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Changes in special education teacher roles while implementing one-to-one devices in rural secondary public schools

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CHANGES IN SPECIAL EDUCATION TEACHER ROLES WHILE IMPLEMENTING ONE-TO-ONE DEVICES IN RURAL SECONDARY PUBLIC SCHOOLS

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Approval of Dissertation

We, the faculty supervising the work of Heather Farley, affirm that the dissertation, *Changes in Special Education Teacher Roles While Implementing One-to-One Devices in Rural Secondary Public Schools*, meets the high academic standards for original scholarship and creative work established by the EdD Program in Leadership Studies and the College of Education and Professional Development. The work also conforms to the requirements and formatting guidelines of Marshall University. With our signatures, we approve the manuscript for publication.

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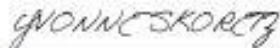2/20/2024

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Dedication

This work is dedicated to my family. To my parents, who taught me at an early age that education is important and that it is the only thing that can never be taken away from you. To my husband, Ray, for always being there for me, and to my son, Hunter. You are the best thing that has ever happened to me. Your smile means more to me than all the riches of the world. I love you all, and I am so proud to be your daughter, wife, and mom.

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Abstract

Successful technology integration takes many forms and performs several functions, but at its core, the integration of technology into a curriculum must feel seamless, be student-centered, and begin with the end goal in mind. The purpose of this study was to explore how the role and function of middle and high school special education teachers have changed after integrating one-to-one student devices in their classrooms. This study used a qualitative, phenomenological approach to look at how the roles of middle and high school special education teachers have changed due to the implementation of a one-to-one device initiative in a rural West Virginia school system. Semi-structured interviews were conducted with 21 teachers to answer research questions about the depth of technology integration in their classrooms. The study used the seven categories from the ISTE Standards for Educators (2017) to examine how teachers utilized digital instructional materials for students based on instructional goals, objectives, and the Individual Education Plans (IEPs) of their students. Additionally, this study explored the challenges and successes of one-to-one technology integration in the special education classroom. Findings have provided insight into how special education teachers are currently integrating one-to-one devices in their instructional practice and provided recommendations for future technology use in special education classrooms.

Chapter 1: Introduction

Technology integration in public schools has exploded since the introduction of the personal computer in the 1980s (Tamim et al., 2011). Although the use of technology in K-12 classrooms is widespread, not all researchers agree on what constitutes successful technology integration. Liu et al. (2016) define technology integration as any use of technology in a K-12 classroom that supports instructional methods, while Mishra and Koehler (2006) emphasized that teacher knowledge and use of technology are not the same as being able to teach with it. The US Department of Education Office of Instructional Technology (2017) suggests technology integration needs to be transformative to the educational process to be successful. Belland (2009) defined technology integration as a change in the social system inside schools and stressed the need for students to construct new knowledge with the technology they were using. Scherer et al. (2018) described technology integration in terms of how accepting teachers feel about new technologies, and whether those technologies are used meaningfully, while Alkhezzi and Ahmed (2020) defined technology integration as technology resources that become regular practice.

With the rise in the scope of technologies available, and several conflicting definitions of technology integration, it has become increasingly more difficult to determine what constitutes quality technology integration in classrooms. Popular technology frameworks, such as TPACK (Mishra & Koehler, 2006), SAMR developed by Puentedura (2014), and the Florida Center for Instructional Technology's TIM (2019), were created to help educators and administrators determine exactly how they are already using technology in their classrooms, improve their technology usage, and increase student learning.

Technological, Pedagogical, and Content Knowledge (TPACK) describes the three types of knowledge teachers need to be able to successfully integrate technology into their curriculum

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– knowledge of the technology, knowledge of teaching practice, and knowledge of the content they are teaching (Mishra & Koehler, 2006). According to Khan and Gul (2022), teachers who use TPACK to plan their lessons will be able to better use strategies that enhance their technology skills in the classroom (p. 201).

The Substitution, Augmentation, Modification, and Redefinition (SAMR) framework contains four successive levels of technology integration (Puentedura, 2014). The first level, Substitution, is where the technology is used as a substitute for a task that was previously performed manually. At the Augmentation level, the technology not only replaces a manual function, but the technology also improves the task, or learning, taking place. On the third level, Modification, the task is redesigned due to the inclusion of the technology. In the fourth level, Redefinition, the technology is used to create completely new tasks (Hamilton et al., 2016).

The Technology Integration Matrix (TIM) was created by the Florida Center for Instructional Technology in 2006 and contains five levels of technology integration along with five characteristics of meaningful learning environments (Florida Center for Instructional Technology, 2019). The matrix gives concrete examples of technology integration over the five levels and within the various learning environments. This integrated approach allows teachers to evaluate how they are integrating technology, and to gain new ideas and insights into how technology can be integrated in future lessons (Welsh et al., 2011).

While the goal of all technology integration frameworks is to support teachers in improving their ability to create successful learning environments, both the SAMR and TIM frameworks include multiple levels of technology integration, thus indicating there are different degrees of technology integration with different student outcomes. The objective of these different outcomes is to move from lower to higher levels of integration (Liu et al., 2016). To

meet these heightened technology integration objectives, the International Society for Technology in Education (ISTE) created technology standards to help educators successfully integrate technology at a higher level into their classroom routines. The ISTE standards provide a "comprehensive roadmap for the effective use of technology in schools," (International Society for Technology in Education, 2022a).

ISTE Standards

ISTE first published its National Educational Technology Standards (NETS) for students in 1998, the Technology Standards for Teachers in 2000, and the Technology Standards for Administrators in 2001. In the subsequent years, ISTE has renamed and updated these standards multiple times. The current ISTE Standards for Students were published in 2016, the ISTE Standards for Educators in 2017, and the ISTE Standards for Education Leaders in 2018 (International Society for Technology in Education, 2022b).

The ISTE Standards for Educators (2017) include seven categories: Learner, Leader, Citizen, Collaborator, Designer, Facilitator, and Analyst. Each of these categories is further divided into subcategories (See Table 1). These categories offer examples of exemplary educator actions aligned with the standard (International Society for Technology in Education, 2022a). The standards are used by teachers, schools, and school districts around the world to inform their professional development, teaching practice, communication, and collaboration (Zook, 2022).

Table 1

ISTE Standards for Educators (2017)

Standard	Subcategories
2.1 Learner	
	2.1a Set Professional Learning Goals and Reflect on their Effectiveness
	2.1b Participate in Local and Global Learning Networks
	2.1c Stay Current with Research that Supports Improved Learning Outcomes
2.2 Leader	
	2.2a Engaging with Education Stakeholders to Create a Shared Vision
	2.2b Advocate for Equitable Access
	2.2c Model the Phases of Adoption of New Digital Resources
2.3 Citizen	
	2.3a Create Experiences for Learners Where They Can Make Positive Contributions and Exhibit Empathetic Behavior Online
	2.3b Promote Curiosity and Critical Examination of Online Resources
	2.3c Mentor Students in the Safe, Ethical, and Legal Use of Digital Tools
	2.3d Promote Management of Personal Data and Digital Identity
2.4 Collaborator	
	2.4a Use Planning Time to Collaborate with Colleagues
	2.4b Collaborate and Co-Learn with Students
	2.4c Use Collaborative Tools to Connect with Experts, Teams, and Students
	2.4d Demonstrate Cultural Competency when Communicating with Students, Parents, and Colleagues
2.5 Designer	
	2.5a Use Technology to Create, Adapt, and Personalize Learning Experiences
	2.5b Design Authentic Learning Activities that Align with Content Standards
	2.5c Use Instructional Design Principals to Create Innovative Digital Learning Environments
2.6 Facilitator	
	2.6a Foster a Culture Where Students Take Ownership of Their Learning
	2.6b Manage the Use of Technology for Learning in Digital Platforms
	2.6c Create Learning Opportunities for Students to Innovate and Solve Problems
	2.6d Model and Nurture Creativity and Creative Expression
2.7 Analyst	
	2.7a Provide Alternative Ways for Students to Demonstrate Competency and Reflect
	2.7b Use Technology to Design and Implement Formative and Summative Assessments
	2.7c Use Assessment Data to Guide Progress and Communicate with Students, Parents, and Stakeholders

International Society for Technology in Education, (2022a)

One-To-One Device Initiatives

Tamim et al. (2011) assert that we are at a place in educational study where the question has become what types of technology are we using in our classrooms, and not simply whether we choose to use educational technology or not. Schoolchildren have become more and more connected. School districts have continued to invest in more technology and increasingly choose to implement one-to-one device initiatives where each student is given a mobile device to use for educational purposes (McClure & Pilgrim, 2022). Research from the U.S. Department of Education's National Center for Education Statistics (2021) found during the 2019-2020 school year, 45% of schools had a computer for each student, 64% of schools rated their internet connections as very reliable, and 15% of schools let the students take their computers home each day. In the same study, 42% of schools reported that leaders in the school have moderate or a lot of flexibility in choosing the types and amounts of technology purchased by the school.

One-to-one device initiatives help teachers deliver more personalized instruction, allow students to complete more creative and complex work, and cultivate students' technology skills (Peled et al., 2022). In a study of student academic engagement, including those with special needs, Greenwood et al. (2002) endorsed using computers as among the best instructional tasks for promoting academic engagement.

Varier et al., (2017) interviewed 18 elementary, middle, and high school teachers whose school district was implementing a one-to-one device program. Those teachers reported that, despite a steep learning curve and start-up issues, all participants experienced positive changes in the learning environment and with their students' motivation and learning. None of the teachers wanted to stop using the devices once they were able to incorporate them into their curriculum, and all teachers reported the devices afforded opportunities for students to develop 21st-century

skills. Donovan et al., (2010) found that although students with one-to-one devices were off-task during part of the time they were using the devices, teachers were accepting of this behavior because the learning had become more student-centered and individualized.

Special Education and Technology Integration

Teachers who work with students with special needs routinely customize instruction through Individual Education Programs (IEPs) and Section 504 of the Americans with Disabilities Act (ADA), resulting in individualized practices for effective education (Zirkel, 2019). One-to-one technology device programs, where each child is given a mobile device by the school or district, also support personalized instruction and assessment (Zheng et al., 2016). When special education teachers adeptly integrate mobile technologies into their classrooms, students are afforded opportunities for individualized learning interventions (Qahmash, 2018).

Wooten et al. (2021), looked at how choosing technologies for special education students changed during the pandemic and suggested special education teachers increase collaboration, review new technologies for accessibility features, and solicit feedback on technologies in the classroom from students and their parents. These three suggestions parallel the ISTE Standards 2.4, 2.1c, and 2.7c (International Society for Technology in Education, 2022a). Wooten et al. also suggest special education teachers become advocates for their students by contacting technology companies and asking for more accommodations and support for people with special needs, forming partnerships with the technology managers in their district to focus on how technologies can best help their students, use data to determine the effectiveness of the technologies used in the classroom, and use the collective buying power of school districts to purchase technologies with accessibility options (p.156). Courduff and Moktari (2021) studied the experiences of special education teachers who successfully integrate technology in their

classrooms, and also found the need for special education teachers to advocate for themselves and the technologies they require.

Study Context

The school system being studied is a small, rural county in southern West Virginia with a population of 8,465 students and 611.5 classroom teachers (National Center for Education Statistics (NCES), 2022). In response to the COVID-19 pandemic, the school system began a one-to-one device program. In the fall of 2020, each child was given either an iPad (students in grades Pre-K – 2) or a laptop computer (students in grades 3-12). Special education students whose IEPs required an iPad for their individual needs were given an iPad instead of a laptop, regardless of grade level. In addition to the new devices, the school system adopted Schoology as their official Learning Management System (LMS). All teachers were given professional development on the use of the devices and the use of Schoology at the beginning of the 2020-2021 school year.

Prior to the 2020-2021 school year, all classroom teachers had a Smartboard installed in their classrooms, and laptops were issued to the teachers to be used with those boards. All schools had at least one set of student laptops and/or iPads that could be checked out for student use, and all secondary schools had multiple sets of student devices. The current school year, 2022-2023, is the third year of the one-to-one device initiative, where each student has their own assigned device they take with them from class to class, and then home each day.

Combining the ideas of technology integration, 21st-century learning through one-to-one device programs, and meeting the needs of diverse learners, this study will use the 2017 ISTE Standards for Educators as a framework for evaluating the impact of technology integration on the role of the teacher in secondary special education classrooms with one-to-one devices.

Problem Statement

Technology integration in schools, especially one-to-one device configurations, has the potential to transform special education by allowing teachers the ability to tailor instruction while making individualized accommodations for students with disabilities. Several studies have investigated the technological abilities and competencies of general education teachers in one-to-one computing environments (Fulton, 2022; Higgins & BuShell, 2017; Lindsay, 2015; Varier et al., 2017; Zhai et al., 2016; Zheng et al., 2016), but according to Yilmaz et al., (2021), there are few studies on the technological proficiencies of special education teachers in general, and more specifically, on the influence of one-to-one device integration on the role and function of the teacher. Using the ISTE Standards for Educators (2017) as a guiding framework, this study seeks to determine the impact of implementing a multi-year, one-to-one device initiative on the role and function of special education teachers in a rural school system.

Purpose Statement

The purpose of this study is to explore how the role and function of middle and high school special education teachers have changed after integrating one-to-one student devices in their classrooms. The seven categories from the ISTE Standards for Educators (2017): Learner, Leader, Citizen, Collaborator, Designer, Facilitator, and Analyst will serve as a framework to examine how teachers utilize digital instructional materials for students based on instructional goals, objectives, and the Individual Education Plans (IEPs) of their students. Additionally, this study will explore the challenges and successes of one-to-one technology integration in the self-contained special education classroom.

Research Questions

Specific research questions guiding the study include:

RQ1: To what extent, if any, did the implementation of a one-to-one technology device initiative influence the special education teachers' ability to leverage technology to improve practice and increase student learning?

RQ2: To what extent, if any, did the implementation of a one-to-one technology device initiative provide leadership opportunities for special education teachers to improve teaching and learning?

RQ3: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teachers to motivate students to participate in the digital environment positively and responsibly?

RQ4: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teacher collaboration with colleagues and students to improve practice, share resources, and problem-solve?

RQ5: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teachers' development of authentic learner-driven activities and environments that accommodate learner variability?

RQ6: To what extent, if any, did the implementation of a one-to-one technology device initiative affect the role of special education teachers in facilitating learning with technology to support student achievement?

RQ7: To what extent, if any, did the implementation of a one-to-one technology device initiative influence special education teachers' ability to understand and use data to drive instruction and support student achievement?

RQ8: What are the major challenges and concerns of special education teachers in implementing a one-to-one technology device initiative?

Significance

The significance of this study lies in contributing to the existing research on how the role and function of teachers change as they integrate technologies in their classrooms. The focus of this study – on secondary teachers of students with special needs – will fill a particular void in the research. While previous studies have looked at one-to-one initiatives in general education classrooms (Higgins & BuShell, 2017; Lindsay, 2015; Varier et al., 2017; Zhai et al., 2016; Zheng et al., 2016), and others have examined assistive technology in the special education classroom (Nepo, 2016; Pennington, 2010; Qahmash, 2018; Satsangi et al., 2019), few have looked at one-to-one technology use with special needs students (Harris & Smith, 2004). This study will explore how special education teachers integrate their one-to-one devices into their curriculum. As more school systems transition to students using one-to-one devices, understanding how teachers choose to use one-to-one devices with their students will help other special education teachers locate quality materials that coordinate with their students' Individual Education Programs (IEPs).

Chapter 2: Literature Review

Technology in education allows for both expanding the learning environment and bringing the outside world into the classroom (Varier et al., 2017). Increased student understanding, retention, and motivation are often attributed to increased access to technology in education, but this is not always the case (Donovan et al., 2010; See et al., 2021). The effective use of technology in the classroom depends on several factors, not just access to a particular hardware or software. One-to-one device initiatives facilitate increased student access to technology but come with challenges of their own. In addition to building a strong infrastructure - teacher training, seamlessly integrating the technology into the existing curriculum, and teaching students relevant 21st-century skills are the most important aspects of a successful one-to-one device implementation ("5 Steps to 1-to-1 Success," 2013).

ISTE Standards for Educators

The ISTE Standards for Educators (2017) are a guide to assist teachers in successfully integrating technology in the classroom. The seven categories identified by the ISTE Standards, Learner, Leader, Citizen, Collaborator, Designer, Facilitator, and Analyst describe the features of an ideal integration model for teaching in the twenty-first century (International Society for Technology in Education, 2022b). These elements can be difficult for any educator to master, but they can be especially hard for special education teachers – who not only have a curriculum to teach but also have students in their classes with a wide variety of special needs.

The review of the literature that follows is divided into the categories created by the ISTE Standards for Educators (2017). Each section takes one of the seven categories, Learner, Leader, Citizen, Collaborator, Designed, Facilitator, and Analyst, and examines current, relevant literature related to each of those teacher qualities.

Teacher As Learner

The first ISTE Standard for Educators describes how teachers should be learners themselves, continuously improving their pedagogy by setting goals, staying current with new technologies, and pursuing professional interests related to those technologies (International Society for Technology in Education, 2022a). As school systems exchange their textbooks for one-to-one technology devices, they have not always afforded teachers the professional development they need to be successful. In her study of teachers in a school system with a one-to-one device initiative, Knops (2017) found that teachers were not given the professional development they needed to fully integrate their new devices. In addition, the school systems were not clear about their expectations for teaching in one-to-one classrooms, and teacher attitudes were a major factor in their resistance to embracing the devices in their teaching practice. Conversely, the school system studied by Perry (2018) invested heavily in professional development sessions as they began their one-to-one device initiative, and the teachers not only reported a high level of comfortability with technology, but the researcher found the teachers using their devices with the students, some at the higher levels of the SAMR model.

Personal beliefs and attitudes regarding the value of technology in the classroom can influence how much time and energy individual teachers invest in learning about new technologies. Blackwell et al. (2013) described how access to technology in the classroom was not as important as personal attitudes regarding the value of that technology to their students. They did find, however, that more targeted professional development on specific technologies did positively influence teacher adoption, so the more a teacher learns about a technology, the more apt they are to see the value in it, and ultimately to use it (Blackwell et al., 2013). Njiku et al. (2019) also found teacher attitudes toward technology to be more important than access in

successful technology integration. Specifically, they found teacher anxiety tends to influence

attitude and behavior (p. 3050).

Teacher behavior and attitudes have been found to significantly impact student

achievement (Idris et al., 2021). Flitcroft and Woods (2018) conducted a literature review that

looked at the motivational behaviors secondary school teachers use to improve student

performance in their classrooms, specifically on achievement tests. A correlation between

negative feedback and poor performance, as well as the inverse relationship - between caring and

supportive teacher behavior and higher student achievement, were found. The study also

observed that students want their teachers to know more about the subject matter than they do (p.

118). This can be a significant issue with technology, since teachers may not know more about

the technologies being used in the classroom than the students. Again, according to Blackwell et

al. (2013), more professional development would be beneficial in this regard.

Ekanayake and Wishart (2015) developed professional development sessions for

secondary teachers looking to integrate mobile phones into their classrooms. The three-tiered

sessions included a hands-on portion, a time for collaboration and planning, and then a reflective

session after implementing their first lessons with students. Teachers who participated in the

sessions reported that the hands-on nature of the first professional development sessions not only

allowed them to learn how to use the devices themselves, but also to see the value the devices

brought to their classroom instruction. Learning how to use the new devices changed the

teachers' attitudes toward the technology, ensuring its use with students.

Special education teachers can be at a disadvantage when choosing technologies for their

students. Genc et al. (2021) suggested special education teachers do not have sufficient

knowledge and experience, nor do they feel competent in choosing technologies and digital

materials for their students. Qahmash (2018) also suggested teacher willingness and competency with the technology as important factors to consider regarding the adoption of technologies in the classroom. Teachers may not confidently integrate technologies they do not feel comfortable with themselves, but Yilmaz et al. (2021) observed that as special education teachers' professional experience increased, so did their competencies with technology integration.

Teacher as Leader

The ISTE standard regarding leadership challenges teachers to seek out opportunities to be leaders in the areas of educational technology teaching and learning. This includes advocating for equitable access to technologies, modeling the adoption of new technologies for learning, and engaging with education stakeholders to shape a shared vision for education that includes technology (International Society for Technology in Education, 2022a).

Masullo (2017) studied how teachers look to instructional leaders within their schools to influence their technology implementation practices. He found that informal leaders, classroom teachers who take on the role of "opinion leaders," earn the respect of the other teachers and are looked to as models within the school social system (p. 62). Teachers in Masullo's study reported technology leaders within the school shared lesson plans, gave insights and opinions on hardware and software choices, helped keep the equipment working well, modeled how different technologies helped make teachers more productive, and were willing to learn and train others. Masullo also recognized that the leader's willingness to be the first to try new things resulted in other teachers being more willing to follow.

This type of horizontal leadership was also described by Bingham (2021) who studied a successful three-year-long technology integration program on the high school level that included a 'pilot teacher' system. Pilot teachers were teacher-leaders who were willing to try new

technologies in their classrooms, report back to administration on successes and failures, and then collaborate with and train other teachers on those techniques and processes that proved successful.

This same idea, termed "distributed leadership" by Levin and Schrum (2013), was found to be one of the eight common characteristics of technology-rich school systems in their study of secondary school districts that creatively integrate technology. They found that a distributed leadership model, where teacher-leaders try out technologies first and then share their experiences with others, lends itself to creating a school culture that promotes problem-based learning and successful technology integration.

Green and Kent (2016) studied how teacher-leaders were created during a Math, Science, and Technology Initiative Fellows program (MSTI). The program offered teachers a year-long program of professional development in hands-on, inquiry-based learning in exchange for participants becoming MSTI leaders in their home schools. The program resulted in statistically significant increases in student achievement over two years, and participants credited the professional development they received as the primary reason for the program's success (p. 4).

Teacher as Citizen

The citizen standard of the ISTE Standards for Educators describes an educator who challenges students to become responsible citizens in the digital world (International Society for Technology in Education, 2022a). The West Virginia Department of Education requires all students receive instruction in cyber-safety/digital citizenship each school year. The school system being studied uses lessons created by Common Sense Media to fulfill that requirement (Digital citizenship, n.d.).

The expansion of social media usage necessitates the need for increased digital citizenship instruction for students. According to Perrin, (2015), a Pew Research Center report found young adult (ages 18-29) social media usage surged from 12% in 2005 to 90% in 2015. The same Pew Research Center study found sixty-five percent of adults reported using social media in 2015, up from 7% in 2005. Teachers and students alike live with an increased online presence that calls for an increase in digital citizenship.

Special education teachers are not exempt from the obligation to teach their students about digital citizenship, and Phillips and Anderson (2020) found there is a real need. Their study of librarians working with students with Autism Spectrum Disorder (ASD) found students with ASD are active social media users and online video game players, the same as any other teenager. Phillips and Anderson also found students with ASD are subject to the same cyberbullying and online harassment as their peers, demonstrating the need for digital citizenship education (p.265).

Zhong (2017) found digital citizenship instruction lacking in her review of three K-12 schools in Mississippi. The study found most educators relied on the digital content filter employed by the state to keep students off unacceptable websites, and the Acceptable Use Policy (AUP) signed by students and parents, where they promise not to participate in illegal activities online, to keep children from engaging in prohibited pursuits with their digital devices. The author recommended leaders, such as principals, who value technology to model its use for reluctant teachers, increase professional development that offers practical examples for teachers, and provide opportunities for teachers to share with each other and collaborate to help prepare students for living in a digital world (p. 36).

Teacher as Collaborator

The ISTE Standards for Educators includes a collaboration standard that advocates for teachers collaborating with each other, as well as the collaboration between teachers and students, as an important aspect of teaching twenty-first century skills (International Society for Technology in Education, 2022a). Teacher collaboration can be a powerful tool in school improvement (Bingham, 2021).

Special education teachers are often asked to collaborate with general education teachers through the process of inclusion. Courduff and Moktari (2021) interviewed special education teachers and found that although co-teaching is becoming commonplace in education, there are still misunderstandings between the groups of teachers and a culture of these are "my students" and those are "your students" still exists (p. 423).

In a review of 16 journal articles regarding teacher collaboration, Garcia-Martinez et al., (2022) found teachers use virtual collaborative work environments to exchange resources, engage in peer coaching, and work on group projects with other teachers, both in their own schools and with teachers in other schools. The study also looked at how teachers and students use social networks, such as Facebook, for educational use (p. 1737). The authors found these online learning communities strengthened relationships between the collaborators by sharing experiences beyond that which could have been achieved otherwise. The networks also created a culture of collaboration and allowed teachers to work on teamwork, reflection, and critical thinking.

In the three-tiered professional development sessions developed by Ekanayake and Wishart (2015), teachers were given time to collaborate while planning their integration of mobile phones into their secondary science classrooms. The teachers worked together during the

planning stages and then engaged in role-play to try out their plans on each other before taking them to the students. The teachers reported positive experiences sharing their knowledge and skills during the planning stages, and reported how the mobile phones fostered collaboration between their students during the implementation of the lessons.

Higgins and BuShell (2017), who studied the student-teacher relationship in a one-to-one technology environment, noted positive changes due to collaboration in classrooms where each child has their own device. They found when both the students and the teachers were willing to work together to use the devices to their full potential, the relationship between the student and the teacher improved.

Lock and Redmond (2021) spent 12 years facilitating and studying a collaborative online learning platform where preservice teachers, teacher educators, and current teachers talked and worked together. Designed so preservice teachers would have a place to ask questions of experts in the field, the experts reported that the collaborative space was a valuable learning experience for them, as well (p. 4). Since this was strictly an online collaboration space, the participants reported that the online environment could be both a help and a hindrance as the anonymity could be both freeing in some instances and hampered meaningful engagement in others (p. 7).

Teacher as Designer

The designer standard of the ISTE Standards for Educators urges teachers to create authentic, student-centered educational activities (International Society for Technology in Education, 2022a). In a study of eight secondary school districts with successful technology integration programs, Levin and Schrum (2013) found that integrating technology was never the goal. Instead, creating student-centered learning environments by changing the curriculum facilitated the successful incorporation of new technologies. Parker et al. (2019) identified four

dimensions of quality technology integration: choosing a technology type that matches desired outcomes, authentic applications of the technology, student-centered teaching practices, and making connections between the learning and the real world.

Technology frameworks such as TPACK, SAMR, and TIM can be used by teachers to design the use of technology in the classroom. Kimmons and Hall (2017) surveyed 129 preservice and in-service teachers to find out what features they valued in a technology integration framework, and which specific models aligned with those values. They found that teachers want technology integration frameworks to be aligned with a good, practical theory and that some models were more useful to teachers than others. The results of the survey showed that teachers value models that offer real-world, concrete applications with defined student outcomes. Not all teachers found value in the same model, which points to model usefulness being determined by individual preferences and the idea that there is not a single model available that meets the needs of all teachers (pp. 34-35).

Voithofer et al. (2019) looked specifically at how the ISTE Standards influenced preservice teachers' adoption of the TPACK model and described the ideal environment for adoption as one that included access to the various technologies, professional development for the teachers to utilize them, and numerous levels of support. A culture of collaboration, curriculum planning and development, as well as a shared vision of what technology integration should look like would empower teachers to create fully integrated lessons. Their study found that although only 38 percent of respondents currently utilized TPACK to create their lessons, there was a strong correlation between those who reported integrating the ISTE Standards to plan and their use of the TPACK framework (p. 1442).

Zheng et al. (2016) reviewed one-to-one device initiatives and found increased student-centered instruction, engagement, and enthusiasm, as well as increased achievement in English, writing, math and science. Amin Husni et al. (2022) found increased student achievement and retention as well, but only where the students exhibited an interest in their learning and put forth effort into their activities. Those students who put little effort into their coursework showed low or medium levels of retention, even while using one-to-one devices and an online Learning Management System (LMS).

Students want to know that what they are doing is meaningful, so teachers should take care to design meaningful activities. According to Varier et al. (2017), successful technology integration occurs when students feel engaged, invested, take responsibility for their learning, and see real-world value in their tasks. Their study described observing different one-to-one classroom implementations that varied by subject area. Students were viewed writing, revising, and editing in English classes, researching and creating presentations in social studies, looking for illustrations of concepts in science, and playing math games, taking quizzes, and completing homework in math classes.

According to Wooten et al. (2021), technology will continue to be a critical tool used by teachers to deliver curriculum and support students with special needs, and the use of technology to teach and enhance twenty-first-century skills can be considered an authentic application of the technology. Varier et al. (2017) listed submitting online assignments, typing instead of writing, and completing homework during free time as factors that increase student efficiency and show increased engagement from the use of one-to-one devices.

Satsangi et al. (2019) developed three guidelines to help teachers choose assistive technologies for secondary students with special needs. These guidelines are whether the

technology helps the student develop autonomy, the preference of the student, and the social implications of the assistive technology. According to their research, for any assistive technology to be effective, it must help the student become more self-sufficient, be preferred by the student over other methods of engagement, and not be socially embarrassing or stigmatizing for the student to use (Satsangi et al., 2019).

The adaptability of technology is noted by Genc et al. (2021) as a positive outcome of the authentic application of technology in education. The learning environments created by technology can be easily adapted for different student characteristics, resulting in accessible and productive special education classrooms. In a study conducted by Zheng et al. (2016), teachers who used one-to-one laptops in their classrooms were more able to individualize instruction and meet individual student learning needs.

Teacher as Facilitator

The ISTE Standards for Educators task teachers with becoming a facilitator of student learning (International Society for Technology in Education, 2022a). The shift from a teacher-centered classroom, where the teacher is the giver of knowledge, to a student-centered classroom, where students construct their own knowledge, is made easier with the integration of one-to-one devices, according to Varier et al. (2017). Their meta-analysis of 96 one-to-one laptop initiatives found an increase in project-based learning and student-centered learning environments. The teachers they interviewed described how the integration of devices changed their classrooms from teacher-centered to student-centered environments where students were working independently, and teachers were acting more as facilitators than teaching directly.

Peled et al., (2022) found similar results when they followed a one-to-one device program implemented in a junior high school over a five-year period. The researchers observed

the teachers and conducted semi-structured interviews to track the changes in teacher behavior and their perspectives on the one-to-one devices. One teacher reported an advantage of teaching with laptops was the students began to take responsibility for their own learning. Before the one-to-one implementation, teachers described feeling as though they were responsible for student learning since they were at the front of the class teaching in a traditional manner, but after the one-to-one device implementation, the students became more responsible for their learning and teachers acted more as facilitators.

While studying a student-centered teaching model, Inquiry Based Learning (IBL), in online learning environments, Amin Husni et al. (2022) looked at the relationship between student motivation, cognitive engagement, and cognitive retention. The researchers noted students benefit from one-to-one device initiatives in part because of the increase in IBL (p. 185). In the course being studied, those students with the highest levels of retention were also those who were actively engaged and motivated to participate in the inquiry activities and discussions. Only 2 out of 16 students showed low levels of retention, and those students put in the lowest amounts of effort. The study concluded online IBL successfully enhanced student participation and learning.

When Maceira and Wong (2017) studied the integration of iPads in library science classes they found a change occurred in classroom dynamics. Collaborative workspaces allowed for more fluid interactions resulting from the students' observations and questions. The teachers in this study used the SAMR framework to create lessons where students were actively engaged, and the teachers acted more as facilitators than lecturers. The teachers reported increased creativity, engagement, and reflection from their students while using the iPads.

Higgins and BuShell (2017), who looked at how relationships between teachers and students have changed due to one-to-one device programs in schools, described how the teacher-student relationship has expanded beyond the classroom and into a global community thanks to online features such as LMSs and email. Peled et al. (2022) also found one-to-one laptop use allowed for communication between teachers and students that extended the learning beyond the classroom and the traditional school day.

Teacher as Analyst

Using technology for the sake of using technology will not improve student achievement. The ISTE Standards for Educators (2022a) includes a standard that charges teachers with analyzing and using data to drive instruction to meet student learning goals. Teachers of students with special needs already write individualized learning goals into their students' IEPs. Peled et al., (2022) found the most often reported advantage of teaching with one-to-one student devices was the ability to teach differentially, being able to teach each student at their own pace.

Spector et al. (2016) examined formative assessments, where teachers use assessment data to determine how students are learning and what changes need to be made to instruction to meet the needs of those students, in technology-rich classrooms and found teachers who are using more inquiry-based or problem-based lessons to teach twenty-first-century skills require more timely and meaningful feedback to guide those lessons (p. 61).

In a study by Wagner (2021), teachers were found to be inconsistently using digital tools for conducting formative assessments to inform instruction, despite having ready access to them in a one-to-one teaching environment. Wagner concluded that further professional development in the use of digital tools for formative assessments was needed since access does not always ensure appropriate use. Spector et al. (2016) also advocated for more professional development

for teachers in the use of formative assessments in twenty-first-century teaching and learning. In a review of 56 studies looking at the use of digital tools for formative assessments, See et al. (2022) concluded that the technologies themselves were not the important component of formative assessments, but teachers competently using well-tested programs and teaching practices made more of a difference in student learning outcomes.

Part of analyzing student technology use is realizing not all students can skillfully use all technologies. Special education teachers need to be able to distinguish which technologies are appropriate for their students. Higgins and BuShell (2017) found a student who did not like using an iPad because she found it to be a distraction. She admitted to using the device to search for unrelated topics rather than attending to her coursework.

Determining which technology integration framework may be of use when planning instruction can be another task requiring critical analysis from the teacher. Tondeur et al., (2021) developed specific quality criteria for judging technology integration models based on four measures: accuracy, consistency, scope, simplicity, and fruitfulness (p. 2200). The accuracy of a framework deals with whether the guidelines use data to support its worth. The consistency ensures the framework is logical, and the guidelines make sense. The scope ensures generalizability across grade levels and subject areas, while simplicity supports the idea of ease of use. Fruitfulness implies usefulness, since teachers will not want to employ an integration framework that does not produce the desired results (Tondeur et al., 2021). Since no one framework incorporates all measures and is beneficial in all areas (Kimmons & Hall, 2017), using an analytical model to gauge planning use may be valuable to classroom teachers.

One-to-One Device Integration Concerns/Challenges

Along with the positive outcomes of a one-to-one device initiative, teachers interviewed by Varier et al. (2017) also discussed the challenges they faced, especially at the beginning of the implementation. Technical issues, a steep learning curve, lack of parental permission, and the lack of internet access at home were all problems seen as worth it for the positive learning outcomes created by the one-to-one student devices.

The stakeholders, superintendents, technology directors, and teachers, interviewed by Ackley (2017) discussed challenges such as having the parents buy into the idea of using devices both at home and at schools and the difficulty of finding a balance between using the technologies and learning via traditional methods as concerns emerging from the one-to-one device integration in three rural Texas school districts. Lindqvist (2013) noted that more efficient and flexible pedagogy may be needed for successful one-to-one initiatives.

Zheng et al. (2016) described what they termed the "second-year effect," where in the second year of implementation, teachers and students are more familiar with the devices, and therefore more likely to focus on subject-area learning rather than technical issues. This study also determined that when technical support and professional development were not sufficient, teachers developed negative perceptions of the laptop programs. With training and support, however, teachers became more confident and were able to use the technologies efficiently.

Like Zheng et al. (2016), the veteran teachers studied by Doron and Spektor-Levy (2018) reported feeling like novices at the beginning of their one-to-one device program. The teachers also described feeling like they were fighting for the attention of the students and struggling to find a balance between using the new technologies and traditional teaching methods. Over the

course of the three-year study, teachers became more adept at using the devices in their teaching practice and more accepting of the one-to-one devices.

Peled et al. (2022) also found that teacher support for the one-to-one program grew in subsequent years, but the teachers in this study listed student discipline issues as the biggest problem with one-to-one student devices. Although the teachers found students to be using their computers for activities other than classwork or homework, the teachers agreed that the students were ultimately learning with the devices. Lindqvist (2013) listed discipline issues, along with digital literacy and over-dependency on the devices as challenges to one-to-one programs. The lack of time and resources for professional development and the unstructured use of devices were also found to be detrimental to implementation. One of the most important factors for gaining the support of teachers is changing their beliefs about the value of technologies in the classroom and about the abilities of students when it comes to learning with one-to-one devices (Lindqvist, 2013).

Summary

The review of the literature shows the complex relationship between teaching, learning, and technology integration. Using the ISTE Standards for Educators as a guide, this review looks at how teachers implement one-to-one device initiatives, teach twenty-first-century skills to their students, and some of the challenges unique to those teaching students in special education classrooms. According to the seven categories identified by the ISTE Standards (2017), the ideal model for teaching in the twenty-first century includes teachers who are learners – open to new technologies and the professional development required to become capable users and facilitators of those technologies. Teachers who are leaders, willing to try new technologies with their students and share with colleagues their successes and failures. Teachers who are digital citizens,

ready to prepare their students to make informed choices in their online lives. Teachers who are collaborators – not only working with each other, but working with students, administration, and other stakeholders to improve the educational environment. Teachers also need to be designers of meaningful, student-centered instruction to engage learners and differentiate for specific learning needs. Teachers should try to become facilitators, not just lecturers, and create inquiry-based learning environments where the students take responsibility for their learning, and the teachers are not seen as the givers of knowledge from the front of the classroom. Finally, teachers need to become analysts who can determine student progress through formative assessments, decide which integration models work best for their planning styles and needs, and ascertain which technologies will benefit their students the most.

One-to-one device integration programs also come with their own set of unique challenges. Technical issues, discipline issues, a lack of professional development, and finding a balance between teaching with the new technologies and traditional methods have all been listed as difficulties faced by teachers when working with one-to-one student devices.

Chapter 3: Methods

The purpose of this study is to determine how the role and function of secondary special education teachers has changed because of the implementation of a one-to-one device initiative in a rural school system in southern West Virginia. The study will use the ISTE Standards for Educators as a framework for looking at the extent to which the educators have successfully implemented technology into their pedagogy, if any. This chapter outlines the proposed research design, population/sample, data collection methods, data analysis procedures, and limitations of the proposed study.

Research Design

This study utilized a qualitative phenomenological design to investigate the experiences of secondary special education teachers in a rural school system in West Virginia. The purpose of qualitative research, as defined by McMillan, (2016) is "to provide rich narrative descriptions of phenomena that enhance understanding" (p. 17). Creswell and Creswell (2018) add to that definition the idea that the researcher tries to develop a holistic account of the issue being studied by examining the problem in the natural setting, reviewing multiple sources of data, using inductive and deductive data analysis, keeping focused on the participants' meanings, allowing the research to have an emergent design, and remaining reflexive about their role in the study and how their background might shape the interpretations (pp. 181-182). Since this study attempted to describe the experiences of special education teachers, a qualitative approach was deemed the best method to achieve this goal.

Phenomenological studies are qualitative studies that attempt to understand the commonalities in the lived experiences of the participants (McMillan, 2016). Phenomenology attempts to describe a phenomenon as accurately as possible from the perspectives of the people

involved (Groenewald 2004). Conducting semi-structured interviews with the participants allowed them to give their perspectives and actively change the direction of the interview through follow-up questions based on individual answers.

The focus of the research was on the special education teachers' experiences teaching with the one-to-one technology devices in their classrooms, and how utilizing those devices has changed their role and function, if at all. The seven ISTE Standards for Educators (2022a) (learner, leader, citizen, collaborator, designer, facilitator, and analyst) served to guide the questions and act as a framework to outline best practices by which comparisons were made.

Population/Sample

The school system from which the sample was taken is a small, rural school system in southern West Virginia. The secondary schools in the county consist of four middle schools and four high schools with approximately 4,300 total students. According to the National Center for Education Statistics (NCES), (2022), 11.1% of students in the school system have some sort of disability. There are approximately 45 special education teachers throughout these eight secondary schools, and they made up the population from which a sample was drawn.

Instrument Development and Validation

The interview protocol utilized in this study was created based on the ISTE Standards for Educators (2017). The seven standards detail exemplary teacher actions within the categories of Learner, Leader, Citizen, Collaborator, Designer, Facilitator, and Analyst. Each category is further divided into subcategories. Interview questions restate the standards to evaluate whether special education teachers are using these guidelines for the planning and implementation of quality instruction in their classrooms.

Data Collection Methods

Semi-structured interviews were used to collect participant responses regarding the use of one-to-one devices in their classrooms. Previously created questions based on the ISTE Standards for Educators (2022a) (See Appendix A) were used for the main interview, but follow-up questions and/or probing questions were asked based on the participants' responses. Merriam and Tisdell (2016) describe the semi-structured interview as allowing the researcher to react to the individual situation as it emerges and being able to respond to new ideas as they arise (p. 111). All questions were directed toward how the participants think and feel about the subject matter in order to describe their lived experiences (Groenewald, 2004).

To enhance observations, field notes were taken during the interview process. Creswell and Creswell (2018) define field notes as qualitative observations that document activities at the research site (pp. 186-187). Merriam and Tisdell (2016) talk about the reflective component of field notes, as well as the descriptive nature of the notes. Qualitative researchers record their own feelings, reactions, and commentary in the margins of field notes.

Interviews were conducted in person, over the phone, or on Microsoft TEAMS and recorded. The data was transcribed from those recordings and coded for data analysis to assist in the development of themes (Merriam & Tisdell 2016).

Member checking, described by Merriam and Tisdell (2016) as soliciting feedback on preliminary findings from some of the people who were interviewed, was utilized to ensure there were no misunderstandings or misinterpretations of what the participants wanted to convey during their interviews.

Limitations

One of the limitations of this study is researcher bias, which is common in qualitative research (Merriam & Tisdell, 2016). Other typical limitations present in this research are participant recollection bias and social desirability bias, where the participants either do not clearly remember what they are being asked or purposefully craft answers to make them more socially acceptable. Issues regarding confidentiality were difficult in this study as well, since the school system the sample was drawn from is a small, rural one. That setting, along with the purposeful sampling of participants and lack of diversity among those participants, can also be considered limiting.

Chapter 4: Findings

This chapter presents the study findings and is organized into three sections: data collection, characteristics of participants, and major findings, where the research questions are considered individually and themes developed from the participant interviews. The final section of this chapter includes a summary of the major findings.

Data Collection

Twenty-one secondary special education teachers were interviewed for this study. Using convenience sampling, invitation emails were sent to 47 special education teachers identified at the study's eight middle and high schools. The emails explained the purpose of the research and contained the study abstract and informed consent. Individuals who responded to the inquiry emails were contacted individually to schedule a date and time for the interview. Interviews were conducted either in-person, over the telephone, or within a Microsoft TEAMS videoconferencing meeting between March 21, 2023, and May 15, 2023. All participants consented to the recording of the interview, and transcripts were created regardless of the interview mode. Completed transcripts were emailed to each interviewee for review to ensure their responses were an accurate representation of their responses. Interviews lasted between 40 minutes and two hours.

Characteristics of Respondents

Six (29%) of the participants in the study identified as male and 15 (71%) identified as female. Eight (38%) of the teachers taught in a high school with grades 9-12, 11 (52%) taught in a middle school with grades 6-8, and two (10%) taught in a combined middle and high school with grades 7-12. Twelve (57%) participants taught in pull-out classrooms, where students with disabilities such as LD, MI, BD, or Autism were taught one of the four core subjects (English language arts, math, science, or social studies) for one or two class periods per day. Five (24%)

teachers taught students with Moderate Mental Impairments (MOMI) in pull-out classrooms where students were taught all main subjects in the same classroom daily. Two (10%) of the teachers (10%) taught students with either Autism or Severe and Profound Mental Impairments (SPMI) in pull-out classrooms where students were taught all main subjects in the same classroom daily. Five (24%) participants taught inclusion classes, where students with disabilities are in the same classroom as general education students, and there are two teachers – one general education teacher and one special education teacher – working together to teach all the children. One of those teachers was a full-time inclusion teacher, and the other four taught both inclusion classes and pull-out classes throughout the day. One teacher taught students who had been identified as gifted in pull-out classes. Gifted students are considered special education students because they require an IEP to meet their special educational needs.

Participants reported an average of 14.83 (R=3-29) years of total teaching experience. Nineteen (90%) of the interviewees were employed by the study school system during the 2019-2020 school year, which was the last year the students did not have one-to-one technology devices. Devices were assigned to each student beginning in the fall of the 2020-2021 school year in response to the COVID-19 closures in the spring of 2020. One participant was employed as an administrator in a neighboring school district with their own one-to-one device initiative during that time, and another participant did not start teaching until the 2020-2021 school year. Four (19%) participants have five years or less total experience in education, and 17 (81%) have six years or more. When asked how many years the teachers have been in their current teaching positions, 12 (57%) had been in their current position for five years or less, and 9 (43%) six years or more. The average number of years for all participants in their current positions was 6.12 years.

Major Findings

This section of the chapter is organized into sections defined by the eight research questions and a chapter summary. Interviewee responses were sorted and analyzed, paying particular attention to common themes within the answers. Teacher quotations were used to illustrate these themes. Participants were not numbered or identified in any way to protect their confidentiality.

Impact on Practice and Student Learning

Research Question One sought to determine if the one-to-one device initiative in the fall of 2020 influenced the ability of secondary special education teachers to improve their practice and increase student learning. Participants were asked a series of six questions that corresponded to ISTE Standard 2.1: Learner and the subcategories of the Learner standard. According to the ISTE Standard 2.1, teachers improve their teaching practice and increase student learning by setting professional learning goals related to technology, actively participating in learning networks that match their interests, and staying current with research regarding student learning with technology (International Society for Technology in Education, 2022a).

Improved Teaching Practice

Twenty (95%) of the 21 interviewees felt their teaching practice had improved as a result of the one-to-one device initiative. Even those teachers not especially supportive of the overall one-to-one initiative felt their teaching practice had improved due to their involvement. One such teacher commented, "Well, you're always working to improve, and as a teacher you're always a learner. You're always learning new things. So as a teacher, I'm a student at all times."

The one interviewee who felt the devices had not improved their teaching practice admitted learning new things; however, as an experienced teacher, they did not want to change

the way they taught. This teacher only allowed the students to use the devices to play learning games like Kahoot! or Blooket in class, and although seeing other teachers successfully teach with the one-to-one devices in an inclusion setting, did not feel students benefitted from an increased use of technology:

> One of the inclusion teachers, in particular, that I am with is amazing – amazing and using everything on the computer...rarely has paper/pencil [assignments]. They do almost everything by submitting a document, but notoriously, the kids that are not doing well...are the MI kids. The kids who are mainstreamed...can't keep up...but I need to stand next to [them] and say, "No, do this," and "No, do that."

According to this teacher, students struggled with "juggling all of those [computer] skills on top of juggling the math skills, or the English skills, and the typing skills, and the hunting and finding and keeping it charged," so they concentrated on teaching with paper-and-pencil-based activities.

This was not the only teacher participant who focused on paper and pencil learning activities in their classrooms. Seven (33%) of the interviewees discussed their preference for using paper/pencil-type activities rather than computer-driven activities. One teacher commented, "I don't let my students use their computers very much in class. I teach math, and most of what we do in math class is pencil/paper." Another teacher stated,

> I've been trying to back off [of using computers] since we're back in school – because our kids, they don't know how to write anymore, they can't print their name, they can't write in cursive, like so I've been still using them some, but not as much since we don't have our remote days and things, they don't need to know it as much.

Two of those teachers discussed the students' complacency and a lack of motivation to turn in work online. "When it was fresh and new to them, it was like okay, but now – which it's like, it's like any other thing – I can't get them to submit work."

Ninety-five percent of teachers interviewed felt the one-to-one device initiative had undeniably improved their teaching practices, and the ease of teaching with the devices emerged as a major theme. One commented, "I would hate to think to go back. I can't picture it now. Them not having [devices]. You know, I'm sorry about the pandemic, but it just, it makes it so much easier for everything." Another remarked, "Well, it's made teaching easier." A third affirmed, "I'm actually getting to do less paperwork and more computer work, and it makes it a lot easier for me." A recurring theme throughout the interviews was the teachers' ability to easily individualize and differentiate instruction with the one-to-one devices. When asked if the devices had led to improved teaching practice, six of the 21 (29%) teachers listed the ability to differentiate instruction based on student ability levels as the main reason their teaching had improved.

Another emergent theme was that teaching with the one-to-one devices led the teachers to become more organized. One teacher admitted that even though students may learn better with paper and pencil lessons, he utilized online assignments because "I can be better organized, myself, if I'm not overwhelmed by paperwork." Another stated, "I feel like it's helped me be more organized, one, especially with Schoology – just being able to have all of my links and different things set up into one place, I think that's helped."

Professional Learning Goals

The second part of the ISTE Educator Standard 2.1 (2017) deals with teachers making professional learning goals for themselves (International Society for Technology in Education,

2022a). Thirteen of the 21 (62%) participants listed specific annual goals regarding teaching with technology. Two of the 13 (15%) listed staying current with new technologies as their goal, four (31%) wanted to become more comfortable with the technology they already had, and four (31%) listed professional learning goals related to how they could increase the use of the technology in their classrooms. For example, one teacher stated, "I just want the things that I teach to be more interactive. I want to be able to see what kids can do instead of doing it with them all the time, and basically doing it for them."

Nine teachers out of the 21 (43%) either answered that they did not have a goal, did not answer with a specific goal, or stated their goal was to use the computers in class less than they currently do. One teacher described this approach in the following manner,

> I do use computers pretty much every single day and I would have to say some of my goals would be to not use computers every single day because I think that using them every single day the kids get used to a predictable routine, and it's hard for me to assess if they really know how to do something or if they just know what button to push.

One teacher discussed how their goal was to get back to the level of technology integration they had been used to in another school system, "I strongly feel like that I've taken a step back in terms of using technology. So, I guess if I had a goal, it would be to get back where I was."

Local and Global Learning Networks

According to ISTE Standard 2.1b (2017), teachers should pursue professional interests through participation in local and global learning networks (International Society for Technology in Education, 2022a). When asked about participation in learning networks, nine of the 21 (43%) special education teachers responded they did not participate in such networks. One-third (33%) of those teachers cited a lack of common planning periods as the reason they were unable to

collaborate with peers, "Where I'm in so many different grades, I'm not a part of any of those team meetings when they have them. So, I haven't had that opportunity as much as I would have liked."

Twelve of the 21 (57%) teachers interviewed reported they were members of either local or global learning networks. Half of these teachers discussed collaborating within their school's Special Education Departments either in-person or via email groups, and 58% listed Facebook or Instagram teaching groups as their primary source of participation in outside learning networks. One teacher recalled,

> I started with that crazy Bitmoji thing. I started with that, and then I kind of just went off from there, because then I realized there were tons of groups that involved teachers of kids who were either moderately impaired or more severely impaired – where teachers were giving ideas and advice about how to use different kinds of technology in the classroom. I joined those.

Two (17%) teachers mentioned participating in Yammer (Microsoft, 2023), the Microsoft Social Networking Service. The West Virginia Department of Education has its own Yammer feed, which one teacher described as, "kind of cool because you can post a question and it's sort of like the teacher Facebook."

Staying Current with Research

ISTE Standard 2.1c deals with staying current with research that supports student learning outcomes (International Society for Technology in Education, 2022a). When asked how they stayed current with research regarding student learning with technology, six of the 21 (29%) teachers discussed researching technology options themselves, three (14%) said they learned about new technologies from their students, and five (24%) listed trainings given by the school

and/or the school district. Another five (24%) respondents credited their school's Technology Integration Specialist (TIS) with keeping them updated on research regarding technology. One teacher commented, "Well, our TIS here is really great...keeps us up to date on anything new that the county has purchased for us, and if we need help with anything, [the TIS is] always right there to help."

Two (10%) of the special education teachers interviewed indicated they did not attempt to stay current with research regarding technology. One of those teachers explained,

I can't honestly say that I have been. I think it's kind of an Achilles heel to me. I feel like it's a weakness in my classroom and I probably treat it almost like a secondary piece, almost like a tool instead of the main passageway to everything we need.

That same teacher went on to say, "I know I don't inform myself on it [technology] because I find it to be more problematic than a solution in my room."

Improved Student Performance

The final question in this section asked if the teachers felt student performance had improved as a result of their new practices and knowledge. Eleven of the 21 (52%) teachers responded positively. Teachers listed easier differentiation, increased time to complete more complex assignments such as research projects and presentations, and different types of technologies, such as vision devices and eye gaze machines, as new knowledge and practices promoting increased student participation in class. This increased classroom intervention promoted improved student performance.

Five (24%) of the teachers responded negatively, citing off-task behavior, computers that were not charged or maintained, and a lack of motivation as reasons why performance had suffered since the implementation of the one-to-one device initiative. One teacher noted:

Our kids don't keep up with their chargers. They rarely keep their computers charged. Most of my 11th and 12th graders don't even have a device, don't know where it is, whatever. So, it certainly changes the way I have to teach.

Four (19%) of the teachers responded both yes and no, that the increased technology resulted in both gains and deficits in student learning. One teacher explained,

Yes, if the student really embraces the assignments and things that are given to them through technology. If they actually use those the way they're intended – if they use their devices for educational purposes – yes, they benefit greatly. It seems like too often though, they don't, and they're using it, they're using technology for personal reasons - social media. And it really is a detriment to their education because they're using it for the wrong reasons.

One respondent admitted not knowing if student performance had improved or not, reflecting:

I think that since we're coming off of a year of no in-person instruction, that's really hard to gauge, because pre-pandemic - pre-lockdown and post-lockdown, I feel like we've spent a lot of time and energy in the last two years saying, "We need to get them back to where we were," where your basic tenant of education is meet them where they are. And I think we have really, we've put a lot of expectation and a lot of pressure on ourselves – and our kids – if we think that we can undo what a year and a half of not being in-person has done. So, I don't know if they're learning any better.

Summary: Impact on Practice and Student Learning

The first research question sought to determine to what extent, if any, the implementation of a one-to-one technology device initiative influenced special education teachers' ability to leverage technology to improve practice and increase student learning. Overall, teachers felt their

teaching practice had improved due to an increased use of technology. Teachers also indicated they attempted to remain current on research regarding technology use in the classroom. Concurrently, there was not a consensus surrounding the other components of ISTE Standard 2.1 (2017). A lack of common planning periods emerged as a barrier to teachers participating in learning networks.

The technology learning goals described by the subjects ranged from content specific, "There's a program out called 'Globle' where the students guess the country of the day," to the very broad, "increase the use of the technology with the students, and to help the students be more independent and using the technology." While most respondents described positive goals for their teaching, there was a small group of teachers who sought to decrease the use of technology in their classrooms.

These teachers also made up the 24% who responded in the negative when asked the essential question - whether they believed student performance had improved due to the implementation of the one-to-one devices. This question resulted in a divergent set of responses, with some teachers extremely enthusiastic about the progress their students have made, "Yes, I really do. Like I said, I'm able to differentiate instruction now so much better than I was able to before." Other teachers were on the opposite end of the spectrum, "No, I do not. I think student knowledge has went down. I honestly do. I've seen it in my classroom." Nearly one quarter (24%) of teachers were in the middle of these extremes - either unsure or asserting there were gains in some areas and losses in others.

Impact on Teacher Leadership

Leadership Opportunities

Research Question Two sought to determine to what extent, if any, the implementation of a one-to-one technology device initiative provided leadership opportunities for special education teachers to improve teaching and learning, based on the ISTE Standard 2.2 (2017). The first question directly asked the participants if they had been able to seek out leadership opportunities dealing with the implementation of the one-to-one devices. Seven (33%) of the sample teachers responded yes, they had sought out leadership roles, or at least taken on some leadership responsibilities, to help their fellow teachers. One teacher responded, "If I learn, if I know a new program, then I will turn around and show my colleagues - and we just feed off each other and try to see what works best for our classrooms." Three of the seven (43%) who responded yes have been involved in either national or statewide consortiums or boards to advise or write special education standards, and four (19%) of the teachers serve as their school Special Education Department Chairs.

Another five (24%) teachers said they were not sure or did not know, but when asked follow-up questions discussed how they helped their colleagues with their computer questions or problems. "I'm not sure how to – how I would answer that. I mean, I get trainings and things like that," When asked a follow-up question about if they shared the things they learned at those trainings with fellow teachers, the respondent replied, "Yeah, sometimes we do. If I think it's something that the kids would like."

Seven (33%) teachers indicated they had not sought out or assumed new leadership roles as a result of participating in the initiative. Most cited not wanting to be a leader as the reason, "Not really. But I'm also not really that interested in putting myself out there at this point."

Another teacher agreed, "No, I just think that at this point in my career, I'm still a learner instead of a leader." A third teacher answered similarly, "No, not really – but that's my own decision because I really don't want to be a leader." Interestingly, this teacher discussed a request to the school principal to purchase programs for the whole school in a later answer, and when I pointed out those were acts of leadership, the teacher was surprised and exclaimed, "I'm a leader!" One of the teachers who responded no, also made the observation, "I don't feel like that there's anyone here that is really pushing the use of technology." Two (10%) of the teachers did not answer the question specifically, but alluded to the fact they did not consider themselves to be leaders when it came to their colleagues:

> If they were to ask me, for example, to go do a professional development and then maybe teach a course on some of this [technology], I definitely wouldn't be in a position to do that just because I feel my skills – as far as explaining it or teaching it to, you know, other colleagues or other people experienced with this stuff – probably isn't quite my area, but as far as working with it [technology] with the kids in a classroom of students, you know, being able to lead them through things and then to go with that, then I feel like I'm pretty successful.

Advocating for Equitable Access to Technology

The ISTE Standard 2.2b for Educators prompts teachers to, "Advocate for equitable access to educational technology, digital content and learning opportunities to meet the diverse needs of all students," (International Society for Technology in Education, 2022a). When asked if they had to advocate for equitable access to technology for their students, 12 (57%) replied no, students had been given the technology that they needed, "I feel like we get as much, and even in some situations maybe even more, because of special programs just for special education."

Another teacher commented, "Everything the other classes have, we have here – and more. And if I want something, I get it. So, no." Like this teacher, half (50%) of those who said no discussed how supportive the administration at both the school level and the county level were about purchasing equipment and programs for their students,

> I am blessed. No, I have the best principal with that, and my aides in my room that I've had currently and in the past, they have done an amazing job helping us fundraise, and we just have had thousands and thousands of dollars poured into my classroom. So, I cannot complain there.

A teacher at another school agreed, "I don't think so because I feel like here, if I ask for something, generally, I've never really been told no."

> Nine (43%) teachers reported they did have to advocate for equitable access to technology. Five (56%) of those nine teachers had advocated for different curricula or technology for teacher use, "I advocated for my students to – we use Ramsey, Dave Ramsey's Foundation in Personal Finance curriculum." This teacher went on to explain,

> I'm department chair, I'm looking for a special education science curriculum and a special education English curriculum that my students will be able to use at the high school level. I'm finding that those two curriculums that we have here – you know the county just adopted those new science books – but they are too advanced and they're difficult for our teachers to teach because our teachers are not science teachers. You know, Special Ed. is its own thing.

Teachers of gifted students discussed having the same issues at the opposite end of the spectrum, "Yes, and that has been very frustrating, especially because when you're working with kids who

are accelerated, just like when you're working with kids who are lower functioning, it's always hard." This teacher went on to describe,

> I know when I was working with the moderate kids, we would always buy the 3rd, 4th, and 5th grade levels of whatever the program-du-jour was, but I needed access to the K, 1, 2 levels, and they would never buy it for me because it was not grade appropriate, but it was level appropriate.

Another teacher described a similar situation with a different outcome:

> They had only supplied me with middle school level Unique. I told them I needed a level lower, and they asked me how low, and I said, "Well, these kids are pre-K level," and they went down and got me the elementary access as well. But anything I've asked for, they've given me.

Five (55.56%) of the nine who had advocated for equitable access to technology mentioned specific technological needs, such as iPads for every student, "I didn't have enough iPads. Every kid needed their own iPad." Another teacher asked for larger laptops for students with vision issues, "the big thing that we've had to advocate with from the Special Ed standpoint has been for kids that need, like, that we feel need bigger screens." A third teacher needed stronger Wi-Fi for an eye gaze machine in the classroom, "They still haven't got it in, but they said that they're going to add another drop for Wi-Fi in the room because the eye gaze machine, the Accent, it needs a stronger Wi-Fi signal to stay connected." Another teacher went on to say, "There are certain things that we've noticed that certain kids need, you know – better headphones or whatever. We advocate for those."

Although most of these teachers described a situation where they were able to get the technology they wanted for their classrooms, there were some instances where the teachers were

not able to get the technology they sought. One teacher described a situation where the technology needed was not available, "Things like a document scanner? I don't have one. A document camera? Mine doesn't work." This teacher also has an older Smart TV in the classroom, "I was told that it needed updated and it's an older version, so I don't use it besides anything like a chalkboard and like a projector screen." Another teacher talked about asking for a set of laptops to stay in their classroom, "I advocated that I wanted a cart full of computers that were assigned to the room, not to the kids. So that when they come in, I could say get on this computer, every one of you." He listed the excuses students have for not being able to use their own devices:

> There's always that 10% that didn't bring their computer that day, or the computer's lost its charge, or it's broken, or they can't get logged on, or whatever reason that they would give me. So, I'd like to have stations where they don't have any excuses – that I have control of the computers and make them get on it and do it, but that's mine. And so, I have argued for that, but I haven't gotten it.

Other teachers also argued for classroom sets of computers,

> My wish would be that the devices stayed at the school because we don't assign that much homework. Generally speaking, I think for special education, it would be amazing if we could just keep the devices there because then I could really set some goals because I would actually have 100% participation.

Since the devices are not kept in the classroom, and are assigned to the individual students, one teacher illustrated what happens when students do not all have their devices to use in class, "for whatever reason, now I have two extra laptops in my room. And I have kids that use them every

class period. If every teacher doesn't have that, and they have all their work online, they're screwed."

Meeting the Diverse Needs of Students

The next question asked the participants to describe how the diverse needs of their students have – or have not – been met by the technology available to them. Six of the 21 (29%) teachers discussed either the lack of internet access at home, or the lack of adults either willing or able to help students work from home, as a limiting factor in using the available technology outside of the classroom.

COVID-19 caused students to be on remote learning for long blocks of time during the 2019-2020 and 2020-21 school years. Starting in the fall of 2020, the students were given their devices and classes were conducted through daily scheduled Microsoft TEAMS meetings. Even now, the school system has periodic remote learning or "Reimagine Days" to deal with things like poor weather conditions that can make attending school in-person dangerous for students. "So, most of our kids don't have internet at home," one teacher explained, "And so, we couldn't really have a remote learning plan because we just didn't have kids that had that availability." Another teacher commented,

No access at home – internet at home. That's probably the biggest struggle. I have a lot of my kids that don't have internet at home, no access. So, if you send something home on the computer, it's not getting done.

Other teachers detailed the challenges of students working from home without enough help from their parents:

It's been rough. In some instances, it's been extremely rough. I've walked parents through on the phone. They'll call, I'll walk them through on the phone on how to get logged into

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the computer, how to get logged onto Unique, how to do the assignments. Stayed with

them while they were sitting there with their child, going through it. And I've stayed on

the phone with them hours upon hours, upon hours. I've actually taught parents how to

get onto a computer because I've had some that was so low functioning – the parents.

Another teacher described what happens when parents are not willing to help:

I think overall there are some parents that do not buy into technology, meaning that when

the child is at home, they don't get the practice. Or when we're off from school, those

remote days or Reimagine Days, that their kid doesn't come to the TEAMS meeting.

They don't log them in. They don't have them complete the work that's been assigned.

A third teacher explained, "Now, when they were remote, it was hard because they had to have

somebody right there with them whenever they were working." This teacher went on to say, "but

when they're in the classroom, we are able to do that – and having aides in the classroom really

helps them be able to."

Most of the interviewees discussed the positive aspects of using the available

technologies in the classroom. Six (29%) of the teachers discussed how adaptive technologies,

such as larger screens for vision students, have helped those students achieve:

The technology we have is really wonderful for students with vision problems. We have

one who has like a camera on their desk, and it will blow up anything under that camera

and put it on a large screen so they can see it better.

Another teacher described how her students use the adaptive software within the technologies,

"We have students that have vision issues, and most of the issues that they have, there are ways

to address those issues on the iPad - as far as magnification, changing the background colors,

things like that."

Eight (38%) participants discussed ways in which the supports within the technology, such as text-to-speech options in some programs, have helped their students achieve more academically because they allow them to work on their own levels,

> It kind of levels the playing field for the kids with disabilities or kids who struggle to write and find the right words because you can speech to text, you can start filling in the words and use the predictability aspects.

The teacher went on to explain:

> It gives them those supports that were much more difficult to give whenever you had a group of more than a couple, because they're getting that one-on-one assistance with the technology, even if you can't get to every single child, every single minute of the day.

> Another teacher summarized, "I think that the technology has made it easier to meet the diverse needs of the students because they can complete things at their own level a little bit easier when it's electronic." The teacher further explained, "it's helped me to identify some of the problems that some of my students have," and then elaborated:

> Like one student comes to mind. For that, he's a very nice kid. In oral presentations he does very well, but he says he can't read a lick, and I, you know, he's kind of convincing me that that's true, but he's still able to be successful at his own level. And I guess that's what I like about it [technology] – the diversity.

Another teacher stressed the importance of student acceptance of the technological help or motivation to use the online supports:

> Well, since I'm in the pull-out classes, a lot of our kids do not read on grade level. So, we have the human read aloud and the programs that – in Word – that will read to our kids

and help them. But now, getting them to use it, sometimes it's tough, but the ones that do need it and use it, it's been very nice for them to use.

In summary, 14 of the 21 (67%) participants felt the technology available to them was meeting the needs of their students. The ones who answered the question negatively mostly described problems with using technology from home, and not inside the school buildings. Students not bringing their devices to class, taking care of the devices they have, or using the supports available to them were other frequently noted concerns.

Adoption of Digital Resources

ISTE Standard for Educators 2.2c directs teachers to, "model for colleagues the identification, exploration, evaluation, curation and adoption of new digital resources and tools for learning," (International Society for Technology in Education, 2022a). Interviewees were asked how new digital resources are found, explored and adopted in their department, and the answers fell into three distinct categories. The first group of three (14%) teachers answered that all of the new programs were found and provided by either the county's central office personnel or the state department. For example, one teacher explained, "Generally, something comes from someone in Central Office. They really are really good about sending us the training that's available."

The second group of nine (43%) teachers discussed finding resources themselves either online through search engines or websites like Google, Facebook and TikTok, or getting ideas from other teachers, "I always say the best teacher's a thief. So, if I see you doing something, I'm gonna steal it." The teacher further explained, "we steal ideas from other teachers, from other schools, from TikTok," and then went on to describe the process of purchasing new resources:

But anything that we need, you know, I go to [the school principal] and he gives me, as

the department chair, like I've got the budget of Special Ed money that we can use. And

anything that's above that, if I think it's something beneficial to the school, or if we don't

have the money for it, he usually finds the money. He's never told me no.

Five (24%) of the interviewee responses reflected a combination of the two previous types. They

discussed both finding resources on their own and being given resources from the county, or,

"people higher up the ladder," as one teacher described it.

Most teachers were confident they would be able to get any resources they wanted, if

they went through the proper channels, "if I really wanted an account, I've got budget money

that would pay for it, and I would get an account and hook it up and use it the way I wanted to.

Just fill out the right paperwork." Only one (5%) teacher talked about not easily being able to get

the resources needed for students,

I can't download anything to my kids' iPads. So, I have to contact someone in the Special

Ed. department to get permission, then they have me contact somebody in the Tech

Department. I have to go through a process, the whole process to get an app added [to the

iPads]."

The teacher continued describing the issue:

But getting the technology, or getting something, even if it's free, to try something new is

a big process. And I understand the thought behind it – because you have all these things

with people getting things that aren't appropriate or downloading something that has

viruses or – I understand all that, but there's still got to be a simpler way. Or maybe even

send out an email bulleted to say, "If you need something, these are the steps to take."

Because I don't think any of us know the steps we're supposed to be taking.

Summary: Impact on Teacher Leadership

The second research question sought to determine to what extent, if any, the implementation of a one-to-one technology device initiative provided leadership opportunities for special education teachers to improve teaching and learning, based on the ISTE Standard 2.2 (2017), by asking them four questions. The first question about seeking out opportunities for leadership related to the one-to-one devices, resulted in one-third of the teachers responding in the affirmative, one-third in the negative, almost one-fourth replying they were not sure, and the remainder who did not fully answer the question that was asked. Some of the teachers who claimed they were not leaders, or did not want to be leaders, described engaging in behaviors consistent with leadership roles, which may mean the percentage of teachers who are leaders may actually be higher than reported.

The second question asked if the teachers had advocated for equitable access to technology or digital content for their students. The majority (57%) of respondents thought the students had been given access to everything they need, while 43% described having to advocate for technology either for themselves to use in class, or directly for student use. The teachers who had advocated for additional technology had mixed results as to whether their technology requests had been granted.

The third question in this section asked the teachers to describe how the diverse needs of their students had or had not been met by the available technology. Fourteen of the 21 (67%) teachers described positive ways in which either assistive technology or technology supports were helping them to meet the needs of their students, while 29% of the respondents discussed the challenges they have with assigning homework or remote work due to the lack of internet access or adequate help for students in the home.

The fourth question dealing with ISTE Standard 2.2 (2017) asked the teachers how new digital resources are found, explored, and adopted. Almost half (43%) of the teachers interviewed talked about searching out new resources on the internet, 14% of teachers reported new resources were given to them from either the county level or state level administrations, and another 24% of respondents answered with a combination of the two previous answers. One teacher described the challenges faced in trying to obtain new digital content for students, but the vast majority (81%) had either been given anything they had asked for, or felt they would not have trouble getting new resources if they asked.

Impact on Participation in Digital Environments

Research Question Three revolves around the teaching of digital citizenship and correlates to ISTE Standard 2.3: Citizen (2017). According to the standard, "Educators inspire students to positively contribute to and responsibly participate in the digital world." There are four sub-sections of the standard which were translated into five separate questions asked of the teachers in this study. The four sub-sections include making socially responsible decisions and displaying empathetic behavior, promoting students building relationships and community online, establishing a learning culture that promotes both curiosity and the critical examination of online resources, the protection of intellectual rights and property, and the management of personal data and digital identity (International Society for Technology in Education, 2022a).

Socially Responsible Decisions and Empathetic Behavior Online

ISTE Standard 2.3a asks teachers to, "Create experiences for learners to make positive, socially responsible contributions and exhibit empathetic behavior online that build relationships and community" (International Society for Technology in Education, 2022a). This standard was broken down into two interview questions. The first question asked teachers what experiences

they created for learners to make socially responsible decisions and exhibit empathetic behavior online. A majority of the teachers, 12 of the 21 (57%), talked about using the conversations students brought to them as teachable moments in their classrooms, "occasionally something will come up where they're talking about Facebook drama or Snapchat or something that's happened outside, and we talk about how you should handle that and be responsible and appropriate." Another teacher explained:

> So, as far as a set aside time, or a set aside time in my lesson plans? No, I don't really teach that. But at the same time, in the same token, if the opportunity arises based on what the students are talking about, then yes, I'll take the opportunity to talk to them about what's proper social media etiquette.

Four (19%) of the teachers listed the county-required cyber-safety lessons taught to every student at the beginning of the school year as their answer to this question. All kindergarten through 12th grade students must have at least one cyber-safety lesson taught and documented before they are allowed to access the internet on a county-owned device. Five (24%) additional teachers detailed other lessons on various social skills, social media, and used situational examples to illustrate for the children what responsible and empathetic behaviors look like. One teacher described his citizenship lessons:

> We use a lot of examples, real life scenarios, and then we have activity sheets that go along with them: anti-bullying, cyber bullying, of course. With our kids, a lot of it is really hands-on, just more talking and doing scenarios with them than it is websites or things that they can watch or do online.

Three (14%) of the teachers, all of whom teach more moderately or severely impaired students, indicated their students were not capable of chatting or having social interactions online, so the

question did not apply to their situations, "I mean, my kids really don't have that kind of interaction online with other kids. I mean, the only interaction that they have online is through academic applications or curriculum." These three teachers did, however, report they had discussions with their students about other appropriate behaviors and choices:

> They don't do anything like any chat groups or anything, but as far as like what choice –
> like I allow them to use the computers on their breaks – if they are allowed to look at
> little videos. But we do discuss what types of things they are allowed to look at at school.
> I have one student that likes to watch scary movies, and we have to discuss that. But they
> don't really get online to talk to other people on Facebook or Instagram or that type of
> thing.

Students Building Relationships and Community Online

The second half of ISTE Standard 2.3a (2017) deals with students building relationships and community online. Most (76%) of the teachers either stated they were not currently doing these sorts of activities, or described in-person group projects but nothing online. One teacher reported actively discouraging students from talking to each other online:

> That, we try not to. They've been messaging and all that, and we try to keep them from
> doing that because they end up doing it at the wrong times – not paying attention – and
> they've got too much opportunity for that at home. And they're doing it wrong – like
> most people. Most adults do, too.

Another teacher described creating the opposite experience for students – teaching them how to email, chat, and use messaging software:

> Well, the big thing right now has been through the email, and I even do Schoology,
> getting them to email their other teachers to communicate that way. We do have

GoGuardian now. So, we've been chatting – like kind of texting. So that's been good. And a couple of my kids have phones. So, they have been communicating with one another. So, we've been encouraging that.

The teacher continued, "So there are ways that we try to, to teach them and let them feel included, and text and do the things that, you know, everybody else is doing."

Three (19%) other respondents detailed ways in which they were promoting students working together online. One teacher explained, "we teach them how to share documents where they all can work on the same document together and they can collaborate and work together." Another teacher allows students to continue to use the Microsoft TEAMS groups created for them during remote learning to chat with each other:

So, in 2019, I gathered my kids in grade levels on TEAMS, and I've kept those grade leveled TEAMS groups open. I've been keeping them open for two years, and then if nobody interacts, I drop them. But this last group that is in 9th grade now, I'm still getting messages from them. They're still talking to each other. They'll be in different classes, and they'll be chatting with each other a little bit. And it's cool because I can get in there and say, "Okay, guys, drop the politics. Or if you're going to talk politics, speak kindly to each other and don't attack somebody just because they don't think like you."

The third teacher talked about a collaborative project between the English Language Arts class and a local Pre-Kindergarten classroom through Microsoft TEAMS. The middle school students read books to the Pre-K kids in a feeder school, "So, they get up there and read the story, show them the pictures." The teacher later explained what led to the start of the collaboration:

That's what I started with – the eighth graders doing it because some of them don't like to read. And I thought, you know, this is a way that the kids can see that it might make the

littler kids want to see them read, and it would make them feel more confident about

reading.

In summary, 16 (76%) of the 21 teachers interviewed were not currently promoting the students

building relationships and community online. Four (19%) of the 21 teachers had engaged in

projects where students were asked to either work collaboratively or were allowed to create

connections with other students online.

Promoting Both Curiosity and the Critical Examination of Online Resources

ISTE Standard 2.3b suggests teachers, "Establish a learning culture that promotes

curiosity and critical examination of online resources and fosters digital literacy and media

fluency." (International Society for Technology in Education, 2022a). When asked how they

established such a learning culture, eight (38%) participants discussed research projects

completed with their students. One teacher's students researched a possible future career:

So, we did a large research project. And we talked a lot about how things that you see

online might not necessarily be true and how to trust your sources. So, we talked a lot

about what appropriate and inappropriate sources were online and what's trustworthy and

what you can use for information – and the difference between entertainment value and

actual research value.

Three (38%) of those teachers gave their students a list of specific websites to use when doing

research. One teacher outlined what happens when students are given free access to a search

engine:

I'm walking around and asking, "Why are you looking at pictures of snakes?" "We're

supposed to be researching." "But why are you looking at pictures of snakes? That's not

giving you appearances, and traits, and habitats, and food. Shut it down, that's not the

website you're supposed to be on. Go to where you're supposed to be and follow through on that."

Five (24%) of the interviewees used teachable moments based on conversations with their students instead of teaching specific lessons. One teacher talked about how students will tell outlandish things they saw online, "somebody mentions it and then we talk about it, but I always tell the kids to question. Not just question what they've read online, but question what somebody else has said to them – that doesn't necessarily make it true." Three (14%) of the teachers discussed specific lessons they had taught:

> We actually talked about that today with our personal finance. We do the Ramsey
> [Foundations in Personal Finance curriculum] and today was talking about ads and how
> they promote and what do they use to get your attention that's not true. So yes, we talk
> about that.

No one specific way emerged as to how most of the special education teachers taught their students about the critical examination of online resources. Sixteen (76%) of the 21 teachers discussed how they helped their students navigate appropriate versus inappropriate online content. Four (19%) participants reported they either did not teach this type of content, or it did not apply to their students due to ability levels. One teacher commented, "Yeah, that's not really applicable in my room right now."

The Protection of Intellectual Rights and Property

The next section of ISTE Standard 2.3 (2017) deals with the problems of copyright and plagiarism. Standard 2.3c challenges teachers to, "Mentor students in safe, legal and ethical practices with digital tools and the protection of intellectual rights and property" (International

Society for Technology in Education, 2022a). Five (24%) of the teachers did not teach these subjects due to the ability levels of their students. One teacher explained:

> We haven't with the population that I have because they're not really independent. As far as a lot of the writing goes, they more just like answer comprehension questions. They don't do like any really real writing – other than like verbally.

Another teacher agreed, "I just don't have that ability level in my room to even understand that." Four (14%) other teachers admitted they did not specifically teach about the protection of intellectual rights and property in their classrooms, but it was taught in the classrooms where they co-teach:

> I really don't do any of that in math, but we do do that in some of my – in the two inclusion classes I'm in – talking about citing appropriate sources, especially online, and those kinds of things. But I don't do any of that in math, usually.

> Nine (43%) of the special education teachers interviewed detailed ways in which they taught students about plagiarism. Two of the nine discussed apps where students can take pictures of a math problem and are given the correct answer. One teacher described the process in the following manner, "In math a lot of them are trying to use the photo math app. And so, I do talk to them about, you know, that's cheating." The teacher continued,

> And so, they're just writing down whatever the app tells them, and so it really has no, no correctness to it at all. So, I mean, it usually stands out like a sore thumb. So that's an opportunity to talk to them.

> The other seven teachers in this group discussed plagiarism in regard to research projects, reports, and PowerPoints they had completed with their students. One middle school teacher explained how students cite their sources:

You have to cite where you're getting the information. Every – if you get a picture, just

write down where you – I have them go to the last slide – or the next slide, and then they

get added, but the next slide and put it in there. "Slide #1, got the picture from this place.

Slide #2, got the picture from this place. Just take the website, put it in there." It's easy

citing. And it's not the proper, exact way of doing it, but it gives them the idea that they

have to.

Another middle level teacher talked about the problem of students being able to easily copy and

paste information from the internet:

We talk about plagiarism, and that you can't copy people's work. Because that's a big

thing, you know – just copy and paste, copy and paste. So, we, we don't do that. And I

mean that's probably the gist of it with my kids – is just not copy. You can't copy

somebody's stuff and use it as your own.

An English teacher described what happens when the students get mixed messages from their

other teachers regarding the protection of intellectual rights and property:

Oh yeah, we talk about plagiarism. I even use it as a spelling word with the "i" in it. And

I try to explain it to my kids. That is something that is tough when you have some

hiccups in your learning and different approaches to it. Because one class may have you

copying and pasting, just to understand how to load a Word document or something and

put it in an email. So, then I have to kind of explain to my kids, "When you're told to

copy and paste, that's one thing. But when we copy and paste and don't give that person

credit, or we don't change it into our own thoughts, that is plagiarism."

Another teacher asks students to make sure they understand the work they have turned in,

Or after they bring me their paper I'll say, "All right, tell me what unionism means." And they're like [blank look]. I said, "You just wrote it down, but you didn't read it." And so, now I know before I even look, this is probably copied right out of the text.

Overall, twelve (57%) of the 21 teachers listed student ability, the subject area taught, or that the topic was covered by other teachers in an inclusion setting as reasons they did not directly teach about the protection of intellectual rights and property. One teacher reported not teaching about copyright and plagiarism, but telling students, "they can't steal stuff – like copy and paste things – but they don't listen. They don't understand that it's really stealing." The other nine (43%) teachers spoke at length about how they addressed the problems of copying and pasting, citing sources, and using someone else's work as your own with their students in an attempt to curb the volume of plagiarism happening in their classrooms.

The Management of Personal Data and Digital Identity Online

ISTE Sub-standard 2.3d (2017) asks teachers to, "Model and promote management of personal data and digital identity and protect student data privacy" (International Society for Technology in Education, 2022a). Eighteen of the 21 (86%) teachers interviewed responded yes, they engaged in the modeling and promotion of managing personal data and digital identity online. One-third of those teachers said they discussed the issue whenever the need arose, "Yeah, I mean, we talk about it – not daily – but, you know, whenever it comes across, we talk about it in classroom discussions." Three of those teachers answered in the affirmative, but were not specific as to how they addressed the issue. One teacher gave a specific lesson example, "We're talking a little bit about that right now because we're actually doing some consumer math topics. So, we're actually doing credit cards right now," and six (33%) of those teachers discussed how

they have had issues with students allowing others to use their devices and getting flagged by the GoGuardian filter.

GoGuardian is a filtering program that alerts administration if a county device has been used to search online for inappropriate materials. The GoGuardian reports are linked to the login information that is used on the device, so if students allow others to use their usernames and passwords, they can be cited for looking up inappropriate materials, even if they are not the one searching for those materials. One teacher explained:

Yes, absolutely, and especially now, we've had some kids, some siblings even, who have gotten on their sibling's device and maybe looked up some things they shouldn't. And then we have to deal with the recourse of that. And so, that's again, an opportunity for me to, even with somebody who is a low learner, to say, "We have to keep our things safe from everyone. This is only yours. This is just like an extension of you."

Another teacher concurred, "We've also had a couple of instances where students have hit the GoGuardian, you know, and then said, "Well, that wasn't me. So-and-so had my computer." So, we've had discussions about that, too." One teacher spoke about how the problems of sharing passwords at school and being safe while gaming online were addressed:

And we talk about it at home because a couple of these kids do go home, and they do, they do gaming and things like that – so we talk about, you know, "You don't know who the other person is on the other end, you have to protect your identity. You should never be anywhere that your parents don't know about, or talking to anyone that you don't know."

Only two (10%) of the teachers responded that this issue did not apply to their students because of their impaired ability levels.

Summary: Impact on Participation in Digital Environments

Teachers were asked to describe experiences they create to help students make socially responsible decisions and exhibit empathetic behavior online. Eighteen of the 21 (86%) participants were able to talk about what steps they take in their classrooms to help students be more socially responsible in their digital interactions. Three of the 21 (14%) teachers felt this question did not apply to their children. When asked how they promoted students building relationships and community online, 80% of respondents reported they were not actively engaged in having students build those relationships, while 20% discussed the ways they had students working together online. These strategies included teaching students to email, how to text and send messages appropriately, and working collaboratively with other students on online projects.

A majority (76%) of interviewees described lessons and classroom interactions where students were engaged in discussions about finding reputable Internet sources. Nineteen percent of respondents said these types of lessons would not apply to their children. When asked about activities that teach students about the protection of intellectual rights and property, 43% of the teachers reported not teaching this content, either because it did not apply to their subject area, or to the ability level of their students. The other 57% of teachers detailed specific lessons and activities focused on the importance of copyright and plagiarism and described projects where students were tasked with using appropriate resources during research. Eighty percent of the Special Education teachers interviewed discussed how they helped their students understand the importance of managing their usernames, passwords, and other personal data, while 20% said this topic would not apply to their students. Several elements of this section were not applicable

due to the severity of student disabilities. Each question in this section had between two and five teachers who reported their students would not understand the content.

Impact on Teacher Collaboration

Research Question Four was focused on collaboration and correlates to ISTE Standard 2.4: Collaborator (2017). According to the standard, "Educators dedicate time to collaborate with both colleagues and students to improve practice, discover and share resources and ideas, and solve problems." There are four sub-sections of the standard, which were turned into the five interview questions. These sub-sections call for teachers to dedicate planning time to collaborate with colleagues, collaborate and co-learn with students, use collaborative tools for authentic, real-world learning experiences, and to demonstrate cultural competency when communicating with students, parents, and colleagues. (International Society for Technology in Education, 2022a).

Collaboration with Colleagues

When asked about their collaboration with colleagues, all 21 subjects discussed ways in which they were able to share resources and information. The frequency and methods of collaboration differed greatly, but all willingly shared what collaboration looks like in their roles. Three (14%) of the teachers talked about daily communication and collaboration with their colleagues – either during a common planning time, or just throughout the course of their daily activities, "Oh gosh, it's daily. It really is with us because as three Special Education teachers, we're constantly dealing with things that we know we might teach next year – we might teach next week." Five (24%) teachers detailed how other educators who teach similar curriculums in the same building share ideas and materials. One interviewee explained this sharing as follows:

Well, like our Unique curriculum that we do for alternate assessment, we have the same

unit that we're using throughout the building – and there's four classrooms that are using

that unit. So, we will collaborate on whatever we're working with, and we'll share if one

of us finds a good resource to go along with it. We'll share it with each other so that we –

like a video, or worksheets, or an experiment that goes with it. We'll work together on

that.

Five (24%) other teachers discussed how they were able to share during staff meetings, team

meetings, and trainings. One listed several places where collaboration takes place: "Yeah, I think

just through staff meetings, through team meetings, through email or an email group, Facebook,

TikTok – like using technology to collaborate with one another is probably just the biggest way."

Four (19%) teachers listed working with their inclusion teachers as their main

collaboration. One teacher elaborated, "By talking about what we're doing in class and seeing it

– I have the benefit of being in four different classes. So, I see the things that they're doing, and

if I see something that I want to borrow, I say, 'Hey, how'd you do that? Where did you get that

information?' Or I share it back." Another teacher discussed how working with a more

experienced inclusion teacher helped increase their confidence as a math teacher:

I'm not actually a math teacher. I'm not certified in math. So, I feel like being in

[another] classroom [taught] me 1.) how to teach the math, and then 2.) how to manage –

how to teach it, what organization and how to correlate different programs and do

different things. [It] helped me a lot with that.

Five (24%) interviewees spoke about the challenges of collaboration, either because of their

current positions or their schedules. One teacher said, "I love to collaborate, but I don't really get

to in this job." Another teacher admitted:

During the pandemic we did that [collaborate] almost every day. None of us knew how to

teach through the computers, so we helped each other work through it. Now, we don't get

to collaborate as much, but we are still helping each other when we can.

Planning Time

The second question in this section asked the participants how much planning time they

dedicated to collaborating with colleagues to create authentic learning experiences that leverage

technology. The answers varied widely, but most (76%) said they either did not have any time, or

had very little time to dedicate to collaboration regarding technology integration. Seven (33%)

teachers reported they had no time to collaborate on lessons regarding technology. "I really don't

feel like I have an opportunity to do that," one teacher responded. Another teacher explained they

had, "No, no common planning. No vertical, no horizontal, no department, no, you know. We

haven't had any of that, and we've asked for it. We wish we could, but we don't have any." Nine

(43%) teachers discussed not having a lot of time for technology planning and collaboration, but

using whatever time they had available. One teacher described this approach in the following

manner:

> I don't have a planning that coincides with anybody. But we have met after school and we
>
> even met at – had a group meeting at one of our houses to try to make plans together on
>
> the weekend. So, I mean, I don't know, maybe six or seven hours is all I have for this
>
> year.

Another teacher said,

> Probably not a whole lot. I mean, I know we correlated the IXLs to our program that we
>
> use in math. So, we specifically did that. In science we had some escape rooms and
>
> things that I would match up with what I'm teaching. That's really about all.

Five (24%) teachers identified specific times they were able to collaborate on a consistent basis, with four of the five indicating they allocated time at least once per week. A high school teacher explained:

> We try to do that at least once a week because two of the teachers, myself and another teacher, have the same planning, and our department head has the last block. So, we try to find ways that we can work on a lesson that will just differentiate the age levels.

Collaboration With the Students

ISTE Standard 2.4b states teachers should, "Collaborate and co-learn with students to discover and use new digital resources and diagnose and troubleshoot technology issues" (International Society for Technology in Education, 2022a). When asked about collaboration and troubleshooting with the students, all 21 teachers replied they did learn with and from their students. The reported frequency of that collaboration fell into one of three categories: daily, often, or not as often. Nine (43%) of the teachers said they collaborated with the students on new technologies or troubleshooting issues on a daily basis. One teacher noted, "Every day. Because the students are the key. They tell you what they're doing and you're like, 'Oh, wow, that's cool. Let me go ask them about that, because we can bring it into this.'" In addition to learning about new technologies, troubleshooting was also a daily occurrence. Another teacher described the frequency of troubleshooting with her students, "24/7 – you know, we're constantly in my room having to fix problems – they're very touch-happy."

Five (24%) of the teachers said they collaborated with students either often or pretty often, "Pretty often. I'd say a couple times a week." This teacher went on to explain, "So yeah, we share things a lot. I just think that it's a group effort. We all are in this together, even though it's small group learning." Another discussed troubleshooting, "That can be at least every other

day – sitting with them and trying to figure out why the screen went black." The other seven

(33%) teachers described collaborating with the students less often, but still learning from them.

One interviewee described this relationship in the following manner:

> Well, things like that don't happen every day, but they do happen. The students are much
>
> more savvy with technology than I am. They can figure things out a lot faster than I can. I
>
> will definitely take their help when I need it.

A middle school teacher provided a specific example, "Not very much, but there's this thing

called Blooket. Well, the kids taught me about that. You know, and one girl did that, did a thing

like that for her book report." Regardless of the frequency, all of the teachers were open to

learning from their students and worked with them to troubleshoot technology issues.

Real-World Learning Experiences

ISTE Standard 2.4c encourages teachers to use collaborative tools to have students

engage in real-world learning experiences (International Society for Technology in Education,

2022a). Email emerged as the most often mentioned collaborative tool used by Special Education

teachers. Nine of the 21 (43%) teachers discussed emailing their students or teaching them how

to use email. Three (14%) others mentioned sending and/or receiving messages through

Schoology, which is the Learning Management System used by the school system. One teacher

explained, "I tried to get them to email me or message me through Schoology, which most of

them are capable of doing that. So, they'll message me through the Schoology." Three (14%) of

the teachers discussed using Microsoft TEAMS meetings while on remote learning, and four

(19%) mentioned other applications, such as Word and PowerPoint, in the Microsoft Office

Suite. Ten (48%) teachers discussed multiple collaborative tools. For example:

I mean, we do have our school emails. We used Zoom there for a little bit, TEAMS has

definitely been the big one – which we've been able to use those on say snow days, or out

of calendar days, or what not – or just simple remote days. As well as, like we said, the

different products that Word gives – the Excel sheet, the PowerPoints and such.

Eight (38%) teachers either discussed group/collaborative work that was not digital, or

reported they did not use technology for collaboration with most of their students. One teacher

explained:

Some of my higher ones, they do know how to get on Schoology and check for like

announcements and things like that. And they also can use their emails to email me, but

that's only, like I said, that's only a small percentage in my classroom.

Overall, 13 (62%) respondents reported using real-world collaborative tools with their students,

while eight (38%) reported they did not use them in their classrooms.

Modeling Cultural Competency

ISTE Standard 2.4d states teachers will, "Demonstrate cultural competency when

communicating with students, parents and colleagues and interact with them as co-collaborators

in student learning," (International Society for Technology in Education, 2022a). To assess this

standard, the teachers were asked the following question: How have you modeled cultural

competency when communicating with students, parents, and colleagues for your students? Two

interviewees chose not to answer. All the teachers who answered the question described how

they either modeled or taught cultural competency for their students, parents, and colleagues.

One-third (33%) of the teachers described lessons where they teach cultural competency in their

classrooms. One high school teacher stated, "Well, being a social studies teacher, that's a big part

of what I teach. I basically teach tolerance and embrace diversity every day." Another talked

about how this topic comes up in the Cybersafety Lessons taught at the beginning of the school year, "I would say that we've probably been able to integrate that in a little bit with some of our cyberbullying and stuff – just showing them what's appropriate and what's not." This teacher went on to describe how increased technology has helped communication with parents, "You mentioned the parents. It's [technology] helped us have a better line of communication with the parents. And you know, we've been able to show some examples of what's appropriate, and what's not, yet again." Four (19%) teachers also discussed communication with parents. For example, one teacher said, "I just treat everyone with respect – student and parent – and I foster a great relationship with all my families." Another teacher responded,

> I try to, you know, of course, send out messages and things that are professional. You know, we all get to a point sometimes where we just want to spout off an email and that sort of thing. I really am like most people, try to calm down first and actually, you know, methodically come up with a logical solution.

One teacher explained why tolerance and cultural sensitivity are not as much of an issue with her parents:

> I feel like I don't really have that problem because in my classroom, the parents are already so accepting because their kids are different. You get what I'm saying? So, unless someone's being mean to their child, I don't really have those issues in my room because everybody's different in my room. So, you know, in the world view, they're all different.

> Seven (33%) respondents described how they were able to model tolerance and cultural competency for their students, "Just by demonstrating acceptance and a willingness to accept others and to be interested in them regardless of what the differences may be." A high school teacher responded,

A lot of these kids, I just try to model – to model professional behavior by, you know, if they're using profanity, I tell them not to. You know, using racial slurs, deal with that. So not too much through technology, but again, just that one-to-one and trying to build relationships.

Four (19%) teachers indicated they addressed the issue when it came up in class discussions and teachable moments:

If it comes up in a situation, I'll stop everything and it's like, "Let's talk about it." You know, I had a boy suspended several days because he just doesn't, does not understand he can't say that – and I mean twice. The same words. It's like, I go to talk to him and it's like, "You have to understand, you've just got to be aware of who you're around, and why it might bother them." And that's what we do. That's what I do.

Another teacher described a similar situation:

We always hear kids on their phones when they shouldn't be. And my kids just have this thing about, they think everybody needs to hear it. So, I'm able to catch a lot of things. They're not super stealthy, which is great for me. So, I can say, "Now, even though that sounded sort of harmless, is there anybody in this room that that would offend?" And then I'll stop and I'll say, "It actually offends us all."

Whether they address cultural competency through class discussions, formal lessons, or modeling, all of the teachers who responded to the question were engaged in teaching their students about tolerance and how to have appropriate interactions with people who may be different than they are.

Summary: Impact on Teacher Collaboration

All of the teachers who were interviewed confirmed they were able to collaborate with colleagues, but 76% of them said they either had no dedicated common planning time with their Special Education counterparts in their school buildings, or had very little time to collaborate. Conversely, one in four of the respondents reported having dedicated time when they were able to collaborate with their colleagues to create technology-rich lessons for their students as described in ISTE Standard 2.4a (International Society for Technology in Education, 2022a).

Similarly, all of teachers interviewed described ways they were able to collaborate with the students to learn about new technologies or to troubleshoot their technology issues. Less than two-thirds (62%) of the teachers reported using collaborative tools for authentic, real-world learning experiences in their classrooms. Email emerged as the most frequently used collaboration tool, with 43% of teachers using and/or teaching their students how to use email. Finally, all respondents discussed ways in which they demonstrate cultural competency when communicating with students and parents.

Impact on Developing Learner-Driven Environments

Research Question Five asks the extent, if any, to which the implementation of a one-to-one technology device initiative facilitates Special Education teachers' development of authentic learner-driven activities and environments that accommodate learner variability? This question correlates to the ISTE Standard for Educators 2.5: Designer: "Educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability," and has three sub-sections. (International Society for Technology in Education, 2022a). To address this question, the interviewees were asked a series of six interview questions.

Learner-Driven Activities and Environments

The first question reflected the overall standard: What types of learner-driven activities and environments have you designed with technology? Four (19%) teachers admitted they did not use the technology in their classrooms in that way. One teacher said:

> There's nothing that's coming to mind like designing things with technology. I mean, just on my regular – like my regular day. Again, we use guided activities, guided practice, independent practice and then like project-based learning for assessment for most of our units.

Seven (33%) of the interviewees discussed using the Unique Learning System created by the company n2y (n2y, 2023). Unique Learning is an English Language Arts and mathematics curriculum adopted in this school system to be used with students with Moderate and Severe Mental Impairments. A middle school teacher of students with Moderate Mental Impairments (MOMI) answered, "Our Unique is totally online. Everything is online. The reading story, the vocabulary, the spelling, the math – everything is online." This teacher went on to explain:

> The county has an elementary band, a middle school band and a high school band, and I was assigned the middle school band – and that works okay for – and it does individualize it some in that middle school group – but I still have one student who significantly struggles. So, I have requested for her to be on the elementary band – and, of course, they allowed me to do that. And she has a different reading story. It kind of has the same topic, but it's a lot different as well.

Sixteen (76%) of the teachers, including five of the teachers who discussed Unique Learning, listed various other websites and apps they use to create learner-driven activities. Examples of these websites include quiz sites such as Blooket, Kahoot! and Quizlet, practice

sites like IXL and Pathblazer, Microsoft Office applications like PowerPoint and Word, and the

Learning Management System, Schoology. One teacher described some of the programs used:

"We love Nearpod, and I've purchased Boardmaker to be able to do the picture things. But even

then, I mean, you can even, like in my room you can use PowerPoint to do life skills with

pictures." The teacher continued to list even more programs:

> I buy Teacher Pay Teacher and all that stuff, too. And you know, we use, of course, n2y,
>
> Nearpod. Boom Learning is great in my room, and then I use all the traditional – you
>
> know, like everything from Word to PowerPoint to all your traditional stuff, too – all in
>
> there. I mean, it's just a constant revolving door [of programs] in our room.

Accommodate Different Learner Abilities

The first sub-standard (2.5a) for the Designer section states teachers will, "Use

technology to create, adapt and personalize learning experiences that foster independent learning

and accommodate learner differences and needs," (International Society for Technology in

Education, 2022a). To understand how Special Education teachers are, or are not, applying this

sub-section with their one-to-one devices, the respondents were asked three questions. The first

question focused on accommodating varying learner abilities, "How do you accommodate

different learner abilities with the one-to-one devices?" Fifteen (71%) participants discussed

using the technology to differentiate learning by creating similar assignments on different ability

levels. A teacher remarked,

> I can tell you sometimes you come in my room – I have 10 kids and I have 10 lessons
>
> going on. They're doing different things at all times – and we do, we want them to be at
>
> grade level, but sometimes they have to work to be there.

Another teacher described teaching in a nontraditional classroom:

I have a nontraditional classroom, which means I have rocking chairs, recliners, a

computer station, a learning table, bins with, you know, Legos and all that. So my room is

completely nontraditional. You walk in my room, and it looks, it looks like your house,

basically. So, my kids, some of them will be using a traditional keyboard that's hooked up

to a monitor. I have some that have to use the touch screen monitor. And then I have

others that are using their iPads - all simultaneously to do the same lesson. So therefore,

some are logged in answering questions that are actually they're going to have to type

their answer. Some are picking word answers out of choices, and some are picking

picture choices - all at the exact same time when we're doing the same lesson. That is a

traditional math and Reading English Language Arts lessons in my room - that there are

at least three different levels at every – almost - every single lesson.

Four (19%) of the teachers listed at least one specific application or program they use that assists

students with differing abilities such as the spell-check function within Microsoft Word. One

teacher explained:

First off, it [technology] helps with if there's anything written. Like if I have them write

about a famous mathematician or whatever, it helps the kids. That's when the pencil and

paper leaves, and that's when they get on and their spell-checks, and it helps them write

their words.

Two (10%) teachers did not describe any specific programs or examples they use in their

classrooms, but one of those teachers talked about working with technologies with a homebound

student in after-school tutoring, "I don't know that I can say yes to that [accommodating abilities

with one-to-one devices] in a classroom, but I can say yes to that in my tutoring and in my

homebound classrooms." She went on to say, "I do a lot of different things like the Unique

Learning, and she still really gets a lot out of ABC Mouse – especially now that they go to 5th grade."

Adaptive/Assistive Technologies

The second question in this set focused on teacher use of adaptive/assistive technologies. According to Quinn et al. (2009), assistive technology "provides increased access to educational tools and environments, enabling students with disabilities to more fully participate with their peers," (p. 1). When asked how they use technology to adapt and personalize learning experiences, 12 (57%) teachers described the assistive hardware currently used in their classrooms. Examples included enhanced vision devices to enlarge screens and texts, "The computers help a lot with some disabilities. Like my vision student's computer that blows everything up in real big print," larger keyboards and touch screens, "one where he has to have the oversized keyboard and he has to have the touch screen larger device," hearing aids and sound blocking headphones, "I use regular headphones, but we just got these really cool sound-blocking headphones for a couple of our kids who are really sensitive," switches and eye gaze machines, "we've also integrated, you know, the One Switch and the Eye Gaze," and, Smartboards/TVs that move up and down to accommodate students in wheelchairs and walkers. A high school Special Education teacher described how having a Smartboard that moves up and down on a lift is beneficial to students:

> That's not something a lot of people think about when trying to integrate every kid in your room. If you've got a kid in a wheelchair, I've got one in a walker, and that's lower to the ground. So, I can move my Smartboard whenever whichever kid comes up to the board so that now everybody can come to the board.

Three (14%) teachers talked about programs or apps that help students participate in class. One

teacher explained how the app Proloquo2Go helps a mute student join in class discussions:

> He's got an app on his iPad that's called Proloquo2Go, and it's pre-programmed with a
>
> lot of individual words, phrases, it's got a chat subfile in it – like it's got a file that says,
>
> "Chat," and you click on it, and it has a bunch of words that you would use in everyday
>
> chatting. And, of course, there's one for food. I mean, he's got thousands of word options
>
> in there.

Seven (33%) of the teachers reported that none of their current students require assistive

technologies.

Independent Learning

The third question in this section focused on the creation of learning experiences that

foster independent learning with the one-to-one devices. Three (14%) teachers noted their

students did not do well with independent learning tasks:

> We don't do a lot of independent learning because they need that guided practice. Every
>
> once in a while, a student will take a concept and run with it – and it's like an ah-ha
>
> moment. But then sometimes if you give them something to do independently, they'll
>
> worry themselves to death over nothing. It's hard to find the balance with such a diverse
>
> group of kids. You don't want to do everything together, but you don't want to frustrate
>
> them either.

Seven (33%) teachers reported assigning their students independent research projects to

complete throughout the school year. One teacher elaborated, "I guess anything that is research-

based, I think. They have to find legitimate sources and integrate that and spout it back to me."

Ten (48%) of the teachers listed at least one specific program or website through which students

use one-to-one devices to work on independently. Examples included IXL, Edpuzzle, Storyline Online, Unique Learning, Nearpod, and resources and assessments posted in Schoology. One teacher explained how the classroom was organized to foster independent learning:

Right, when they're doing their - like their stations for reading, and then also like when they're doing their math on Unique, we'll let them know what they need to do and they'll go in and do it, and then they have like the little tokens I was talking about. They have a - we're doing a camping theme. So, they have like a little honeycomb, and they have bees that they have to get. They have to fill up their honeycomb with bees. So, every job that they do throughout the day they get a bee for each one. And then that way they know they've done their work when they see that they have the bees for that section, and then we can come and glance and know that they did each one.

Content Area Standards

The next section of the standard, 2.5b, requires teachers to, "Design authentic learning activities that align with content area standards and use digital tools and resources to maximize active, deep learning," (International Society for Technology in Education, 2022a). Interviewees were asked two questions that align with the standard, one about authentic learning activities that align with content area standards, and the second about using digital tools to maximize active learning. Seventeen (81%) teachers indicated everything they taught was based on content standards. One high school social studies teacher stated, "I teach my kids the same content the General Ed. kids get. And they may not jump as high, but they run the same race as everybody else." Another teacher concurred, "Pretty much everything that we do is [aligned with content standards] because we follow the same sixth grade math curriculum." The teachers in the alternative diploma programs responded in a similar manner, "We are standards, we have it. They

are called Essential Elements, and they're our content standards. They're derived from the regular standards." Three (14%) of the teachers discussed working on curriculum from the students' IEP goals, but one explained how those goals are also taken from the standards:

> Well, I try to do a mixture of both, because I figure most of your content standards are there for a reason. Of course, I set goals for each and every student. I always take my IEP goals when I write them and I base them off of the content standard as far as what I think they still need, which is what you're supposed to do. At least, that's the way I was taught, base your IEP goals off your content standards.

Active Learning

The next question addressed the digital tools teachers have used to maximize active learning. Twelve (57%) teachers listed specific examples of digital tools and/or programs they use for active learning – where the students are actively creating something, and not just using the one-to-one devices for games or content practice. A middle school teacher described several instances of active learning:

> We've done the PowerPoints and such, we've let them do things in Word documents, Excel documents and such. Different diagrams and different written pieces and typed pieces, but we've also gone out of our window a little bit and let them do things – like if we do like a Kahoot! game in math, we'll let them go and design a Kahoot!, submit that, even for a grade, and then we'll tell them, you know, we'll pick a few of them just randomly and we'll actually use those with the class. And then, you know, they kind of get excited about, "Oh, you know, my game might be the one that gets used!"

One of the teachers talked about using hands-on activities with students, "It's like a lot of hands-on. Especially at the high school level." The teacher continued, "So we try to do the

PowerPoints or the posters or letting them use the Smartboard to come up and interact. So, anything to interact with – to adapt to their levels." Nine (43%) teachers either did not answer the question or listed tools or programs where students were either passive – such as watching the Smartboard or presentation TV in the front of the room – or practicing skills using computer games. One teacher admitted, "I'll be honest. I mean, a lot of stuff that we do with technology is practice."

Innovative Digital Learning Environments

The final sub-section of Standard 2.5 requires teachers to: "Explore and apply instructional design principles to create innovative digital learning environments that engage and support learning," (International Society for Technology in Education, 2022a). Three (14%) teachers indicated they either did not create digital learning environments or did not do much, "at this point," and four (19%) others did not answer the question. The remaining (62%) teachers provided specific examples of digital learning environments including Virtual Reality activities, virtual field trips, and flash card programs such as Boom Learning. One teacher illustrated the use of different virtual environments:

> There's a Constitution Center that we follow in history class. We've done some virtual stuff on the NASA site. I'm very interested in the NASA site and everything that it has on it. We talked a lot about Mars, so we looked at the Mars Rover stuff.

The teacher added,

> I try to find things that are interactive. We did one with volcanoes the other day, where you could actually touch where the volcano happened, and then you'd have to guess what type of reaction to the plates that actually caused it.

Summary: Impact on Developing Learner-Driven Environments

Seventeen (81%) teachers discussed the different websites, apps, and electronic lessons they have completed with their students, while four (19%) teachers said they did not really create those types of lessons. Nineteen (90%) of the 21 teachers gave specific examples of how the available technology has helped them to differentiate instruction in their classrooms. Two-thirds (67%) of the respondents discussed the adaptive/assistive technologies students use in their classes to personalize instruction, such as computers with larger screens for students with vision impairments, while one-third (33%) said this question did not apply to their current students. Three (14%) of the teachers did not often do independent learning activities with their students due to their ability levels, while 18 (86%) teachers discussed how they were able to urge their students to work independently with the available technology.

All of the teachers were able to give specific examples of how they create lessons that align with either their content standards or their students' IEP goals, which are based on the reading and math content standards. Twelve (57%) teachers talked about specific lessons where students were engaged in active learning, while seven (33%) described passive activities – where the students were playing educational games or watching videos or websites on the Smartboard. Two (9%) teachers did not answer the question. Thirteen (62%) teachers provided examples of lessons where they successfully used digital learning environments with their students. Three (14%) teachers admitted they did not do this with their classes, and five (24%) teachers did not respond to the question.

Impact on Facilitating Learning with Technology

Research Question Six asks: to what extent, if any, did the implementation of a one-to-one technology device initiative affect the role of special education teachers in facilitating

learning with technology to support student achievement? This question was derived from ISTE Standard 2.6: Facilitator (2017). The standard has four sub-sections: 2.6.a – Foster a culture where students take ownership of their learning goals and outcomes in both independent and group settings. 2.6.b – Manage the use of technology and student learning strategies in digital platforms, virtual environments, hands-on makerspaces or in the field. 2.6.c – Create learning opportunities that challenge students to use a design process and computational thinking to innovate and solve problems, and 2.6.d – Model and nurture creativity and creative expression to communicate ideas, knowledge or connections (International Society for Technology in Education, 2022a). To answer this research question, the participants were asked five questions that reflect the standard and its sub-sections.

Using Technology to Facilitate Learning

The first question mirrors the overall research question and the ISTE Standard 2.6: Facilitator. The question reads, "Have you been able to facilitate learning with technology to support student achievement?" Six (29%) of the teachers answered they either could not think of an example, or the ability level of the group of students they teach made facilitation unrealistic, "I don't. For them to be independently learning and me just helping? No, I don't." Five (24%) teachers talked about walking around the classroom and checking student progress while the students were working on various projects:

> Usually, we'll kind of stagger working with the ones that have more – need more help – and kind of stand between ones that don't need as much help – so that we can kind of monitor whether they're getting the lesson or not when they're working online. And then also we can check the grades on Unique and on that Spelling Stars we use. We can go back immediately and it does check it. It does give them a grade for it. So that you can

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check and see if they did the work, and how well they did, and if you need to help them

reteach with it.

The other 10 (48%) interviewees discussed different ways they were able to facilitate learning

with technology. One teacher said, "Sure. I would say that we have, like I said, just being able to

have a classroom and kids, especially in my situation – where you got people on different ability

levels, and you can turn them loose." Another teacher talked about one of the benefits of

facilitating learning with the one-to-one computers, "Technology just gives my students the

ability for more practice and more differentiated practice. Practice that's on their level, plus

practice specifically to what they need."

Student Ownership of Learning Goals and Outcomes

The next question asked teachers, "Have you been able to foster a culture where students

take ownership of their learning goals and outcomes?" The question was taken from ISTE

Standard 2.6a which reads, "Foster a culture where students take ownership of their learning

goals and outcomes in both independent and group settings," (International Society for

Technology in Education, 2022a). Eight (38%) teachers responded yes, their students took

ownership of their learning – either through goal setting, "Yeah, we do goals – SMART goals. Of

course, we have our [bulletin] boards in the classroom that show where they're at and where

they're going with their STAR test," or through immediate feedback:

> They can look at like, you know, some of these programs that give them immediate
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> feedback and they can sit there and look and say, "Oh, you know, I got 13 out of 15." I'm
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> like, "Well, do you think that's pretty good? Do you think you could do better?" Or if
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> they got seven out of 15, I'm like, "That's not – let's try it again." And they're like,
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> "Yeah, I think I need to try that again and get better at it."

One-third of the teachers reported they were working on creating a culture where students take ownership of their learning,

> We're working on it, so it's a process. We're trying. Some students are there. We're still working on the others – that they can come in and do what they need to do and take ownership. They can log on, they can say, "Oh, we have this to do today," and they can do it themselves, where other ones – you have to help them along a lot.

Five (24%) teachers either did not answer the question or replied no, their students either did not, or were not able to, take ownership of their learning outcomes, "Not in this level – I have not,"

Management of the Use of Technology

The next sub-section of ISTE Standard 2.6 asks teachers to, "Manage the use of technology and student learning strategies in digital platforms, virtual environments, hands-on makerspaces or in the field" (International Society for Technology in Education, 2022a). When asked about managing the use of technology and student learning in digital platforms like virtual environments, several of the teachers listed more than one method. Two-thirds of the teachers cited the management programs GoGuardian or Apple's Guided Access. GoGuardian allows teachers to see student screens, open or close windows and tabs, chat with the students, and set up lists of approved websites students are allowed to visit (GoGuardian Teacher, n.d.). One teacher explained, "Well, GoGuardian's helped to manage, to be able to set scenes and stuff where if I want them on IXL at this time, that's the only site that they're going to go to." The teachers whose students primarily use iPads discussed that platform's Guided Access feature which allows teachers to lock a student inside an application so the student cannot close the app (Use Guided Access With iPhone, iPad, and iPod Touch, 2022). One teacher stated, "I mean obviously with some of my lower ones, I'll use Guided Access."

In addition to the monitoring or blocking software, six (29%) of the teachers also talked about walking around the classroom to monitor what students were doing on the computers, "Just with monitoring and walking around when they're supposed to be on – well, say if they're supposed to be on Pathblazer. I'm just walking around and making sure that's what they're doing." Another teacher explained:

> Yeah, we have GoGuardian, and plus, I'm up and around – I have to watch my students' screens. Before we got GoGuardian, a lot of times, if they're taking a test or something, I would sit in the back of the room so I could see everybody's screen and see what they're doing. I mean, you have to monitor them and watch. You can't just not when they have technology.

Six (29%) other teachers discussed limiting student access to their devices. For example:

> If they're [the computers] out, they're on them – where they're supposed to be. If not, they're put away. So I just make sure they know when and where we're supposed to have them and what we're supposed to do with them.

Another teacher agreed, "They know that they're only allowed to use it [the computer] at certain times. They can't just sit on the computer all day long." Three (14%) teachers discussed using positive reinforcement and rewards to encourage good behavior, "They have to earn the reward of getting to use the computer for, like, we'll let them use it at the end of class for a break for just a few minutes if we're doing other work," and three (14%) others said they were easily able to monitor student technology use because of the size of the small groups they work with.

Using a Design Process and Computational Thinking

The ISTE sub-section 2.6c challenges teachers to, "Create learning opportunities that challenge students to use a design process and computational thinking to innovate and solve

problems" (International Society for Technology in Education, 2022a). When asked if they did this with the one-to-one devices in their classes, seven (33%) teachers said their students were not able to work with the computers on that level:

> That one is really hard with my kids. So, I mean, I have a couple that, you know, we've done different activities and different things where they've created things and like that, but that's really hard in my room. You know what I mean? We do a lot of, like, picture choices and sorting.

Fourteen (67%) teachers described different activities they had done with their students where they either created something, "PowerPoint – where they've got, they get to, you know, manipulate where stuff's at, pick their pictures, use like the design, which slides they're going to use, what the transition's going to be," or used online tools for computation:

> A lot of them [the students] like to use an online calculator, so they do. They do use – some of them do use their computer for online computation or converting from one measurement to another because they don't have a good concept of that at all.

Another teacher described a project where her students were able to do both using a design process and computational thinking:

> We did a tiny house project in my geometry class and part of it was research on tiny houses. They had to watch some videos and find out about a tiny house. And then we used, it was just some free design a tiny house, something software I found – like a little – it was actually for a company that built tiny houses, but you could design your own. So, we used that and let them design their own. And then we did it with Legos.

Nurture Creativity

The next question matches ISTE Standard 2.6d (2017) and asks, "How do you model and nurture creativity to communicate ideas, knowledge, or connections?" Seven (33%) teachers either did not answer the question or said their students do not get many opportunities to be creative with their one-to-one devices. One teacher answered, "Well, I really don't have them create anything on their computers. This level of kids, I'm working more on handwriting skills, and being able to write, and spelling, and creating sentences." Another teacher explained, "I'll be honest, a lot of the time, I mean, they're just on there doing their practice. Like in that ELA class, they're doing whatever assignments they have or IXL – that kind of stuff."

Eleven (52%) teachers provided specific examples of how they model and nurture creativity in the classroom with technology. One teacher described the interaction she has with her students when they are drawing:

> With modeling – I don't know, but even when I'm up here on the Smartboard doing something, or drawing something, or whatever – even if it's not the best drawing, I will talk about how, "I'm not the greatest, but that's okay – we're all different. We all are at different levels. As long as you're trying your best," and "How can I make this better? What could I do differently next time?"

Another teacher stated:

> Yeah. I like to see what they will do with something. Even if we start with just a blank document and I want them to have some writing and then some pictures, just the way they go about it. Some of the kids like to make, they'll do their little fancy stuff of it. Of, especially on Paint. Something as simple as Paint. The kids know everything about Paint.

I'm like, "Well, go to town, make it pretty. Some people want black and white but do

your thing." So, I love to see that. I encourage that highly.

Three (14%) teachers described activities that were creative but did not include the use of

technology. For example, one teacher said, "We let them do drawings and sculptures and make

different things to go along with the lessons that we're doing." Those are creative endeavors, but

do not include the use of the student devices.

Summary: Impact on Facilitating Learning with Technology

Six (29%) teachers could not come up with an example of facilitating learning with

technology, while 15 (71%) respondents were able to discuss specific examples from their

classrooms. When asked about fostering a culture where students take ownership of their

learning, six (29%) teachers either did not answer the question, or answered no, while 15 (71%)

teachers either answered yes, or stated they were working toward that goal. Nineteen (91%)

teachers responded and discussed the specific ways in which they manage students while using

their one-to-one devices. The most frequent responses were using the GoGuardian program on

the computers and Apple's Guided Access on the iPads to watch and/or limit the sites students

can access. Other answers included walking around the classroom and physically monitoring

(29%) and limiting student access by only using the devices at certain times or for certain

assignments (29%).

One-third of the teachers reported either their students were not able to complete

assignments where they were asked to design things with their devices, or they did not assign

such tasks. The other two-thirds provided detailed examples of lessons where students were

asked to create something with their computers. Half of those teachers (one-third of the whole)

discussed students making PowerPoints as at least part of their examples. When asked about

modeling creativity, ten (48%) teachers answered they either did not model creativity for their students or answered with creative works that did not include the use of technology. The other 11 (52%) teachers discussed how they model and nurture creativity in their classes using the one-to-one devices.

Impact on the Use of Data to Drive Instruction and Achieve Learning Goals

Research Question Seven sought to determine the extent to which the implementation of a one-to-one technology device initiative influence teachers' ability to understand and use data to drive instruction and support student achievement. This question is based on the ISTE Standard 2.7: Analyst, (2017) which reads, "Educators understand and use data to drive their instruction and support students in achieving their learning goals" (International Society for Technology in Education, 2022a).

Data Driven Instruction

All respondents discussed how they use data in their classrooms to assess student progress and target reteaching and review, "Well, I just use the data to evaluate what they've done, and to decide what to reteach and what to review." Eight (38%) teachers listed more than one application. Eight (38%) teachers specifically talked about the state standardized tests, and eight (38%) mentioned the Star tests purchased by the school system to be used as benchmark assessments at various times throughout the school year (Renaissance, 2023). Six (29%) of the interviewees talked about the IXL program's diagnostic assessments (IXL Maths and English Practice, n.d.), while one-third listed the benchmark assessments or the pretest/posttest assessments embedded in Unique Learning (n2y, 2023). Four (19%) teachers listed other applications they use in their classes, but all discussed why understanding and using data is important to their practice. For example:

So yeah, I try to really look at the data and where our kids are, so that I know, because if

you ask a student to read something and they don't understand the words, they're not

going to get anything from it. So, we just have to figure out where they are, start them

there. That's why the data is so critical. Even behavioral data, just really lets you know

how to work with a kid and not trigger an episode that's going to keep everybody from

learning.

Alternative Ways to Demonstrate Competency

Standard 2.7a (2017) asks teachers to, "Provide alternative ways for students to

demonstrate competency and reflect on their learning using technology," (International Society

for Technology in Education, 2022a). When asked how they provide these alternatives with

technology, six (29%) teachers stated they normally did not allow for alternatives, or their

alternatives did not include technology. One high school math teacher stated:

In math, it's okay to get the answer in several different ways, but you always have to

come up with the correct answer – and most of the time there's really only one correct

answer. So, it doesn't matter as much how you get the answer, as long as you end up with

the right one. But I don't require them to use technology to find the answer – actually, I

prefer that they didn't.

Six (29%) teachers used the available technology as the alternative to traditional paper/pencil

assignments. One teacher explained:

Yeah, sometimes, you know, you can answer this question and submit it through

Schoology, or if you would rather handwrite it, you can do that. It's usually about half the

class. So, half of them will submit through Schoology and want to type it and submit that

way, then the other half want to handwrite it.

Another teacher responded:

A lot of times I let them choose. One of the choices they could do recently was a PowerPoint, and so I let them just – and it's completely up to them if they want to do a PowerPoint with technology or if they wanted to write a paper. I do require my students to type most of their stuff because their handwriting is usually horrible, so student choice is pretty much the thing for them.

One-third of the teachers gave several different scenarios based on the ability levels of their students. One responded, "But where one student might have to type up a paragraph for me, one might type up a sentence. One might use pictures to show me, you know, what they've learned or to answer the prompts." Another teacher had a similar answer, "There's all kinds of different ways that they can [answer,] you know, buy using the touch, by using pictures instead of traditional answers and words, and typing answer in." A third teacher summed up providing alternative ways for students to demonstrate competency in this way:

Well, each of our students are different, so they – we just do individuals – always doing what works best for that person. We don't do it as a whole, so we just want them to grow and to be able to move on and to learn different things. So, it's just about individualizing the instruction for each of the students and coming up with a plan for each one.

Three (14%) other teachers gave specific examples based on their content. One teacher provided the following example:

Well, I have a couple of kids that just don't really want to do anything, so I'll let them, if they want to be creative, I mean, I'll give them the option to create something. I mean, they can make a song, and a lot of them play with the little piano things. I mean, as long as they're showing me that they understand what we're doing, or at least have an idea of

what they're doing. Or we've made some songs up to talk about rules in math, and a lot of kids like to record themselves, so they can do that. They'll record kind of a news program or just report, or they can record themselves teaching – some of the kids like to teach.

Formative and Summative Assessments

The next question aligns with ISTE Standard 2.7b (2017). The standard reads that teachers will, "Use technology to design and implement a variety of formative and summative assessments that accommodate learner needs, provide timely feedback to students and inform instruction," (International Society for Technology in Education, 2022a). Six (29%) teachers reported they did not use technology to design and implement formative and summative assessments, even though at least two of those teachers talked about giving online benchmark assessments in answers to other questions in this section.

Ten (48%) teachers discussed students taking online tests that have been created by other entities, such as the state standardized testing at the end of the year – the West Virginia General Summative Assessment (WVGSA) and West Virginia Alternate Summative Assessment (WVASA) – which are both online, as well as tests created by textbook companies, Star tests, and the assessments inside of Unique Learning. One teacher said, "Well, I use the assessments that are in Unique – the benchmarks. Of course, I use the one at the end of the school year – the WVASA." The teachers also listed several different programs they use for formative assessments such as Blooket, Kahoot!, and Boom Learning. A middle school inclusion teacher shared:

We have, like for example, our Star platform where we can just simply just use the technology, even with the text-to-speech applications for the special needs students, in order to just formally assess the students. And then, you know, as far as just regular

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things, we'll take things like a Kahoot! for example, and use that as a way to sort of assess, because if you do a Kahoot! game in math and you have the kids log in, make their little pin ID, and then you give them a quiz. Even while they're having fun and trying to win the game, they're still giving you that data feedback and then you can log in later and use that as basically a formative assessment just to go back and see, "Ok, this is where we're lacking. This is what student is lacking here, here, and here," versus just giving them a standardized test, so to say.

In addition to tests created by others, nine (43%) teachers discussed creating their own tests within the Schoology Learning Management System. Schoology allows teachers to create custom assessments that are graded by the program with the results are automatically added to the teachers' online gradebooks (PowerSchool, 2023). One teacher explained:

Yeah. On the, the Schoology assessments – like that. Yeah, I use it all the time. It's easy to grade, and well, it's a minute to type it in, but at least it's easy to grade and it puts it right in the system. And you can rearrange the questions easily, versus if you had worksheets – you can't do that unless you cut and paste stuff. And so, yeah, I just hit that little button – reorder – so they're not peeking over at each other's to see.

Using the Assessment Data

The final question in this set, "Do you use the assessment data to guide progress and communicate with students and parents and build student self-direction?", was taken directly from ISTE Standard 2.7c (2017). All 21 teachers interviewed answered "Yes" to this question. They all stressed the importance of communication, and of using data in that communication. Three (14%) teachers with lower functioning students said they communicate with their parents on a daily basis. One teacher explained:

Yeah, I mean, parent communication is super, super important. Especially if you have kids who are nonverbal. Because I didn't want to trust – I would have questions if my child is nonverbal, and I have a teacher who is never sending anything home. I just don't know how you could be a teacher in a classroom like that and not expect that you need to be sending home a detailed note at the end of the day. Because that child's not going to be able to go home and the parents say, "What did you do today?" They can't answer that question. So, the parent needs to know, what did you do that day? Did they eat well? Did they have trouble in the bathroom? Did they refuse to do their work that day because they were stubborn, or because they're struggling?

Ten (48%) teachers mentioned the IEP process and/or the quarterly monitoring reports that are sent home, while two others talked about giving grades and sending home report cards in addition to other communication methods. A high school teacher explained:

Oh yeah – and so on an assignment basis, if a student is not, you know, not confident, or if I take off any kind of points for any reason, I'll always comment on Schoology. The comments are all in there. Every interim period we send out monitoring forms to our Special Education students. Just where they are in the class for either the grading period – or the entire class – if it's year-long, and we'll send out those monitoring forms for parents, and plus on IEP's every year, I'll do all the assessment data that I can get. So I'll pull, like I said, I'll pull the Horizon scores, I'll pull their IXL diagnostics, I'll pull their report card information, their grades, and we talk about, "Your student is showing at the second percentile," or, "Your student is showing in the 30th percentile," or you know, so we use all of that data, all the time for placement, and instruction, and everything that we can use it for.

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Five (24%) teachers gave other specific examples of using the data to communicate with parents and build student self-direction. One middle school teacher explained how the technology has helped the data collection process:

> And with technology, things like that do come easier. Just because, you know, we can do, you know, things throughout the entire 9 Weeks, or the entire semester, the entire school year, and we're able to sort of compile that data in a much easier, cleaner way. That makes it a lot more user-friendly for the teacher of the student and the parent to understand. Kind of like how I was mentioning like if we do the IXLs and then it's throwing that data back at us on each individual student, or an entire group of kids as a class versus, you know, you back up before we had the technology. We're doing the pencil/paper and the writing and we're trying to gather all this and we're trying to, as a human, you know, say "Okay – here's what we've got. What do we make of this?"

Summary: Impact on Use of Data to Drive Instruction

All of the teachers discussed the ways in which the data they collected determined what they decided to teach or reteach their students. Eight (38%) teachers listed standardized tests, eight (38%) talked about Star benchmark tests, six (29%) mentioned IXL diagnostic tests, seven (33%) discussed the tests embedded in Unique Learning, and four (19%) teachers named other programs specific to their content area. Eight (38%) of the teachers listed programs in more than one category.

When asked about alternative ways for student to demonstrate competency, six (29%) teachers indicated they did not generally provide students with alternative means to answer questions using their one-to-one devices, while 15 (71%) did. Six (29%) of those teachers said using technology instead of paper/pencil assignments was the alternative they offer the students.

Seven (33%) teachers gave different examples based on the students' ability levels, while three (14%) others gave examples based on their content areas.

Six (29%) of the interviewees replied they did not use the one-to-one devices for summative or formative assessments, but at least two of those teachers talked specifically about online tests they utilize in other answers. Ten (48%) other respondents listed tests created by other entities such as standardized summative assessments, benchmark assessments, and various companies and applications. Nine (43%) teachers create their own online assessments through the LMS, Schoology.

All of the teachers indicated they used their assessment data to guide progress and communicate with parents. Three teachers said they talked to their parents daily, two discussed using grades and report cards as communication with both students and parents, ten (48%) teachers listed the IEP process and quarterly monitoring reports as examples, and five (24%) other respondents gave examples specific to their teaching situation or content area.

Challenges in Using One-to-One Technology Device Model

Research Question Eight asks, "What are the major challenges and concerns of Special Education teachers in implementing a one-to-one technology device initiative?" To answer this question, the interviewees were asked a series of three questions. The first question was directly focused on the challenges teachers have faced in the one-to-one device implementation. The second question asked the teachers to talk about any negative outcomes associated with the one-to-one device implementation, and the third question was a catch-all question that asked teachers if they wanted to discuss anything additional related to the one-to-one devices. The answers to these questions overlapped, resulting in the identification of a series of recurring themes.

The first theme had to do with the students not maintaining their devices. Twenty (95%) teachers identified students not taking care of the technology given to them as either a challenge or a negative outcome. One teacher noted, "I think that the daily challenges of remembering to bring the devices to school, and then making sure they're charged, and that they're working good has been a problem." Some of the teachers who seemed resistant to using the technology on a consistent basis listed these same issues as the reason why. A high school teacher explained:

 I have a very mixed feeling on the devices and the way they are handled, maybe even

 just with special education. And I say that because we probably, out of the population of

 the teaching environment – neurotypical and atypical – I think we tend to give less

 homework, but, however, it pairs with a situation where our kids tend to be the ones –

 and maybe not the only ones – but our kids don't keep up with their chargers. They rarely

 keep their computers charged. Most of my 11th and 12th graders don't even have a

 device, don't know where it is, whatever. That's always a mess at the end of the year. So,

 it certainly changes the way I have to teach.

Sixteen (76%) teachers reported the computers have been a distraction to their students and resulted in them paying less attention in class. Most of the teachers did credit the GoGuardian program, which was newly purchased in the school system, as helping with that issue. One middle school teacher used the following example:

If you had a room of say 30 [students] with just the one teacher in it, and being able to

make sure everybody's staying on task, staying on pace, because when they are – that

technology, that individual piece – is extremely good for them. But then if it provides a

distraction, or another outlet way for them to get off task, that's where the real challenge

was. But now that we've got some tools to our disposal to help us with that, it's helped

that challenge be a lot more manageable.

Another middle school teacher described a similar situation:

Just before GoGuardian made it easier to see what they're doing, [a challenge] was

making sure they're staying on track. Because you can see kids typing – and this happens

in the inclusion class all the time. They're supposed to be working on a bellringer, which

is, you know, write two paragraphs about this subject. And they're over there typing, and

then it's all good. But when you walk over there, all of a sudden, they stop. And they

don't have nearly as much typed in their box as should be. And you find out they've been

on chat, or they're playing a game, and yeah, that's not – that's irritating.

Four (19%) other teachers went a step farther and described their students as not only distracted

by the devices but used terms like "addicted" and "obsession" when asked about the challenges

they have faced implementing the one-to-one devices. For example:

The students' obsession with the devices. They can't get enough of them. Like I have

several students with autism, and that's their niche. That's what they like. They love that

YouTube. So, they can get defiant. That can become an issue – when it shouldn't be an

issue – because they get so they want to watch it, they want that all the time.

Another behavioral issue, mentioned by nine (43%) participants was students looking at

things they should not online, or using their devices for non-educational purposes. Again, the

recent implementation of the GoGuardian program has curbed that issue to an extent.

To answer the question about a negative outcome of the one-to-one device initiative, one

teacher stated:

I think having to deal with the bad behaviors. With them being off-task and not doing

their work. With them looking at bad things on the computers – they just have easy

access to things that they shouldn't because they all have computers.

Another teacher added:

Well, I wish we'd had GoGuardian a long time ago. Maybe that was a negative because,

you know, they could go home and get on stuff, and at school get on stuff. And it was

hard to monitor all that. Now, like I said, I turn mine on and when they're on it, you

know, I turn it [GoGuardian] on all the time now and monitor that. Whereas before you

could walk around the room, but they're smart enough to, you know, if they're on

something they can switch, you know, switch it and you not even know, unless you're

just looking right at me.

Five (24%) teachers reported another negative outcome as thinking some teachers had

become too reliant on the one-to-one devices, "It's made teachers think that's all they need to use

is technology – and instead of having teachers, the computer's teaching the kid." Another teacher

agreed:

I personally, I mean with our kids learning hands-on, I think paper or pencil in their

hands, they're going to learn more and pay attention more versus just, "You get on that

laptop and here's the assignment." I think in teachers, you've seen less teaching. That's

just me being real.

Three (14%) other teachers discussed how learning to use the technology themselves was

a challenge. A middle school teacher answered the question about negative outcomes with the

following:

Just me, maybe feeling a little overwhelmed – just making sure that I was doing, on my end, everything that I was supposed to be doing, being that the programs are new and I'm not all the way 100% familiar with it all the time. So, I wanted to make sure that I'm doing the best that I know how and getting it to my kids in a clear way that they understand and making sure that I'm giving them what they need on their end. Just worried about my competency, I think more than anything.

Summary: Challenges in Using One-to-One Technology Device Model

In summary, when asked about the challenges they faced implementing the one-to-one devices with their students and about a negative outcome of that implementation, several common themes emerged. More than 95% of the interviewees discussed students in their classrooms who had lost their computers, not charged their computers, or had broken their computers. Three of four respondents talked about students being distracted by the computers and not paying attention in class, and one in four used words like "obsessed" and "addicted" to describe the students' levels of focus on their devices. Nine out of the 21 teachers said they were concerned about students using their computers to look at material they should not. Five (24%) teachers thought there were some teachers who used the technology too much, while three (14%) participants were worried about their ability to use the computers in their classrooms.

Chapter Summary

Chapter Four examined the study findings based on eight research questions. The first seven research questions were derived from the ISTE Standards for Educators (2017) and focused on determining what effect, if any, the school system's one-to-one device initiative had on Special Education teachers' ability to meet those standards, while the final question asked teachers to relay the challenges they have faced while implementing the one-to-one device

initiative. Most teachers felt their teaching practice had improved due to the one-to-one devices. However, only about half of the respondents felt that student achievement had improved due to the devices. Nearly one-fourth of teachers thought the devices were necessary during remote learning, but now felt they were more of a distraction and that using them had not improved student achievement. Among those Special Education teachers who felt student achievement had improved, the ease of differentiation for students with different learning abilities was a common theme, with almost all discussing specific ways they were able to accommodate different learner abilities with the one-to-one devices.

While all the participants valued collaboration and learning with and from other teachers, the lack of common planning time and other opportunities for teachers to collaborate with each other resulted in 76% of teachers responding they either did not spend any time or did not spend much time collaborating with colleagues. Similarly, only 57% of the teachers reported actively participating in learning networks, citing a lack of time with their peers in the Special Education department as a contributing factor. Even without those learning networks, 90% of teachers attempted to stay current with research regarding technology in education.

While facilitating student learning with the one-to-one devices, 81% of teachers discussed creating learner-driven activities and environments for their students, with 86% saying the devices helped to foster independent learning in their classrooms. Most (76%) teachers reported using the devices to provide alternative ways for students to demonstrate competency. While the teachers used the devices for demonstrating competency, most (80%) teachers reported they did not have their students participate in building relationships and community online. Slightly more than half of teachers replied they allowed students to use the devices for creative pursuits, while two-thirds of the teachers challenged students to use a design process with their

devices. Many of the higher-level thinking activities reported by the teachers included researching topics and creating PowerPoint presentations, and/or writing reports on various subjects.

Teachers felt the one-to-one devices have made data collection easier. All the teachers reported using data from various programs and applications to drive instruction and support learning goals. Almost three-fourths (71%) of the respondents discussed using online assessments to help determine student progress.

The management of students in online learning environments, and the importance of a dedicated program to track student use, emerged as common themes. The participants' school system had recently launched an online student management program, and of the 91% of teachers who discussed their management style, two-thirds of them talked about this program and how much easier it was to manage students who were off-task. Students not paying attention was listed by 76% of teachers as a major challenge faced due to the one-to-one device initiative. Students doing things online they should not was listed as a challenge by 43% of teachers.

The most common challenge discussed by the interviewees was the maintenance of the one-to-one devices. At different points in the interviews, and especially in answer to the question about major challenges and concerns, 20 out of the 21 participants spoke at length about the maintenance of the devices. They reported students who forgot their devices at home or elsewhere, did not charge their devices, lost their charger, broke their device or did not know where their device might be. They talked about not having enough chargers in their classrooms and not having enough replacement devices in the building to keep up with the number of broken devices being repaired. Teachers were frustrated with the lack of care the students took of their devices, and how students without working devices negatively affected their instruction.

Chapter 5: Conclusion and Recommendations

This study sought to determine how a one-to-one device initiative influenced the role and function of secondary special education teachers in a small, rural school system. This chapter provides the purpose of the study, problem statement, research questions, and a summary of the methods, findings and conclusions. A discussion of the implications of the study and recommendations for further research is included.

Problem Statement

Technology integration in schools, especially one-to-one device configurations, has the potential to transform special education by allowing teachers the ability to tailor instruction, while making individualized accommodations for students with disabilities. Several studies have investigated the technological abilities and competencies of general education teachers in one-to-one computing environments (Fulton, 2022; Higgins & BuShell, 2017; Lindsay, 2015; Varier et al., 2017; Zhai et al., 2016; Zheng et al., 2016), but according to Yilmaz et al., (2021), there are few studies on the technological proficiencies of special education teachers in general, and more specifically, on the influence of one-to-one device integration on the role and function of the teacher. Using the ISTE Standards for Educators (2017) as a guiding framework, this study seeks to determine the impact of implementing a multi-year, one-to-one device initiative on the role and function of special education teachers in a rural school system.

Research Questions

The first seven research questions for this study were derived from the ISTE Standards for Educators (2017) and question eight was developed to document the challenges faced by the teachers during the previous three years of the one-to-one device implementation in their school system. The research questions are as follows:

RQ1: To what extent, if any, did the implementation of a one-to-one technology device initiative influence the special education teachers' ability to leverage technology to improve practice and increase student learning?

RQ2: To what extent, if any, did the implementation of a one-to-one technology device initiative provide leadership opportunities for special education teachers to improve teaching and learning?

RQ3: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teachers to motivate students to participate in the digital environment positively and responsibly?

RQ4: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teacher collaboration with colleagues and students to improve practice, share resources, and problem-solve?

RQ5: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teachers development of authentic learner-driven activities and environments that accommodate learner variability?

RQ6: To what extent, if any, did the implementation of a one-to-one technology device initiative affect the role of special education teachers in facilitating learning with technology to support student achievement?

RQ7: To what extent, if any, did the implementation of a one-to-one technology device initiative influence special education teachers' ability to understand and use data to drive instruction and support student achievement?

RQ8: What are the major challenges and concerns of special education teachers in implementing a one-to-one technology device initiative?

Summary of Methods

This study utilized a qualitative phenomenological design to investigate the experiences of secondary special education teachers in a rural school system in West Virginia. Semi-structured interviews with 21 participants were used to collect responses regarding the use of one-to-one devices in their classrooms. These interviews were conducted between March and May of 2023 and took place in-person, over the phone, or through Microsoft TEAMS. All interviews were recorded. Interviews were transcribed from those recordings and coded for data analysis to assist in the development of themes (Merriam & Tisdell 2016). Member checking, described by Merriam and Tisdell (2016) as soliciting feedback on preliminary findings from some of the people who were interviewed, was utilized in order to ensure there were no misunderstandings or misinterpretations of what the participants wanted to convey during their interviews.

Summary of Findings

Participant responses to interview questions were grouped according to common themes. Major themes included improved teaching practices, improved student achievement, an increase in learner-driven activities and the ability to differentiate instruction with the one-to-one devices, the importance of having an online student management system, the need for more collaboration with colleagues, the devices allowing for more organization and easier collection of data, and the challenges of device maintenance.

Most respondents reported improvements to their teaching practices due to the one-to-one device implementation, and even though less than one-quarter of interviewees reported having regularly scheduled times to collaborate with peers, 90% of teachers attempted to stay current with research regarding teaching and learning with those devices, and over half felt their

improved teaching resulted in higher student achievement. Those teachers responded that the devices allowed for greater differentiation to meet the needs of diverse learners, and 76% of all respondents reported using the devices to allow students to demonstrate competency in alternative ways. While only half of the interviewees felt the devices had resulted in increased student achievement, four-fifths of all participating teachers discussed using the devices to create opportunities for student-centered learning. More than half used the devices to offer creative activities for their students, and 86% reported the devices helped to create independent learning within their classrooms.

The inclusion of one-to-one devices also came with challenges. Twenty-four percent of the respondents felt the devices had not resulted in increased student achievement and considered the devices a distraction to the learning process. Students not paying attention to classwork because of the devices was listed as a challenge by three-fourths of all respondents. The difficulty of managing students while they are online was discussed by all the teachers, and 67% used dedicated management software to keep track of what the students were doing while using their computers. The most discussed challenge was the maintenance of the devices. Student neglect of their device was listed as a challenge by 95% of interviewees, resulting in teacher frustration and teachers not taking full advantage of using the devices. Despite these challenges, teachers reported increased ease in data collection, with 71% using online assessments, and all the teachers using these data to drive their instruction and support learning goals.

Conclusion

The findings from this study were sufficient to support the following conclusions:

RQ1: To what extent, if any, did the implementation of a one-to-one technology device initiative influence the special education teachers' ability to leverage technology to improve practice and increase student learning?

The one-to-one device initiative resulted in special education teachers improving their teaching practice with technology. Participants did not agree as to whether the student devices had resulted in increased student learning, but teachers still felt compelled to remain current on research on teaching and learning with technology.

RQ2: To what extent, if any, did the implementation of a one-to-one technology device initiative provide leadership opportunities for special education teachers to improve teaching and learning?

Teachers who naturally take on leadership roles were able to use the increased technology to continue to advocate for themselves and their students, while teachers who were not interested in taking on leadership roles did not find themselves motivated to do so. Most of the special education teachers felt the diverse needs of their students had been met by the technology available to them. All teachers described ways in which they have participated in informal leadership opportunities afforded by the one-to-one devices by working together, sharing resources, and helping one another.

RQ3: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teachers to motivate students to participate in the digital environment positively and responsibly?

The sample school system already required all students to participate in a cyber-safety training lesson at the beginning of each school year. The one-to-one device implementation did not require further student training, but increased use of electronic devices led to more

opportunities for teachers to discuss proper online etiquette with their students and model acceptable behaviors.

RQ4: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teacher collaboration with colleagues and students to improve practice, share resources, and problem-solve?

Most teachers do not have common planning times to be able to collaborate with colleagues on a regular basis. Collaboration with students has been facilitated by the devices – as teachers and students work together on a daily basis to improve practice, share resources, and problem-solve their technology issues. Teachers reported using real-world collaboration tools with their students, with email being the most identified collaborative tool.

RQ5: To what extent, if any, did the implementation of a one-to-one technology device initiative facilitate special education teachers' development of authentic learner-driven activities and environments that accommodate learner variability?

Teachers are not regularly creating activities and environments from scratch, but they are using the devices to differentiate instruction and practice. The teachers reported using the devices for learner-driven instruction, to foster independent learning, and to differentiate instruction for students with differing ability levels.

RQ6: To what extent, if any, did the implementation of a one-to-one technology device initiative affect the role of special education teachers in facilitating learning with technology to support student achievement?

Most of the teachers believed the one-to-one device initiative helped to facilitate learning through differentiation and specialized online programs that help students learn and achieve. A majority of teachers interviewed have been able to foster a culture where students take ownership

of their learning through using one-to-one devices. Teachers also reported nurturing creativity and giving their students opportunities to use a design process with their devices.

RQ7: To what extent, if any, did the implementation of a one-to-one technology device initiative influence special education teachers' ability to understand and use data to drive instruction and support student achievement?

Teachers were already using data to drive instruction and support student achievement, but the one-to-one devices have made data easier to gather and disseminate to parents. All teachers reported using the devices to gather data through online assessments and various learning applications. Teachers also reported teaching with the devices has made them more organized.

RQ8: What are the major challenges and concerns of special education teachers in implementing a one-to-one technology device initiative?

Two major challenges of implementing the one-to-one device initiative included issues of device maintenance and the lack of internet in student homes. Teachers felt they could not rely on the devices being brought to class charged and in good repair, so most were reluctant to plan daily activities which relied heavily on student devices. Teachers were also not inclined to assign homework using the devices since internet access was not always available in students' homes.

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Discussion and Implications

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The literature review highlighted the best practices and challenges faced by school systems implementing one-to-one device initiatives. This study provided insights of secondary special education teachers in the third year of such a program. The following section provides a discussion of the findings and implications of this research compared to the literature and is arranged into the same subsections reflected in the ISTE Standards for Educators (2017), with a

final section discussing the specific challenges faced by the teachers while implementing the one-to-one device initiative.

Teacher as Learner

The literature review addressed how teacher beliefs and attitudes can influence how much time and energy teachers invest in learning about new technologies (Blackwell et al., 2013; Njiku et al., 2019). The findings of this study support that hypothesis. Teachers with favorable attitudes toward technology used the devices more in their classrooms, and with higher degrees of engagement than those who held negative views of technology integration. Twenty-four percent of participants felt the devices were a distraction to learning and detrimental to student achievement, and those teachers reported only using the devices for activities and assessments mandated by the school system.

The literature review also considered how the amount of professional development afforded to teachers affected the success of a one-to-one device initiative (Knops, 2017; Perry, 2018). The teachers in this study discussed the lack of professional development provided by the school system during the COVID-19 shutdowns, when the computers were first given to students. One teacher stated, "While we were teaching remotely, I had to completely teach myself how to do everything over the computer." Teacher competency with technology, which can be increased by adequate professional development, was also found to influence teacher willingness to use educational technologies (Genc et al., 2021; Qahmash, 2018; Yilmaz et al., 2021). Voithofer et al. (2019) also listed professional development as an integral level of support when looking at how teachers integrate technologies in their classrooms.

Teacher as Leader

Teachers who were already inclined toward leadership roles found new opportunities to do so as a result of the one-to-one device initiative. Thirty-three percent of teachers reported taking advantage of new leadership opportunities. Additionally, those participants who were not interested in formal leadership roles all described ways in which they took part in informal displays of leadership – by sharing lesson plans, insights, opinions, and helping each other with technology issues – which was described in the literature as vital to a successful one-to-one device initiative (Bingham, 2021; Levin & Schrum, 2013; Masullo, 2017).

Over half (57%) of the teachers felt students had everything they needed in regard to technology, but 43% detailed the ways in which they have had to advocate for additional technology and/or resources either for themselves or for their students. Having computers that stay in the classroom so students would always have access to computers in good, working order was a common wish:

> I'd like to have stations where they don't have any excuses - that I have control of the computers and make them get on it and do it, but that are mine. And so, I have argued for that, but I haven't gotten it.

Although the number of teachers who felt the students had everything they needed was divided, two-thirds of interviewees felt the diverse needs of their students had been met by the technology available to them.

Teacher as Citizen

With social media usage on the rise, the literature review indicates a real need for increased instruction in digital citizenship (Perrin, 2015). Phillips and Anderson (2020) found that special education students are not exempt from this need, as they can be just as active on

social media and online video games as their peers. The teachers in this study found the one-to-one devices generated increased opportunities for student discussions about issues of digital citizenship – such as making socially responsible decisions, critically examining online resources for credibility, correctly handling issues of copyright and intellectual property, and the management of personal data and digital identity online. One teacher explained how these conversations started in the classroom:

> Well, a lot of the problems they have is Instagram and TikTok's and back and forth and conversations where they, you know, in my room we just – they come to me with an issue, and it's like, "Well, what caused this?" and we just talk about how it could have been avoided. When the opportunity arises, I probably talk too much, but it's a social studies classroom, so we'll talk about social issues: "This is a problem that you're having, this is what we can do to try to stay away from it."

Another teacher described letting students start these conversations in the morning, "A lot of our so-called lessons that we have in computer skills and social skills and life skills all are what somebody says around the breakfast table in the morning."

Teacher as Collaborator

The literature on collaboration indicates special education teachers not only benefit from collaborating with other special education teachers, but with general education teachers as well (Courduff & Moktari, 2021). Garcia-Martinez et al. (2022) also found that electronic environments are becoming more prevalent in teacher collaboration, especially when in-person collaboration is impractical or impossible. Over three-quarters of the teachers in this study were not afforded regular in-person collaboration opportunities during their workday, and although they discussed using virtual collaboration methods, such as email, Microsoft TEAMS meetings,

and Facebook groups to compensate for the lack of common planning periods, each of those teachers talked about their desire for more time to collaborate with peers. One teacher explained:

> I would really love some special education training as a group, because that's where I think - even TEAMS is probably acceptable. But if we had a training where we could all just really network - like I remember two years ago when we were at (a local) Middle School, even though most teachers who were seasoned hated the time that they had to spend there before school started – but for me, I was able to collaborate with teachers that I didn't get to normally collaborate with. I got a pacing guide for math because I knew I'd eventually be teaching math. Then if I have a problem, that makes me think of that person, "Hey, I can call this person for assistance." So, yeah, I would love more networking, but we actively don't do that.

Higgins and BuShell (2017) studied teacher/student collaboration in a one-to-one technology environment and found when students and teachers work together, the relationship between them improved, and devices were better utilized to their full potential. Each of this study's participants described collaborating with students to troubleshoot technology problems and learn about new technologies.

Teacher as Designer

The literature review described how successful technology integration programs often utilize technology frameworks such as TPACK, SAMR, and TIM (Hamilton et al., 2016; Khan & Gul, 2022; Kimmons & Hall, 2017; Voithofer et al., 2019; Welsh et al., 2011). None of the participants in this study mentioned utilizing a technology framework or having any professional development on a technology framework for planning and implementing lessons with technology.

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Voithofer et al. (2019) described the criteria teachers need to create integrated lessons with their one-to-one devices. These include a culture of collaboration, curriculum planning, professional development, and a shared vision of what technology integration should look like in their classrooms. Most of the teachers in this study discussed not having opportunities for collaboration or curriculum planning, and a lack of professional development specifically related to the one-to-one devices. Nevertheless, 81% of respondents described creating learner-driven activities with one-to-one devices, and 90% of the teachers valued the devices for their ability to easily accommodate different learner abilities.

Sixty-seven percent of teachers in this study used adaptive technologies to adapt and personalize instruction for their students with disabilities. Satsangi et al. (2019) researched how teachers choose assistive technology for their secondary students, and found assistive technologies must help students become self-sufficient, be preferred by the student, and not be embarrassing or stigmatizing to use. Eighty-six percent of interviewees reported using their devices to foster a culture of independent learning in their classrooms, and all of the teachers discussed creating learning opportunities for their students based on the state-approved content standards and objectives.

Teacher as Facilitator

The adaptability of technology lends itself to easier differentiation and the ability to individualize instruction (Genc et al., 2021; Zheng et al., 2016). Seventy-one percent of teachers described using their one-to-one devices to facilitate learning with technology to support student achievement, and the ease of differentiation was a recurring theme throughout all of the interviews. According to Varier et al. (2017), successful technology integration occurs when students feel engaged and invested, take responsibility for their learning, and see real-world

value in their tasks. Peled et al. (2022) also found students took more responsibility for their learning while using one-to-one devices. Seventy-one percent of teachers in this study said they were either able to foster a culture where students take ownership of their learning, or they were working toward it. Even though 62% of interviewees were able to list at least one real-world collaboration tool their students used in their classrooms, and 67% challenged students to use a design process and/or computational thinking with their one-to-one devices, most teachers struggled to answer the question, and half of them described allowing students to create a Microsoft PowerPoint presentation as part of a larger research project. Fifty-two percent of teachers reported they modeled and nurtured creativity with their devices, but again, most struggled to pinpoint examples. It was much easier for them to describe ways in which they use the devices for skills practice and assessment.

Teacher as Analyst

The literature regarding formative assessments in one-to-one teaching environments suggests teachers inconsistently use the devices to inform instruction through formative assessments, but that increased professional development increased teacher competence and practice (See et al., 2022; Spector et al., 2016; Wagner, 2021). Although all teachers in this study described the ways in which they use data to drive instruction and support student achievement, and 90% responded they used technology to implement formative and summative assessments, most of the examples were summative instead of formative. Regardless of the assessments teachers chose to incorporate in their classrooms, 100% of the teachers described using the assessment data available to them to guide instruction and communicate progress with both their students and their parents.

Challenges

The special education teachers in this study reported facing similar challenges as those found in the literature. Varier et al. (2017) listed a steep learning curve, technical issues, lack of parental permission, and the lack of internet access at home as common challenges to device initiatives. Each of these concerns was noted by the respondents in this study as challenges faced in their classrooms. All teachers in this study discussed devices being kept in poor condition by their students and issues with regular device maintenance by the school system as barriers to consistent device usage in class, while the lack of internet in student homes presented a barrier to using the devices for homework assignments.

Ackley (2017) discussed issues involving parental buy-in and the difficulty of finding a balance between teaching with technology and traditional teaching methods. Twenty-nine percent of respondents discussed either the lack of internet access at home, or the lack of adults willing or able to help students work from home, as a limiting factor in using technology outside of the classroom. Although most teachers in this study embraced the increased use of technology inside the classroom, 24% of the teachers felt the one-to-one devices were more of a distraction to learning than a tool for advancing it.

Summary

The literature review for this study found that access to technology does not always ensure appropriate use (Wagner, 2021). Time to collaborate with peers, both those in their buildings and across the school system, was found to be beneficial to all teachers (Wooten et al., 2021; Zook, 2022). All the teachers in this study valued the ability to share resources and information, but most were not given the opportunity to do so within the school day. Common

planning periods during the workday and increased opportunities for collaboration across the school system may improve technology integration in special education classrooms.

Increased professional development for teachers in technology integration, in particular professional development in using a technology framework for planning lessons, and how to appropriately use devices for both formative and summative assessments, can help educators use their devices to their full potential (Blackwell et al., 2013; Ekanayake & Wishart, 2015; Knops, 2017; Perry, 2018; See et al., 2022; Spector et al., 2016; Voithofer et al., 2019; Wagner, 2021; Zheng et al., 2016; Zhong, 2017) The special education teachers in this study could benefit from more professional development, particularly from professional development in the use of SAMR or another planning tool in order to create lessons which utilize higher levels of integration instead of using the devices for simple practice and assessment (Liu et al., 2016).

Leadership and Policy Implications

Device maintenance and the poor condition of student devices were discussed by each of the 21 teachers who were interviewed for this study. In particular, teachers felt they should have access to devices that stay in their classrooms – in addition to the devices assigned to the students – since the student devices are not always brought to class in working condition. School system administration could be more flexible on this point and allow teachers to have access to devices that stay in their classrooms, or at least have some devices in the school that teachers could check out for projects and then return when they were finished. As it stands, teachers are reliant on the students to bring their computers to class in good working condition, which frequently does not happen.

The lack of consistent collaboration time was another common theme in the teacher interviews. School administration should provide for common planning periods to allow for

increased collaboration between special education teachers. Additionally, several teachers in this study talked about the benefits of collaborating with their colleagues who teach in other schools. The school system administration should plan for more collaborative sessions which include special education teachers from across the school system.

In addition to more collaboration, school and county administrators should invest in more professional development for their special education teachers. Quality technology integration does not occur simply because teachers are given more technology to work with. As increased access does not automatically result in quality technology integration, more professional development in a technology framework such as TPACK or SAMR would help increase teacher attitudes and comfort using technology with their students (Blackwell et al., 2013).

Suggestions for Future Research

This study took place in a rural school system in West Virginia. The same research could be replicated in a more urban school system, or in a school system outside of West Virginia, as technology spending and professional development varies from one school system to another.

The population of this study included all secondary special education teachers in this rural school system. The respondents were teachers of students with several different ability levels – from gifted and talented students, to those with mild or moderate learning disabilities, to students with severe and profound disabilities. Due to the wide range of student ability levels, there were several questions in the interview protocol which applied to one subsection of respondents but did not apply to others. Future research may benefit from studying teachers of students with similar ability levels.

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Appendix A: IRB Approval Letter

MARSHALL UNIVERSITY
www.marshall.edu

Office of Research Integrity
Institutional Review Board
One John Marshall Drive
Huntington, WV 25755

FWA 00002704

IRB1 #00002205
IRB2 #00003206

March 6, 2023

Ronald Childress, Ed.D.
Leadership Studies Department, MUGC

RE: IRBNet ID# 2019305-1
At: Marshall University Institutional Review Board #2 (Social/Behavioral)

Dear Dr. Childress:

Protocol Title:	[2019305-1] Changes in Special Education Teacher Roles While Implementing One-to-One Devices in Rural Secondary Public Schools
Site Location:	MUGC
Submission Type:	New Project APPROVED
Review Type:	Exempt Review

In accordance with 45CFR46.104(d)(2), the above study was granted Exempted approval today by the Marshall University Institutional Review Board #2 (Social/Behavioral) Designee. No further submission (or closure) is required for an Exempt study **unless** there is an amendment to the study. All amendments must be submitted and approved by the IRB Chair/Designee.

This study is for student Heather Farley.

If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/ Behavioral) Coordinator Lindsey Taylor at (304) 696-6322 or l.taylor@marshall.edu. Please include your study title and reference number in all correspondence with this office.

Sincerely,

Bruce F. Day, ThD, CIP
Director, Office of Research Integrity

Generated on IRBNet

Appendix B: Interview Protocol

Thank you for agreeing to participate in my study. As a reminder, this study is being conducted through the Marshall University College of Education and Professional Development to explore the role and function of teachers who use one-to-one technology devices in their secondary special education classrooms. This interview will be recorded for the sole use of the co-investigator's analysis. Your answers will be integrated with the answers of other participants. You will not be identified in any way, and confidentiality will always be maintained. Participation is completely voluntary, and you can stop participating at any time.

I anticipate the interview will take approximately 45-60 minutes. Did you read the Informed Consent Form and Study Abstract? Do you have any questions about the purpose of the study? Are you willing to continue with the interview?

Interview Questions
1. *General Questions/Background Information*
   a. What grade level(s)/student ability levels do you currently teach?
   b. How long have you taught? Overall? This grade/ability level?
   c. What made you want to become a teacher? A special education teacher?

2. *General Technology Integration Questions*
   a. How comfortable are you with using technology? Overall? In your classroom?

3. *Teacher as Learner*
   a. How have you been able to use the one-to-one devices to improve your teaching practice?
   b. Describe any professional learning goals you have made related to teaching with the one-to-one devices.
        i. What have you done to work toward meeting those goals?
   c. Have you been able to learn with and from others?
        i. If so, how?
        ii. What have you learned?
   d. Have you been able to participate in any learning networks?
        i. If so, which ones?
        ii. Were they helpful?
        iii. If so, how?
   e. What are some ways you have been able to remain current on research regarding student learning with technology?
   f. Do you believe student performance has improved as a result of your new practices and knowledge?

4. *Teacher as Leader*
   a. Have you been able to seek out opportunities for leadership to improve teaching and learning with the one-to-one devices?
        i. If so, what leadership roles have you taken?
        ii. Do you feel they successful?

        iii. Why or why not?

    b. Have you had to advocate for equitable access to technology or digital content for your students?

        i. Describe how the diverse needs of your students have, or have not, been met by the technology available to you?

    c. How are new digital resources found, explored, and adopted in your department?

        i. To what extent have you been involved in the adoption of new digital resources?

5. *Teacher as Citizen*

    a. What experiences do you create for learners to make socially responsible decisions and exhibit empathetic behavior online?

    b. What are some ways you promote students building relationships and community online?

    c. How do you establish a learning culture that promotes both curiosity and the critical examination of online resources?

    d. What types of activities do you provide that teach students about the protection of intellectual rights and property?

    e. Do you model and promote the management of personal data and digital identity online for your students?

        i. If so, how?

6. *Teacher as Collaborator*

    a. Have you been able to collaborate with colleagues to improve practice, discover and share resources and ideas, and solve problems?

        i. With students?

    b. How much planning time have you dedicated to collaborating with colleagues to create authentic learning experiences that leverage technology?

    c. How often do you collaborate and/or co-learn with the students to discover and use new digital resources or troubleshoot technology issues?

    d. What collaborative tools have you used to expand students' real-world learning experiences?

    e. Have you modeled cultural competency when communicating with students, parents, and colleagues for your students?

7. *Teacher as Designer*

    a. What types of learner-driven activities and environments have you designed with technology?

    b. How do you accommodate different learner abilities with the one-to-one devices?

    c. How do you use technology to adapt and personalize learning experiences?

    d. What types of learning experiences do you create that foster independent learning with the one-to-one devices?

    e. What types of authentic learning activities that align with content area standards have you created?

    f. What digital tools have you used with your students to maximize active learning?

    g. Have you been able to apply instructional design principles to create innovative digital learning environments for your students?

8. *Teacher as Facilitator*
    a. Have you been able to facilitate learning with technology to support student achievement?
          i. If so, how?
    b. Have you been able to foster a culture where students take ownership of their learning goals and outcomes?
          i. If so, how?
    c. How do you manage the use of technology and student learning strategies in digital platforms like virtual environments?
    d. What types of learning opportunities have you created that challenge students to use a design process and computational thinking to solve problems?
    e. How do you model and nurture creativity to communicate ideas, knowledge, or connections?

9. *Teacher as Analyst*
    a. How do you use data to drive your instruction and support students in achieving learning goals?
    b. How do you provide alternative ways for students to demonstrate competency and reflect on their learning using technology?
    c. Do you use technology to design and implement formative and summative assessments?
          i. How do you use the data that you get from those assessments?
    d. Do you use the assessment data to guide progress and communicate with students and parents and build student self-direction?

10. Challenges Implementing One-to-One Device Programs
    a. What has been the biggest challenge you have faced due to the one-to-one device implementation?
    b. How have you been able to incorporate the new devices with traditional teaching methods?
    c. Do you feel you received enough professional development on the use of the new devices?
    d. What types of professional development sessions do you feel would be helpful to you now?

12. Wrap-up/Catch-all
   a. Is there anything else you would like to tell me about the school system's one-to-one device implementation?

Thank you so much for your time and willingness to participate in this study!

Appendix C: Informed Consent

<u>Informed Consent to Participate in a Research Study</u>

Changes in Special Education Teacher Roles While Implementing One-to-One Devices in Rural Secondary Public Schools

Ronald Childress, EdD, Primary Investigator (PI)
Heather Farley, Co-Investigator (CI)

Marshall University IRB	
Approved on:	03/06/23
Study number:	2019305
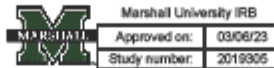
Dear (Participant):

My name is Heather Farley, and I am a Technology Integration Specialist at Straley, Melrose, and Sun Valley Elementary Schools in Mercer County, West Virginia. I am currently a doctoral candidate in the Leadership Ed.D. Program at Marshall University, and I am contacting you to ask for your participation in my dissertation research study investigating the integration of one-to-one technology devices in secondary special education classrooms in Mercer County.

I am asking for your participation in a semi-structured interview that will focus on your use of technology, specifically the county-provided one-to-one laptops and iPads, with your students. The International Society for Technology in Education (ISTE) Standards for Educators found at https://www.iste.org/standards/iste-standards-for-teachers will guide the interview, and those standards are integrated into the interview questions.

The interview will be conducted over Microsoft Teams, and should take between 45-60 minutes of your time. A copy of the study abstract and interview protocol is attached. There are minimal confidentiality risks involved in participating in this study. The interviews will be recorded and transcribed verbatim. You may be contacted after the interview to verify your remarks during the transcription process. After transcription is complete, the recording will be destroyed, transcripts will be assigned a number, and the code list of names will be kept in a password-protected computer file by the CI. Field notes will also be taken during the interview. The information you supply is confidential, and no individual or school will be identified by name or other identifying information.

The success of this study is dependent upon the willingness of professionals such as yourself to share their experiences and insights.

Your consent, and that you are at least 21 years of age, is implied by your willingness to be interviewed. Participation is completely voluntary and there are no penalties or loss of benefits if you choose not to participate. You may also choose not to answer any question included in the interview protocol.

If you have questions about this study, you may contact Dr. Ron Childress (PI) at (304) 545-0245 or rchildress@marshall.edu. You may also contact Heather Farley (CI) at (304) 920-9081 or farley238@marshall.edu. If you have any questions regarding your rights as a research participant, you may contact the Marshall University Office of Research Integrity at (304) 696-4303.

Please reply to this email and let me know if you are willing to participate. If so, I will respond to schedule a date and time for your interview.

Thank you for your willingness to consider participating in this study. The findings will be shared with all participants.

Heather L. Farley

farley238@marshall.edu

EDUCATION

Doctor of Education | Marshall University

·   Major: Doctor of Education in Leadership Studies

·   January 2021 - Present

·   Projected Graduation Date: April, 2024

Master of Education | Coppin State College

·   Major: Master of Education in Curriculum and Instruction

·   Graduation Date: December 21, 2001

·   Overall GPA: 3.91 on a 4.0 scale

Bachelor of Science | Bluefield State College

·   Major: BS in Early/Middle Education

·   Graduation with Honors: Cum Laude

·   Specializations: K-8 Multi-subjects, 5-8 Science, 5-8 Social Studies

·   Graduation Date: May 9, 1998

·   Overall GPA: 3.42 on a 4.0 scale

·   Undergraduate Honors and Activities:

Member of the Gamma Beta Phi Honor Society at BSC 1995-1998; Member of the Phi Eta Sigma Freshman Honor Society at BSC 1994-1998; Member of the Kappa Delta Pi Teacher Education Honor Society at BSC; President's List at BSC: Spring 1998, Spring 1999; Dean's List at BSC: Fall 1994, Fall 1995, Spring 1996, Fall 1997, Fall 1998; Member of the UN Council Debate Team at BSC 1994; Recipient of the Board of Director's Scholarship at BSC 1994-1998; Recipient of the Rotary Club G.G. Auvil Scholarship 1994.

TEACHING CERTIFICATION/LICENSURE

West Virginia Board of Education

- · Professional Teaching Certificate – 0K-08 Multi-Subjects
- · Professional Teaching Certificate – 0K-06 Special Education Multi-Categorical (LD, BD, ID)
- · Professional Teaching Certificate – 05-Adult Special Education Multi-Categorical (LD, BD, ID)
- · Professional Teaching Certificate – 05-08 General Science
- · Professional Teaching Certificate – 05-08 Social Studies
- · Advanced Credential – PK-Adult Technology Integration Specialist
- · Permanent Authorization – PK-05 Computer Science Fundamentals

TEACHING EXPERIENCE

Teacher | Mercer County Schools

August 2000 – Present

Design, implement, and assess curriculum to teach the goals and objectives of the state of West Virginia in an inclusive classroom setting including the use of several modes and methods of instruction, adaptations and accommodations for special needs students, especially hands-on activities in science, social studies, reading, and English.

August 2000 – August 2007 Athens School

Teacher, 6-8 science; 6th grade reading; 6th grade English; 6th grade social studies

August 2007 – August 2008 Princeton Middle School

Teacher, 6-8 Science

Technology Integration Specialist | Mercer County Schools

August 2008 – Present – Technology Integration Specialist at Various Elementary Schools, including teaching in the Mercer County Mobile STEM Lab at all Mercer County Elementary Schools

Design, plan, teach, train, assist, and troubleshoot the integration of technology in teachers' classroom instruction at various schools in Mercer County.

Design, teach, and assess STEM lessons and activities in Mercer County's Mobile STEM Lab.