: Kind of just keeping that training ongoing, I think, is helpful.

Miriam: Yeah, now you have somebody on site, do you talk to them about that fact?

Speaker 6: Yeah. I mean, it is sort of interesting. She, our tech liaison person, she doesn't ... she has done some of the trainings, like more when we've had a new way to take attendance or something. But she hasn't really done any of the training for smart boards or document cameras. Like I said, we don't have Chromebooks, but I don't think that was her that did the training. There's usually been an outside person. And so, then it seems like that kind of ends. I do know that we've given that feedback before. Like when some of us got smart boards in this first round through, and then we were the trainers of the next round through. That seemed, the smart board piece went off pretty well. But now, with the Chromebooks or tablets, or document cameras, different people have different things. It doesn't seem like maybe the training has followed through as well.

Miriam: Yeah. Okay. Well, thank you, very much for your time.

Speaker 6: Yeah

Miriam: I will be submitting this to get put into transcript form and then tomorrow I will send you a copy of it so you can look it over.

Speaker 6: Okay.

Miriam: You can just send me a response back either yes it looks okay or please fix this, or something like that.

Speaker 6: Okay. That sounds good.

Miriam: Thank you very much for your time. I appreciate.

Speaker 6: Hey, yeah, good luck with your research.

Miriam: Thanks. Have a good day.

Speaker 6: Bye bye. Yup, you too.