Perspectives of Special Educators on the Use of Tablets and Handhelds

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Dedication

I dedicate this dissertation to my family. I am forever grateful to my parents, Werner and Dolores, who encouraged me as a first generation college student to pursue my dreams to work in special education. I dedicate this work to my big sisters, Diana and Karen, who encouraged me in my journey and now watch and guide me from the heavens. I am thankful for my oldest son, Wade who served as my “IT Director” and assisted me with the technical aspects of recording group interviews. To my youngest son, Cole, who encouraged me from afar. Lastly and most importantly, I dedicate this work and the persistence to finish to my husband, Don. I thank him for his enduring faith in me. Despite his own health challenges, he offered a second opinion, a second set of eyes, and encouraged me to press on to completion. For this, I will forever be thankful.
Abstract

This paper presents the results of a mixed methods study on the use of tablets and handhelds in special education. The results identify the perceptions of 115 special educators representing 39 districts in Northwestern Wisconsin. This study examined the current and past practices of three groups of special educators. The study sought information regarding how special educators perceived changes to their technology practices as a result of their use of tablets and handhelds and how these changes benefited student learning. In addition, the study examined how the utilization of tablets and handhelds influenced the instruction and learning of students with disabilities (SWD) as well as the necessary school supports for the successful integration of assistive technology. Data from this study supported prior research identifying tablets and handhelds as valuable learning tools for SWD. This study presents a graphic framework that summarizes the data identifying the benefits of tablets and handhelds for student learning and instruction. Access is a key finding of this study. Special educator and student access to tablets and handhelds resulted in perceived student and educator benefits. Student benefits were noted in the areas of motivation, engagement, focus and attention, independence, communication, behavior, and social skills. Special educators and administrators report increased use of assistive technology, changes in how they differentiate, use instructional strategies, individualize, and group students for instruction after tablet and handheld use. The data from this study confirmed research on the importance of key school supports for successful technology integration in education. Identified are school and student success stories offering examples of tablet and/or handheld use in school contexts. Implications for practice provide suggestions that assist school districts and administrators to support tablet and handheld use in special education.
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Chapter 1: Introduction

Background

Fourteen years ago, in their landmark study *High Access, Low Use of Technologies in High School Classrooms: Explaining an Apparent Paradox*, Cuban, Kirkpatrick, and Peck (2001, p. 830) described their vision: “We might envision a day, for example, when all students use portable computers the way they use notebooks today.” That same year, Hasselbring (2001) focused on three significant trends in the future of special education technology by predicting the following:

1) The development of computing devices that will exponentially increase in speed and capacity while decreasing size and cost.
2) The delivery of information and instructional materials anytime and anyplace as a result of advances in broadband and wireless technology.
3) The development of instructional materials and practices that are based on science-of-learning principles. (Hasselbring, 2001, p. 15)

In addition, Hasselbring believed that computing devices would become affordable enough for many to own and thus might begin to close the digital divide in the school environment (Hasselbring, 2001). Fourteen years later, schools are living the vision of Cuban et al. (2001) and Hasselbring (2001).

Schools are in the midst of a digital revolution. Apple broke industry records with the introduction of the iPad in April of 2010. Since then, Apple has sold 250 million iPads (Cheng, 2015). Forrester, a technology and market research company, called the iPad a “game changer” (Epps, 2011) further catapulting competition for developers of touch screen tablet computers (Eisele-Dyrli, 2011). Not long thereafter, the market for tablets exploded with Amazon, Google, and Samsung android devices. Nearly 40 million android tablets have been shipped, with two out of three tablets running Android.
operating systems (Cheng, 2015). By spring of 2015, 725,000 applications (apps) have been designed for tablet and handhelds users (Cheng, 2015).

With the development of the Apple iPod in 2004 and more recently the Apple iPad iOS device in 2010, educators have embraced tablets and handhelds with iPad pilot programs emerging all over the country (Eisele-Dyrli, 2011). Within the K-12 schools in Texas in 2014, there were more than 750,000 iPads (Cheng, 2015). Advantages such as portability, size, and weight (Angst & Malinowski, 2010; Marmarelli & Ringle, 2010; Shah, 2011) eliminate the barrier a laptop creates in classrooms (Marmarelli & Ringle, 2011). What educational users appreciate most about tablets and handhelds and their apps is their ease of use allowing teachers to enhance student learning with active learning techniques (Jennings, Anderson, Dorset, & Mitchell, 2011; Wu & Zhang, 2010). These devices are seen as new tools that enable teachers to “implement learning activities that allow students to achieve the level of ‘create’ at the peak of Bloom’s Taxonomy” (Baum & Walter, 2011, p 7). University researchers McMahon and Walker (2014) state that the use of mobile devices in education is “leading to widespread change” (McMahon and Walker, 2014). One researcher notes that the “iPad is just the beginning of the new technology that is changing the face of traditional special education” (Conley, 2012, p. 3986).

Tablets and handhelds offer many differing assistive technology (AT) solutions in one piece of equipment. Tablets and handhelds can be customized to each device, thus individualizing for a student with a disability (Shah, 2011; Shareski, 2011). Mobile devices, specifically tablets and handhelds, offer students with disabilities access to educational applications that were previously provided in individual, bulky, expensive
devices (Shah, 2011). The advantage of tablets and handhelds is that they break down previous accessibility barriers giving them a niche in special education. As Eric Soloway states, tablets “. . . can compensate for special-needs kids in a way that traditional media cannot” (March 3, 20011, as quoted in Shah, 2011, p. 16). Tablets and handhelds offer the student with print disabilities access to a digital book; the student with vision impairments a portable magnification system; the student with difficulty writing speech-to-text capability; and students with cognitive and autism spectrum disabilities, visual and concrete instructional materials.

Research studies on tablet and handheld technology indicate that these devices can be effective learning tools in general education (Milman, Carlson-Bancroft, & Bogart, 2012; Wong & Looi, 2010; Lan, Sung, & Chang, 2007) and for use with English language learners (Liu, Navarrete, & Wivagg, 2014). An increasing number of studies show promise in assisting students with disabilities (Cummings & Rodriguez, 2013; Flewitt, Kucirkova, & Messer, 2014; Gulchak, 2008; Marks & Milne, 2008; Swan, van t’ Hooft, Kratcoski, & Unger, 2005). Evaluation studies of handheld and tablet pilot programs in K-12 and post-secondary schools across the nation are seeing positive results (Angst & Malinowski, 2011; Crompton, Goodhand, & Wells, 2011; Marmarelli & Ringle, 2011).

**Problem Statement**

The new tablet technology has the potential to enhance teaching and learning for all students and offers the customization students with disabilities need within general and special education environments. Students with disabilities benefit from assistive technology use (Kagohara, van der Meer, Ramdoss, O’Reilly, Lancioni, Davis, Rispoli,
Lang, Marschik et al., 2013; Peterson-Karlan, Wocjik, & Parette, 2006; Mirenda, 2003; VanLaarhoven, Johnson, Laarhoven-Myers, Grider, & Grider, 2009). However, decisions to purchase new technologies are easier than integrating and effectively using them in the classroom. Research supports the claim that based on the number of students who could benefit from assistive devices or services, only a fraction of them actually have access to and use them. Barriers to assistive technology use and integration are well documented in the research (Okolo & Diedrich, 2014; Bausch, Ault, Evmenova, & Behrman, 2008; Copley & Ziviani, 2004).

Tablet and handheld technology has the capacity to reduce documented barriers while offering easy access to applications providing accommodations that reinforce and extend learning. School districts across the nation are spending district, state and federal dollars on tablet and handheld devices for use with students with disabilities with the hope to improve teaching and learning. In Northwestern Wisconsin, districts have purchased tablets and other new technologies in large quantities for use in special education.

Educational history demonstrates that the presence of the newest gadget in education will not guarantee its use. The literature outlines the complex issues and barriers involved in the successful integration of technology in education (Levin & Wadmany, 2008; Staples, Pagach & Himes, 2005; Cuban et al., 2001; Mumtaz, 2000; Veen, 1993). If these barriers continue within the contexts of schools, the opportunity of tablets and handhelds to change how teachers teach and how students learn may never be realized. Understanding the supports and changes needed for successful technology integration will assist educational systems in planning for new initiatives.
Purpose

As districts are utilizing newly purchased tablets and handhelds in special education, it is important to understand the potential barriers and supports necessary for the successful use of these devices. For students with disabilities to benefit from new technologies, special educators must understand how best to integrate them into their practices.

This study sought to understand the digital phenomenon, specifically the tablet and handheld revolution, and its impact on assistive technology for students with disabilities. This study sought understanding of why tablets and handhelds are seen as “game changers” in education and why school boards, families, and special education departments have purchased them in such large numbers. With thousands of new dollars spent on handheld and mobile devices in special education classrooms within northwestern Wisconsin, it is important to learn how educators can use them to maximize student learning.

This study identified the perceptions of special educators regarding their prior and current use of assistive technology devices and their most recent use of tablets and handhelds. This study identified the perceived learning benefits for students with disabilities and how AT is utilized in special education. In addition, it offers information about how tablets and handheld use benefitted the special educators as they integrated them into their instruction. To increase the likelihood of tablet and handheld use and subsequent benefits, this study identified the necessary school supports to successfully integrate tablets and handheld technology in special education and offers recommendations for practice.
Research Questions

1. How do special educators perceive changes, if any, to their use of technology with students with disabilities as a result of their use of tablets and/or handheldds?

2. How are these changes perceived to benefit the learning of students with disabilities?

3. How does the utilization of tablets and handhelds, as perceived by special educators and administrators, influence the instruction and learning of students with disabilities?

4. What school supports do special educators perceive are necessary for the successful use of assistive technology with students with disabilities?

Importance of the Study

This study provides information on the perceptions of special education teachers, service providers, and administrators in Northwestern Wisconsin regarding the use of handheld and tablet devices in special education. The demographics of this study included a variety of suburban and rural areas that included 39 school districts located within the boundaries of the service area within Cooperative Educational Service Agency #11 (CESA #11). This study sought to understand past history regarding the use of assistive technology and devices, understand the tablet and handheld phenomenon in special education, and offer insight into their current and potential use within special education programs. With only a fraction of eligible SWD receiving access to federally mandated AT services, this study informs the field in how special educators use tablets and handhelds in special education. This study informs school administrators, school boards, educators, and parents of the influences on teaching and learning as well as the
perceived student and teacher benefits from using tablet and handheld devices within similar school contexts. Assistive technology purchases for students with disabilities can be a significant expenditure for school districts. This study offers information to guide future financial and educational decisions regarding the use of tablets and handhelds in school environments. In addition, it offers information about the necessary school supports for successful technology integration. Identifying the necessary technology supports for the successful integration will assist school districts as they plan for future technology initiatives. Lastly, this study will add to the existing literature on the implications of using tablets and handhelds within special education contexts.

**Review of Related Research and Applicable Theories**

Understanding the history of technology integration in schools as well as the past barriers can offer insight into how new technologies can be supported in K-12 education.

**Research on Mobile Learning**

Mobile learning has gained momentum as a viable learning tool for all students. Early studies focusing on laptop initiatives suggest that students demonstrate improved independence, engagement and motivation (Apple, 2008) and improved writing skills (Lowther, Ross, & Morrison, 2003; Silvermail & Gritter, 2007). Early research studied mobile devices such as pocket PCs, palm pilots, iPods, and smart phones. Two case studies using mobile devices for language learning focused on content created by a class of 40-eight year-olds demonstrated that mobile devices assisted students to be self-directed learners by integrating formal and informal learning strategies (Wong & Looi, 2010). One study using a smart phone documents the changes of a primary science curriculum for mobile technology delivery (Looi, Zhang, Cheng, Seow, Chia, Norrist &
Soloway, 2011). In this experimental study, the class learning via mobile technology performed better than the other traditional class on science assessments. The researchers noted changes in student engagement and student abilities to construct their own understanding of the subject matter. In addition, self-directed learning, independent research of the topics, self-discipline and student-to-student collaboration increased. The teacher in this empirical study stated that she felt more competent and the structure of student independent learning offered her more time to reflect on her lessons during class time. In this study, the technology helped to change teaching and learning.

A mobilized curriculum is a transformation from a more content-centered and teacher-centered infrastructure to a systematic student-centered infrastructure that seeks to foster personalized learning and self-directed learning (Looi et al. 2009 as quoted in Looi et al, 2011, p. 269).

In their study of classrooms of English language learners using tablets within a school-wide implementation initiative, Liu et al., (2014) noted that the teachers incorporated handhelds into their daily teaching activities and needed to change their teaching to a student-centered approach. Students had more control over their learning by having access to resources and tools instantly that were not available to them prior (Liu et al., 2014).

Mobile learning with students with disabilities. Since 2012, the availability of research on the use of mobile technology with students with disabilities has expanded. Two recent literature reviews offer a review of studies from 2008–2012. In their literature review, Liu, Wu, and Chen (2013) analyzed 26 studies utilizing technology examining the types of technologies, the types of students and each study’s purpose. They found that the most common purpose noted in 75% of the studies was examining the learning effectiveness of using learning technologies. Experimental studies
comprised 46% of the studies with the remaining 19% comprising questionnaires and surveys. Three of the studies utilized mobile learning. This review concluded that positive outcomes were noted more than negative outcomes and highlighted some challenges to integrating technology. Limited access to technology, time constraints, and difficulty with classroom management were three common barriers (Liu et al., 2013).

A systematic review of studies that used tablets and handhelds was conducted for students with developmental disabilities that identified 15 different studies (Kagohara et al., 2013). The 15 studies covered the areas of academics, communication, employment, leisure, and transitioning across school settings including 47 participants. The students ranged in age from four – 27-years-old with intellectual disabilities or Autism Spectrum Disorders. The studies focused mainly on using iPods or iPads delivering prompts to teach a strategy or to use as a speech-generating device (SGD). The researchers reported that the study results were “largely positive” concluding that tablets and handhelds are valuable tools for individuals with disabilities (Kagohara et al., 2013).

Since the introduction of tablets, more studies have become available in the literature that report promising student outcomes and benefits in multiple areas with some studies noting positive outcomes in more than one area. Several studies report increased motivation, independence and engagement for students when using tablets and/or handhelds (Elliott, Livengood, & McGlamery, 2012; Flewitt et al., 2014; Haydon, Hawkins, Denune, Kimener, McCoy, & Basham, 2012; Milman et al., 2012; O’Malley, Lewis, Donehower, 2013). Research suggests that increased engagement of students led to reductions of noncompliant behaviors (O’Malley, et al, 2013). In addition to improved motivation, engagement and independence some studies reported improved academic
achievements (Burton, Anderson, Prater, & Dyches, 2013; Chai, Vail, & Ayres, 2014; Haydon, et al., 2012; McClanahan, Williams, Kennedy & Tate, 2012; Miller, Krockover, & Doughty, 2013). Tablets and handhelds are used to successfully improve independence and functioning (Collins, Ryan, Katsiyannis, Yell, & Barrett, 2014) and have demonstrated changes in communication (Chien, Jheng, Lin, Tang, Taele, Tseng, & Chen, 2014; Flores, Musgrove, Renner, Hinton, Strozier, Franklin, & Hil, 2012). The adults in one study commented that with tablet use the students were able to work independently which had been a struggle in the past (Cumming & Rodriguez, 2013). The apps provided enabled the students to receive individual feedback specific to their correct and incorrect responses. Immediate feedback apps were utilized in a study of students with emotional disturbance comparing math skill development between using tablets and worksheets. The results support that with the use of tablets, students were more engaged with higher rates of work completion (Haydon et al., 2012).

A recent study by Douglas and Uphold, (2014) taught students with intellectual disabilities to use tablets and handhelds to self-create a visual schedule by taking their own pictures and placing them in a first-then activity schedule. The students in this study decreased their reliance on adults and increased their independence (Douglas & Uphold, 2014). Flewitt et al. (2014) describe a “sense of empowerment” that came with the independence and literacy learning for the three -19 year olds with profound intellectual disabilities in their study. They noted, “The portability of the iPads combined with their touch sensitivity and the responsiveness of diverse apps opened up new areas for learning and inclusion for many students” (Flewitt et al., 2014, p. 111). Improvements are documented in behavior and social skills by pairing tablets and/or handhelds with video
modeling and visual strategies (Flores, et al., 2014; Burton, et al., 2013; Murdock, Ganz & Crittendon, 2013). Flores et al. (2014) identify a benefit of tablets and/or handhelds as the ability for the student to access recorded videos for repeated practice (Flores et al., 2014). Another benefit identified in the research is how students with disabilities are perceived by their peers. Conley (2012) identified that the use of an iPad may enhance the students socially. Other researchers noted minimized stigmatization with tablets (Gasparini & Culén, 2012; Elliott et al., 2012). Lastly, the study by Burton et al. (2013) identified that access to tablet and/or handhelds allowed self-contained students access to the core curriculum (Burton et al., 2013).

The literature also identifies observations and anecdotal data describing the teacher benefits of using tablets and handhelds for instruction. The teachers in a study conducted by Flores, et al (2012) reported on the ease of use of tablets indicating less preparation and materials were needed to teach (Flores et al., 2012). Reduced preparation time was noted in a study using a picture exchange communication system with tablets (Chien et al., 2014). The researchers state that developing a traditional paper system is “exhausting and inconvenient” (Chien et al., 2014) for teachers noting that the tablets built-in video, camera and audio reduced preparation time involved leaving time available for teachers to work on other child-centered tasks. Other researchers have noted instructional benefits in the ease in which teachers can differentiate instruction (O’Malley et al., 2013) and provide customized learning (Liu et al., 2014).

The research base on the use of tablets and handhelds is still evolving, however, still limited (Collins et al., 2014). Due to the ever-changing technology in schools and
Edyburn’s notion (2013) that “research follows innovation”, Edyburn (2013) posits that it is difficult for the profession to develop a solid evidenced-based research base.

Integration barriers of mobile learning. School districts in the midst of tablet and handheld initiatives are beginning to deal with issues that they had not anticipated. In his recent article, David Raths describes the top challenges identified by schools as they manage their tablets (Raths, 2013). In districts like the San Diego Unified School district with over 10,000 iPads in use, technical difficulties of the configuration software and syncing stations were posing a significant problem (Raths, 2013). Other problems included inventory management, and software licensing costs and changes to new operating systems for school IT departments arose (Raths, 2013). Liu et al. (2014) identified challenges such as the training needed to learn handheld technology, find apps, lesson development, and the management of devices to sync and download (Liu et al., 2014). In this study the loss of Wi-Fi capability was also challenge.

The History of Technology Integration in IT and AT

The benefits of mobile learning for all will be realized if education can overcome the challenges and barriers noted in the past two and a half decades of research on technology integration in both general and special education. The historical research on the integration of computers into educational environments describes barriers and challenges. Additionally, research studies and literature reviews specific to AT note that the use of assistive technology in K-12 education reveals continuing barriers (Okolo & Diedrich, 2014; Sze, 2009; Bausch, Ault, Evmenova, & Bauman, 2008; Edyburn, 2004).

Barriers and Challenges
Hew and Brush’s (2007) literature review of 48 empirical research studies from the years 1995-2006 found 123 barriers that they classified into six categories of: (1) resources, (2) knowledge and skills, (3) institution, (4) attitudes and beliefs, (5) assessment, and (6) culture (Hew & Brush, 2007). Hew and Brush (2007) utilizes Ertmer’s (1999) conception of first and second order barriers in their review. They describe external barriers such as lack of resources, institution, subject culture, and assessment as first-order barriers and as external to teachers. Attitudes, beliefs, knowledge, and skills are second order barriers and are intrinsic to teachers (Hew & Brush, 2007). Included in their first barrier category of resources were time, technical support, technology access, and lack of technology hardware and software. These barriers apply to past technology use in general and special education. The ongoing challenges of technical support are documented in research studies and reviews (NEA, 2008). The availability of quality technical support is highly correlated with teacher frequency, use, and growth in technology (Dexter, Anderson, & Ronnkvist, 2002).

The barriers in general IT compound in special education. Edyburn (2009) posits that the two technology systems of IT and AT did not work well together. He claims that the need and development for school networks have unintentionally led to failing assistive technology efforts (Edyburn, 2009). With the growth of technology and internet use in education, special educators found themselves locked out of the computers and programs offering their students assistance (Newton & Dell, 2009). During that time, desktop computers could be easily configured by accessing the control panel to change accessibility settings such as the visual resolution, mouse, and keyboard settings; however, due to school district policies and procedures special education teachers were
not able to access them. In an effort to maintain safe school network systems, special educators were unable to download the files and software that would assist their students such as digital books from Recording for the Blind and Dyslexic or Bookshare.org or student voice profiles for speech-to-text availability without the involvement of school district technical staff. Routine maintenance procedures for school networks affected special AT (Newton & Dell, 2009). District procedures often called for the identical configuration of all district computers. This process continues to be completed yearly through the reimaging of computers and software typically occurring in the summer months. Many desktop and laptop software programs were customized based on the individual student needs served by the teacher and to start all over each fall challenged AT efforts (Newton & Dell, 2009).

In addition to the hardware difficulties noted above is the lack of resources and funding (Okolo & Diedrich, 2014; Sze, 2009; Ashton, 2005) and time for programming new devices (Okolo & Diedrich, 2014; Ashton, 2005; Bailey, Stoner, Parette, & Angell., 2006). Device portability, durability, and weight were identified in one study as issues (Bailey et al., 2006) as well as technology cost and obsolescence (Sze, 2009; Copley & Ziviani, 2004; Edyburn, 2004) as additional barriers. Secondly, the knowledge and skills category refers to the specific knowledge educators have related to the technology and using this knowledge to improve teaching and learning in their classrooms. The lack of skills noted in the literature can refer to the knowledge and skill for that piece of hardware or the software applications used within that classroom as well as the pedagogy of using technology.
In special education staff training and skill development regarding AT is documented as a challenge (Okolo & Diedrich, 2014; Ashton, 2005; Bailey et al., 2006; Bausch et al., 2008; Sze, 2009). Sze found a lack of research regarding matching assistive software for children with disabilities (Sze, 2009). In one study AT specialists responsible for making recommendations to a team of professionals had the least amount of training (Lahm & Sizemore, 2002). Lack of training and professional development in technology is an ongoing need for special educators (Okolo & Diedrich, 2014; Bausch et al., 2008; Bailey et al., 2006; Alper & Raharinirina, 2006). Copley and Ziviani (2004) posit that the reason for low rates of AT use was a lack of expertise to allow for experimentation on differing devices (Copley & Ziviani, 2004). The literature indicates that there is a lack of awareness about what AT services are and if they are even considered (Okolo & Diedrick, 2014; Lahm & Sizemore, 2002; Bausch, et al., 2008) as well as which students should receive AT services (Sze, 2009; Edyburn, 2004). Hew and Brush’s (2007) third category of institution encompasses barriers associated with an educational institution such as schedules, leadership, and planning. Edyburn’s discussion on school infrastructures with the dual systems of AT and IT fall within Hew and Brush’s (2007) category of institution. Edyburn posits that past issues were related to power, authority and control thus IT and AT rarely combined services for the success of all students (Edyburn, 2004).

The fourth category of teachers’ attitudes and beliefs are identified in the literature as influencing technology integration. Pedagogical beliefs are teacher beliefs about teaching and learning and are important in a teacher’s adoption and use of technology. Teachers attribute value to their beliefs about whether the technology will
assist them in their learning goals (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012; Ertmer & Ottenbreit-Leftwich, 2010). Chen (2008) studied the inconsistency between teacher pedagogical beliefs and their classroom practices identifying that external factors, incorrect understandings of the meaning of constructivist instruction and conflicting beliefs of other teachers can impede technology integration. For technology integration to be successful, teachers must also feel confident in their abilities and believe in their own self-efficacy (Vanderlinde & van Braak, 2011; Wozney, Venkatesh, & Abrami, 2006). Negative staff attitudes regarding assistive technology are noted in the literature (Copley & Ziviani, 2004).

The fifth categories of barriers are identified as assessment. The current culture of assessment and high-stakes testing has affected the integration of technology through competing initiatives. Lastly, subject culture, specifically the practices and expectations of a specific school are identified as the barometer or indicator of how technology initiatives are embraced. Researchers found that computers were used in supportive rather than integral ways within the curriculum (NEA, 2008; Wozney et al., 2006; Zhao & Frank, 2003; Kleiman, 2004; Cuban, Kirkpatrick, & Peck, 2001; CEO Report, 1999).

Technology integration is a “complex relationship” among curriculum, staff development, and technology (Staples et al., 2005). Hew and Brush’s (2007) model posits that all barriers are interrelated to each other with technology integration either directly or indirectly influenced by the other categories (Hew & Brush, 2007). Years of research and multiple theories continue to support that technology integration is a complex with factors related to school culture, teacher beliefs and attitudes, and leadership, as well as the technology itself. The complexity of integrating technology in
K-12 education has paralleled the integration of technology in special education. In summary, the past challenges and barriers in the integration of technology in education has similarities to the barriers in integrating AT for students with disabilities.

**Lack of Research in Assistive Technology**

In addition to the barriers and challenges in the integration of technology in special education, Edyburn argues that there is an overall lack of quality research regarding assistive technology and its use with students with disabilities (Edyburn, 2013) including AT use or outcomes (Edyburn, 2009; Sze 2009; Bausch et al., 2008). Review of research in assistive technology is limited, and it is “unclear as to what is being used, by whom, where and when” (Quinn, Behrmann, & Mastropieri, 2009). These data alone cause one to question how the accessibility needs of students with disabilities are met if there is no evidence to back teacher decision-making processes. Research supports that assistive technology is not regularly used or suggested by special education service providers for use with student with disabilities. Consistent in the literature is the underutilization of AT (Quinn et al., 2009). The literature supports that based on the number of students who could benefit from an assistive device, only a few of them actually have access and use them (Quinn et al., 2009; Bausch, Ault, Ewmenova, & Behrmann, 2008; Ashton, 2005).

Efforts in the field of special education to improve the decision-making processes for student recommendations for AT is largely unsuccessful. Educators and researchers have developed and identified models to assist in the recommendation of AT devices or services. A comprehensive review by Jones and Hinesmon-Matthews (2014) outlined known AT consideration models developed within the last 20 years. The models outlined
in their review included: (1) Quality Indicators for AT Consortium (QIAT) by Zabala in 2000, (2) Participation Assessment Framework (PAF) by Schlosser (2000), (3) Student, Environment, Tasks, and Tools (SETT) by Zabala in 1996, (4) Wisconsin Assistive Technology Initiative (WATI), (5) Georgia Project for Assistive Technology (GPAT) by Wissick and Gardner in 2008 and (6) AT Consideration Quick Wheel by Marino, Marino and Shaw in 2006 (Jones & Hinesmon-Matthews, 2014). All models were designed to assist Individual Education Program (IEP) teams in determining AT devices and services that would be best matched for the individual student. All models consider the student’s individual needs based on their specific disability and level of functioning and referred to the research base and evidence-based practices. Despite the numerous years of training and model use in the field of special education the research continues to suggest that there is a lack of knowledge and preparedness for AT decisions (Okolo and Diedrich, 2014). Technology cannot assist students unless special educators recommend and use it.

The research on the history of the integration of IT and AT suggests multiple barriers and challenges that influence the abilities of special and general educators to successfully use technology to benefit students.

**Supporting Technology Integration**

To minimize the effects of technology integration barriers and maximize successful integration, researchers have identified multiple strategies that can assist schools. Hew and Brush (2007) describe these strategies grouped into five categories: (1) having a shared vision and technology plan, (2) overcoming the scarcity of resources, (3) changing attitudes and beliefs, (4) conducting professional development, and (5) reconsidering assessments.
Strong leadership and vision supports technology learning (Staples et al., 2005; Dexter, Seashore, & Anderson, 2002) and falls under the first category of school supports. Student learning of the curriculum should be the overall goal of technology integration (Staples, et al., 2005) and should set a focus for school leadership planning. A support listed under the second category is “Quality technology support” (Dexter, Anderson et al., 2002). Research supporting the third category focuses on teacher attitudes and beliefs. Teacher use of technology is a reflection of teacher beliefs (Veen, 1993; Ertmer, Ross, & Gopalakrishnan, 2000). Their confidence in their ability to achieve their goals with technology is closely tied to their successful integration (Wozney et al., 2006). In one study of teacher exemplary technology practices, teachers’ pedagogical goals were correlated with their technology practice and the benefit to students. These teachers persevered through difficult technology barriers due to their student-centered beliefs (Ertmer et al., 2000). The recommendations from Chen’s (2008) study of the inconsistency between what teacher’s practice and what they believe indicates the importance of professional development programs identifying teacher beliefs about teaching and learning and focusing on strategies for their pedagogical improvement (Chen, 2008). Examples of strategies included under the fourth category of professional development are supported in the research. Strategies include teacher collaboration for successful integration (Dexter, Seashore et al., 2002) or inquiry groups or professional learning communities (Hughes, Kerr, & Ooms, 2005; Smith & Robinson, 2003; Dexter, Seashore et al., 2002). Zhao and Frank (2003) suggest that teachers learn along with their peers and use social networks and social pressure for change (Zhao & Frank, 2003).
Utilizing Hew and Brush’s (2007) model for categorizing barriers and providing supports helps schools understand first order and second order barriers to identify their needs and consider the supports needed to transcend them.

**Instructional and Assistive Technology Integration**

Given the recent developments in technology, researchers and educators are grappling with a new paradigm, the merging of IT and AT fulfilling the vision of Hasselbring in 2001 (Hasselbring, 2001). This merger means that the worlds of IT and AT are converging and resulting in the same technologies available for all students. The gap between general technology tools for consumers and technologies designed for individuals with disabilities is closing contributing to the wider use of assistive technologies in the general population. (Stroud, 2010). Bouck, Flanagan, Miller, and Bassette (2012) propose “rethinking assistive technology” by taking widely available technologies to serve as assistive technology. They posit that by “rethinking assistive technology” and supporting students with disabilities with commercial technologies some of the barriers with traditional AT use would be reduced and issues such as device abandonment, training, cost and stigmatization would be minimized (Bouck, et al., 2012). Other researchers reference the “blurring” that is occurring between assistive and general technologies (Fichten, Asuncion, Scapin, 2014, Okolo & Diedrich, 2014). Fichten et al. advocates for the further development of three categories of technology use with students with disabilities. The first is general use technologies such as word processors, second is assistive technologies such as those needed for a student with blindness, and lastly, “adaptable” technologies such as dictation and screen reader software (Fichten et al., 2014). McMahon and Walker (2014) advocate for the use of the Universal Design for
Learning (UDL), a framework making instruction accessible to all learners in any environment. Edyburn (2013) further defines special education technology by separating the terms, assistive technology, instructional technology, and UDL. In 2001, Ludlow recommended a new “paradigm of teaching and learning,” suggesting constructivist learning within a universal access environment (Ludlow, 2001).

Research supports that when mobile learning is used in general education classes, special education students benefit (Swan, van t’Hooft, Kratcoski & Unger, 2005; Swan, van ’t Hooft, Kratcoski, & Schenker, 2007). The use of mobile devices in general education benefits students with disabilities specifically with conceptual understanding, writing, motivation, and “levels the playing field” by empowering learners with disabilities (Swan et al., 2005; Swan et al., 2007). These studies along with new and emerging practices will help to support the research base regarding the benefits of technology use for SWD.

**Conclusion**

The history of the use and integration of instructional and assistive technologies depicts complex factors and barriers affecting if, how, and under what conditions and contexts these technologies are used. Instructional technology serves all students whereas; assistive technology serves students with disabilities. Literature examining the history of technology integration in both general and special education documents multiple barriers affecting education’s ability to change teaching and learning for all students. The literature demonstrates the existence of two parallel systems of technology use that may have contributed to barriers in assistive technology use in special education.
In special education, the lack of data indicates that very few students who are entitled to assistive technology services actually receive them.

The literature identifies the necessary school supports for technology integration in both general and special education. Use of these supports will assist schools in maximizing technology use and building technology integration plans that support student learning.

Educators view new and emerging mobile technologies as having great potential to change teaching and learning in both general and special education environments. These mobile devices offer customization for students with disabilities to ensure their access to the general education environment. Significant amounts of district, state and federal funds are used by schools throughout the state to purchase and implement mobile technology initiatives specifically tablets and handhelds. However, given the history of technology integration, some are cautious about purchasing the next new “gadget” in technology for education.

Research on mobile learning demonstrates that a shift has happened in education, a digital revolution. As the technological landscape in society changes with access to anytime, anywhere learning, so will teaching and learning. Having access to technology in the classroom is important; however, it is how educators use technology for teaching and learning that will make a difference for all students, including those with disabilities (King-Sears & Evmenova, 2007). Michael Baum, former CEO of Renaissance Learning cautions educators that using an iPad or an Android tablet within the classroom is an improvement, not a “revolution” (Baum & Walter, 2011, p. 6). He asks a key question,
“Will tablets fundamentally change the way students learn and teachers teach?” (Baum & Walter, 2011).

This qualitative study sought understanding of an educational technology phenomenon by studying the use of tablets and handhelds in special education. Specifically, this study sought the perceptions of special educators and administrators about past and current assistive technology use and the influence of tablets and handhelds on teaching and learning for students with disabilities (SWD). This study identified the needed technology supports as perceived by special educators and administrators in the midst of technology reforms.
Definition of Terms

Student with a Disability (SWD)
A student with a disability means a student who is in need of special education and related aids and services due to cognitive disabilities, hearing impairments, deafness, speech or language impairments, visual impairments and blindness, emotional behavioral disability, orthopedic impairments, autism, traumatic brain injury, other health impairments, or specific learning disabilities.

Assistive Technology (AT)
Assistive technology means, “technology designed to be utilized in an assistive technology device or assistive technology service”. (Assistive Technology Act, 2004).

Assistive Technology Device
IDEIA 2004 defines AT as “any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability”. (Individuals with Disability Education Improvement Act (IDEIA), 2004).

Assistive Technology Services
“Any service that directly assists a student with a disability in the selection, acquisition, or use of an assistive technology device.” (IDEIA, 2004).

Instructional Technology (IT)
The use of technology in instruction integrated for the improvement of teaching and learning.
Mobile Technology
This refers to technology that can be easily moved or used in a variety of environments while offering internet connectivity.

Mobile Device
This device can be easily moved to be used in a variety of environments. These include handhelds, PDAs, laptops, cell phones, smart phones, and tablets.

Handheld Device
Handhelds are defined in this study as portable information technology (IT) devices that typically fit into the hand or palm of the hand. These include iPods, palm pilots, and pocket personal computers.

Tablet
A tablet computer is a mobile computer larger than a handheld. It is operated by touching the screen and offers an onscreen keyboard. It includes devices of differing operating systems such as the Apple iPad or tablet PC devices operating a Microsoft mobile operating system. This definition does not include Chromebooks.
Chapter 2: Methods and Procedures

Introduction

This chapter outlines the research methods used in this study in the following sections: (1) purpose of this research study, (2) research questions, (3) rationale for a qualitative study, (4) study context, (5) study focus, sample, and data collection methods, (6) data analysis, and (7) limitations of this study.

Purpose

For students with disabilities (SWD) to benefit from new technologies, special educators must understand and use instructional and assistive technologies. The purpose of this study was to understand the tablet and handheld phenomenon and their use in the instruction and learning for SWD. This study sought understanding of why educators see tablets and handhelds as “game changers” in education and sought to understand why school districts have purchased tablets and handhelds in large numbers. With thousands of new dollars spent on handheld and mobile devices in special education classrooms, it is important to know how special educators utilize handheld and tablet devices when working with SWD. This study identified special educator perceptions regarding their current and past use of assistive technology and their current use of handheld and tablet devices. Additionally, this study identified the school supports needed for successful integration within special education.

Research Questions

The research questions that served as the basis for this study are:

1. How do special educators perceive changes, if any, to their use of technology with students with disabilities as a result of their use of tablets and/or handhelds?
2. How are these changes perceived to benefit the learning of students with disabilities?

3. How does the utilization of tablets and handhelds, as perceived by special educators and administrators, influence the instruction and learning of students with disabilities?

4. What school supports do special educators perceive are necessary for the successful use of assistive technology with students with disabilities?

**Rationale for a Qualitative Study**

Understanding the tablet and handheld phenomenon in special education involves understanding special educators’ experiences within the context of providing special education services. Special educators and directors/designees of special education can offer rich descriptions of their perceptions and experiences using technology for teaching and learning. Qualitative data are used to understand the experience from the participants’ “own words” (Patton, 2008). Merriam (2009) states that qualitative researchers seek understanding of how others interpret their experience, construct their worlds, and attribute meaning (Merriam, 2009). Understanding the special educators’ experiences with and use of instructional and assistive technology is imperative to understanding the current use of new mobile technologies with special education students. Data obtained from this study offer detailed descriptions, perceptions, beliefs, and attitudes of the participants’ experiences in utilizing these new technologies. The intent of this study was to provide a comprehensive view of special educator use of tablets and handhelds with SWD in the CESA #11 geographical area of northwestern Wisconsin. This qualitative study utilized mixed methods to gather data for analysis of
tablet and handheld use in the study area. The methods employed for data gathering included an online survey as well as semi-structured group interviews. Although this study employed mixed methods in the gathering of data, the data are analyzed through a qualitative lens or paradigm. According to Michael Quinn Patton (2008), “valuing quantitative measures to the exclusion of other data limits not only what one can find out but what one is even willing to ask.” To fully understand this tablet and handheld phenomenon, quantitative data received from the survey are complimented with qualitative data from the semi-structured group interviews of special educators and administrators who have had direct, extended experiences with tablets and handhelds with SWD.

### Study Context

This study was conducted in the geographical section of northwestern Wisconsin known as Cooperative Educational Service Agency #11 (CESA #11). Wisconsin is divided into 12 educational service areas identified in Appendix A. The CESA #11 service area is located approximately one hour from the metropolitan area of Minneapolis/St. Paul, Minnesota. CESA #11 serves 39 school districts in all or portions of the following counties: Barron, Burnett, Dunn, St. Croix, Pepin, Pierce, Polk and Washburn counties and portions of Buffalo, Chippewa, Eau Claire, Rusk, and Sawyer (See Appendix A). The thirty-nine school districts within the CESA #11 service area are identified in Appendix B. The districts located in this area are Amery, Baldwin-Woodville, Barron, Birchwood, Boyceville, Cameron, Chetek-Weyerhaeuser, Clayton, Clear Lake, Colfax, Cumberland, Durand, Elk Mound, Ellsworth, Elmwood, Frederic, Glenwood City, Grantsburg, Hudson, Luck, Menomonie, New Richmond, Osceola,
Pepin, Plum City, Prairie Farm, Prescott, Rice Lake, River Falls, St. Croix Central, St. Croix Falls, Shell Lake, Siren, Somerset, Spooner, Spring Valley, Turtle Lake, Unity, and Webster. The districts range in size from 225 to 6000 students. The location of these districts ranges from small town rural communities to suburban school districts located on the fringe of a major metropolitan area.

Within the school districts located in CESA #11 are numerous initiatives involving the use of tablets and handhelds as well as 1:1 laptop and Bring Your Own Technology (BYOT) programs. The CESA #11 special education professional development group entitled the Regional Service Network has sponsored training workshops within the area in addition to what may be provided in each individual school district. Special education programming models vary from district to district based on the local resources and the enrollment of SWD.

**Study Focus, Sample, Data Collection Methods**

**Study Focus**

The study was designed after a literature review of the history and status of technology integration in the worlds of general and special education. Common themes emerged from the literature that served as topics of study. A majority of the literature prior to the development and use of tablets and handhelds addressed the barriers of technology integration within school contexts for both general and special education. Identified were the separate worlds of regular and special education technology with little crossover. This literature identified school supports necessary for integration of technology in teaching and learning. More recently, the literature has included newer research that offers an optimistic and positive view of the use of mobile technologies that
demonstrates benefits in special education. This study focused on understanding the “what’s working” paradigm and how successful special educators utilize tablets and/or handhelds in their work within special education. In addition, study topics regarding tablet technology use were constructed after consultation with area special education directors and designees. Special education directors from districts located within the CESA #11 service area were interested in learning the perceptions from special educators about teaching and learning with mobile technologies and the potential benefits for SWD.

In summary, this study focused on gathering data on how tablet and/or handheld mobile technologies are currently being integrated within special education contexts in the CESA #11 service area. Lastly, this study sought information about educator perceptions on their use of past assistive technology and their comparative thoughts regarding the new technology as it relates to the teaching and learning.

Sample

The goal of qualitative research is to seek understanding and enrichment of an experience. Purposeful sampling lends itself to this paradigm. Purposive sampling is a form of nonprobability sampling. When using purposive sampling, a researcher gathers data deliberately with a purpose in mind (Vogt, 2007). Purposive sampling was utilized to determine survey respondents and to identify educators for semi-structured group interviews. Since qualitative study is built around experiential understanding (Stake, 2010), gathering data from individuals who have experiences utilizing tablets and/or handhelds within special education was important in all methods of data collection. The special educators and administrators in this study are employed in schools within the CESA #11 service area currently participating in a variety of school technology
initiatives. An online survey and semi-structured group interviews were utilized to gather rich understandings of the perceptions of special educators in the midst of mobile technology initiatives.

Special education teachers, special education-related service providers, and special education administrators from the CESA #11 service area were invited to participate in this study. Within the 39 school districts (see Appendix A), approximately 512 special education teachers and directors were considered part of the potential sample. With purposive sampling, particular purposes are determined (Fitzpatrick, Sanders, & Worthen, 2011). Purposive sampling was utilized for both the online survey and group interviews to gather specific information on tablet and handheld use within special education. Participants were invited to participate via an online invitation email forwarded from the special education directors or designee assigned to each of the 39 school districts (see Appendix B). The invitation outlined the purpose, privacy, confidentiality and the voluntary nature of the study and the general information requested. Additionally, it outlined the methods of an online survey and semi-structured group interviews and the three special educator groups included in the study.

To gather information that could be easily sorted and compared, the study delineated three groups for this purposive sample. One group consisted of special education directors, and two groups were comprised of special education teachers and service providers. The two special educator groups were identified and grouped according to the majority of students they served in their primary assignment. In Wisconsin, SWD are served in a variety of service models based on program enrollments, district program availability, and staffing. Small to mid-size school districts in Wisconsin
typically serve students with varying disabilities in a multi- or cross-categorical model versus a categorical model with students of one type of disability in the same program. Larger-sized school districts tend to serve students in more like or categorical programs. Since special education category labels do not always accurately describe the level of functioning and thus the assistive technology needs, the guidelines used by the Wisconsin Department of Public Instruction for determining participation in the state’s assessment system were used to further delineate the two special educator teacher groups. Group #1 was comprised of special educators primarily serving students who would participate in the state’s alternate assessment and receive an alternate curriculum with alternate standards. This group serves students with severe and profound needs. Group #2 special educators served students who would participate in the state’s assessment system receiving instruction aligned to the same standards as all students. This group serves students with mild and moderate needs. Lastly, special education administrators supervising special educators in group #1 and group #2 comprise group #3. The study examined tablet and handheld technology use from the perspectives of educators from each of these groups.

A total of 115 special education teachers and administrators participated in this study with a potential of 512. Table #1 identifies the exact sample size for the three groups identified for the online survey and group interviews as well as the participation rate percentages for each group.
Table 1  Study Sample Size by Group and Method

<table>
<thead>
<tr>
<th>Group Description</th>
<th>Group #</th>
<th>Online Survey</th>
<th>Group Interviews</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special educators serving SWD focused on alternate curriculum standards.</td>
<td>Group #1 Severe/Profound</td>
<td>N=21</td>
<td>N=6</td>
<td>N=105</td>
</tr>
<tr>
<td>Special educators serving SWD focusing on general education curriculum standards.</td>
<td>Group #2 Mild/Moderate</td>
<td>N=58</td>
<td>N=5</td>
<td>N=375</td>
</tr>
<tr>
<td>Directors of special education/pupil services/designees</td>
<td>Group #3 Administrators</td>
<td>N=18</td>
<td>N=7</td>
<td>N=32</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>N=97</td>
<td>N=18</td>
<td>N=512</td>
</tr>
</tbody>
</table>

Data Collection Methods

Online Survey. Due to the potential large numbers of survey respondents, the survey was selected as the most appropriate method for gathering general tablet and/or handheld data specific to use within school contexts. All special educators and special education administrators currently utilizing tablets and/or handhelds within the CESA #11 geographical area were invited to participate via the online survey. The online tool SurveyMonkey® was used to create and distribute the survey via a survey link. The use of this survey tool allowed for the confidentiality, ease of distribution, use of data collection tools, and analysis.

Each district’s Director of Special Education and/or designee served as the initial contact for administration of the online survey. Invitations to participate were forwarded via email from their Director of Special Education/Pupil Services or Designee. Each Director determined whether to forward the survey to appropriate staff according to the policies and procedures regarding survey distribution within their individual districts. Participants could choose to visit the survey link at any time during the survey period.
Information about the study was communicated during the CESA #11 Regional Service Network meeting of the Directors.

During the initial development of the survey, think-alouds were conducted with two individuals after the first draft of the survey. After review, recommendations and modifications were made that simplified the visual content of the survey and how participants would respond. The online survey was sent for pilot to 25 individuals currently working in non-sample school contexts. All pilot survey respondents had some experience serving SWD. Information and suggestions from the pilot were incorporated into the survey.

The final survey consisted of 15 questions for group #1 and group #2 and 12 for group #3. An additional eight demographic questions were asked. A copy of the survey is available in Appendix C. Each group’s survey was modified slightly for its population and role. The teacher group surveys included two short answer questions, four open-ended questions, and nine closed-ended questions. The special education director group’s survey consisted of two short answer questions, five open-ended questions, and five closed-ended questions. For each of the groups, the closed-ended questions were ordinal and Likert-scaled requesting respondents to identify their tablet and/or handheld use by choosing responses representing an average amount of time, a level of agreement, or an increased or decreased use. Each teacher group was also surveyed on their perceptions of their use of assistive technology services and devices as well as their student recommendations for assistive technology devices or services before and after their use of tablets and handhelds. The open-ended questions asked respondents for their opinions regarding the learning benefits, their changes to instruction, school supports, and
any additional comments. According to Fink (2009), responses to open-ended questions can offer insight into respondents’ beliefs (Fink, 2009). The short answer questions asked participants to comment on the specific tablet or handheld applications used by students and teachers. Special education directors were surveyed on the use of technology by the special educators they currently supervised. Directors were surveyed on their recommendation to a new director implementing a tablet initiative.

Demographic data from the online survey identified further characteristics of the respondents. The survey participants identified themselves with a district size based on the total student enrollment. The largest percentage of respondents (41.2%) indicated they were working in small to medium-sized districts with enrollments of 500-1000 students. Medium-sized districts with 1001 to 2500 students represented 38.1% of the survey respondents. Small districts made up 12.4% of the survey respondents. The sizes of school districts with the smallest numbers of special educators participating were medium-large districts with a 2502-4000 student enrollment. Large school districts at 4001 students or above were represented with participation percentages of 5.1% and 2% respectively. Lastly, 1% of survey respondents was employees of CESA #11 or served multiple districts.

Survey respondents served a range of student disabilities in their current assignments. All grade levels from PreK to grade 13+ (transition services) were represented in this survey. Table 2 identifies the disabilities and the percentages of respondents indicating serving that specific disability. These data indicate that a majority of survey respondents served students with a range of types of disabilities in their programs and classrooms.
Table 2  Percentage of Survey Respondents Serving Disability Areas

<table>
<thead>
<tr>
<th>Disability Area</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Learning Disabilities</td>
<td>86.3</td>
</tr>
<tr>
<td>Emotional/Behavioral Disabilities</td>
<td>86.3</td>
</tr>
<tr>
<td>Other Health Impairments</td>
<td>85.3</td>
</tr>
<tr>
<td>Autism-Mild/Moderate (e.g., Asperger Syndrome)</td>
<td>84.2</td>
</tr>
<tr>
<td>Cognitive Disabilities-borderline or Mild/Moderate</td>
<td>83.2</td>
</tr>
<tr>
<td>Speech and Language Impairment</td>
<td>80.0</td>
</tr>
<tr>
<td>Significant Development Delay</td>
<td>52.6</td>
</tr>
<tr>
<td>Autism-Severe/Profound</td>
<td>44.2</td>
</tr>
<tr>
<td>Cognitive Disabilities-Severe</td>
<td>44.2</td>
</tr>
<tr>
<td>Hearing Impaired</td>
<td>41.1</td>
</tr>
<tr>
<td>Traumatic Brain Injury</td>
<td>33.7</td>
</tr>
<tr>
<td>Orthopedic Impairments</td>
<td>30.5</td>
</tr>
<tr>
<td>Deaf</td>
<td>17.9</td>
</tr>
<tr>
<td>Low Vision</td>
<td>15.8</td>
</tr>
<tr>
<td>Blind</td>
<td>12.6</td>
</tr>
</tbody>
</table>

Special educators with a range of years’ experience participated in the study. The largest group represented was those with 11-20 years’ experience comprising 34.4% of survey respondents. Special educators with 21-30 and 4-10 years’ experience were represented by 25% and 23% of participants respectively. Lower percentages of respondents indicated 31+ years and 1-3 years’ experience with percentages at 9.4 and 8.3. Lastly, no first year teachers participated in the survey. Participants responded to questions regarding their most recent coursework and their highest degree held. The largest percentage of survey respondents (57.7%) held a master’s degree, 31% held a bachelor’s degree, 10.3% held an education specialist degree, and 1% had doctoral degrees. Thirty-four percent of participants indicated that they had taken a university or college class for credit within the past year, 32% indicated coursework within the last three to five years, and 26.8% within one to two years of the survey. The age range represented in this group of survey respondents was 20 to 70+ years with 59.4% of
respondents in the age range of 40-59 years old. The next largest age group was the 30-39 year olds, comprising 23% of survey respondents.

**Group Interviews.** Interviews are a key method of data collection in qualitative research (Fitzpatrick, Sanders, & Worthen, 2011; Merriam, 2009). Data from group interviews offered richer descriptions of tablet and/or handheld use due to the nature of the small group interview process. The use of interviewing allows for further clarification, probing, and exploration of participants (Fitzpatrick, Sanders, & Worthen, 2011). Semi-structured group interviews of the three separate special educator groups were held. Group interviews offer the advantage for the researcher to meet with multiple individuals at one time, gathering more information in a shorter time period. Group interviews offer group dynamics that may bring forth additional information as opposed to individual interviews. This study sought to gather the perceptions of special educators on current and past AT use, similarities and differences between the differing groups and their collective perspectives. The group interview process lends itself to this outcome.

Participants in the group interviews were recruited via email with the initial invitation to participate in this study. Additionally, special education administrators identified special educators meeting the criteria in their schools and submitted their names to the researcher. Follow-up telephone calls and emails finalized the recruitment process.

Criteria were pre-determined for participation in each of the three special educator groups. Eleven special education teachers or service providers met the following criteria for the participation in the group interviews: 1) tablet and/or handheld use with SWD in schools for the past 12 months, 2) use of tablets and/or handhelds within educational
settings of special and general education, 3) familiarity and use of assistive technology devices and software programs, and 4) currently serving students who fall into the category of that particular group interview. Seven special education administrators meeting the following criteria participated in group interviews: 1) current administration of programs where tablets and/or handhelds have been utilized for the past 12 months, 2) basic knowledge of the details of tablet and/or handheld use and their associated applications in special education, and 3) familiarity and previous supervision of programs utilizing general assistive technology devices.

An interview guide (Appendix D) assisted the researcher during the semi-structured group interviews. This guide was available to participants to allow them time to review and reflect upon the interview questions. In developing interview questions, Seidman (2006) suggests asking participants to reconstruct details rather than recalling from memory. By reconstructing, the participant is utilizing memory as well as what the participant senses as important about the event (Seidman, 2006). Participants were encouraged to share stories and give examples to assist them in their reconstruction process.

**Data Analysis**

The data from this study were analyzed inductively. Merriam (2009) describes all qualitative data analysis as inductive and comparative (Merriam, 2009). Qualitative researchers enter settings without prejudgment (Patton, 2008). Data from the online survey and the group interviews were analyzed separately, beginning with the survey data.
Measures were taken that protect the participants’ privacy and the data gathered from survey and group interviews. This study, number 1402E48168, was approved by the Institutional Review Board (IRB) of the University of Minnesota as meeting the guidelines outlined by the Human Subjects Committee as an exempted study. Survey data are stored on the online data collection tool. An online user name and password is only available to the researcher. Data gathered from the survey could not be traced back to the survey respondent. The survey tool, SurveyMonkey®, utilized a form of online security entitled Secure Sockets Layer (SSL). SSL ensures that all information passing between a webserver and a browser are private through an encrypted link. All data are stored on the researcher’s private hard drive with access only to the researcher. In any future publications resulting from this research, all participants' names, schools, and districts will be confidential. Information that is personally identifiable has been removed.

**Online Survey**

The online survey responses contain both quantitative and qualitative data. Data from the close-ended Likert questions from each group were analyzed using descriptive statistics consisting of percentages of participants responding for each of the three groups. After each group’s responses were reviewed, they were compared for similarities and differences between/among the three groups. The two short answer questions asked participants to list five recommended tablet and/or handheld applications for use with students and for use by teachers. Upon review, it was obvious that these questions were misinterpreted by a number of respondents in each of the groups. They responded to the question asking for application recommendations with names such as iPad, iPod touch, or
android rather than specific applications that would be used or downloaded on tablets or handhelds. Therefore it was determined that these data would not be an accurate representation of the applications used in the study area and thus were eliminated from the data.

The open-ended questions asked participants to respond to questions regarding the perceived student learning benefits, how the use of tablets and/or handhelds has changed their instruction, the school supports needed, and anything else they would like to note. These data were analyzed qualitatively by reviewing each statement and looking for chunks of meaningful information and assigning a topic and codes. After all data were coded in topical areas, they were sorted and assigned a theme. The open form of coding was used prior and during as the themes evolved. Open coding assumes that the researcher is open to any possible bit of data (Merriam, 2009). Once open codes were developed, themes were grouped. Once themes emerged, categorization began. Themes emerged through the sorting and categorization process. Merriam (2009) describes the constant comparative method as a process of taking data pieces and comparing to determine similarities and differences throughout the analysis (Merriam, 2009). A pre-determined number of statements were determined for each group for inclusion as a major theme in each group’s data set. Thematic data were reviewed within each group and then compared between and among the three groups. Similarities and differences were noted and displayed in a table format.

**Group Interviews**

Analysis of interview data involves careful review to be sure the researcher gathers the intent of the interviewee’s message. The semi-structured group interviews
were digitally recorded and transcribed. To avoid any misinterpretation, member checks were utilized for all transcripts of interviews. Interviewees had an opportunity to read their transcripts and clarify misinterpretations prior to the beginning of the coding process. The process for the interviews was very similar to the qualitative survey data. Interview responses were segmented into communication intents (sentences) and assigned a word or sentence code that communicated the intent of the message. When all interviews for each group were finalized, the sentences were placed into a spreadsheet assigning a number and a code for sorting purposes. Similarities between the codes used for the qualitative survey data were observed. If each communication intent fit into that particular code area, it was used or another new code created. After all codes were assigned and sorted, a theme was assigned. A set number of occurrences under each theme area were predetermined for each group. When each group’s interview codes and themes were finalized, they were compared across groups for similarities and differences.

**Limitations**

Limitations exist within the paradigm of qualitative research. One limitation related to data collection and group interviewing is worth consideration. Interviewing to obtain qualitative data is dependent upon the relationship between the researcher and the participant (Polkinghorne, 2005). Some of the participants in the study have had prior experiences with the researcher and may have felt more comfortable than other participants in sharing issues related to this topic. The researcher was cognizant, specifically during the group interviews, of the importance of relationship building. Careful consideration was given to the behaviors of the researcher during the interviews to demonstrate equality to each of the participants.
A second limitation related to this study involves compatibility of email address and survey links with school networks and school filtering programs. It was possible that school network and programs may have filtered the researcher’s email address thus causing it to not arrive in the special education administrators’ mailboxes. To plan for this possibility, the researcher met prior with special education administrators to engage their support and to notify them of a future email. An initial email was sent to each special education director/designee in CESA #11 explaining the survey directions and requesting their assistance by forwarding the email to special education teachers and service providers. A link to the survey was included in the letter. Demographic information from the survey indicates that a small number of respondents were from the three largest school districts in the CESA #11 service area. This researcher is unsure as to the reasons why a small percentage of educators from those districts participated. One speculation is that distribution of the survey may have violated school board or district policies and procedures and was not forwarded on. Another possibility is the full schedules of the administrators assigned to those districts. Lastly, if the survey letter was sent, it is possible that the staffs from the larger districts have more requests for survey information and another request was not seen as their priority.

Online surveys have limitations specific to that method. One limitation relates to confidentiality. By directing participants to a web site, in this case SurveyMonkey®, efforts were made to help respondents feel more anonymous (Fitzpatrick, Sanders, & Worthen, 2011). Another limitation with online and paper surveys relates to response rate. To encourage participation, survey participants were entered into a drawing that would offer a $250.00 Best Buy gift certificate.
Lastly, data from this study come from a geographical area of the nation that may not be representative of the total population of special educators and administrators within another area. Given the lack of survey respondents from larger sized districts, generalizing this information to larger school districts is a limitation. In addition, recommendations and use of data received from this study represent a localized level of device use and local educators’ exposure to staff development and may not reflect all the potential possibilities for the use of tablets and/or handhelds in special education. Information and data from this study are meant to inform the special educators and administrators currently utilizing this technology within this study’s context.

Summary

This chapter outlined a qualitative research study that examines the perceptions, practices, and recommendations of special educators utilizing tablets and/or handhelds with SWD. The purpose of this study was to understand the current tablet phenomenon within the context of northwestern Wisconsin. Four research questions were investigated through a qualitative lens. Mixed methods were used to gather data with the use of an online survey and group interviews of educators currently in the midst of learning and integrating tablets and/or handhelds in special education. Additionally, limitations were identified to inform the readers of this study to applicably transfer the information to their school contexts.
Chapter 3: Results

Survey and Interview Results

The purpose of this study was to examine the perceptions of special educators on the use of tablet and handheld technologies in their practice. This chapter outlines the tablet and/or handheld use and perceptions of special educators in school districts within the specific geographical service area in Northwest Wisconsin known as CESA #11.

Three groups of special educators (teachers and service providers) and administrators participated in this study. Group #1 is comprised of special educators primarily serving students with severe and profound needs participating in the state’s alternate assessments with an alternate standard curriculum. Group #2 special educators primarily serve students with mild and moderate needs participating in the state’s assessment system for all students. Group #3 is comprised of directors/designees of special education or pupil services.

The overall data from this study are organized into four sections: (1) instructional use and changes, (2) assistive technology use and changes, (3) perceived student learning changes and benefits, and (4) school supports for technology integration. Data from each of the three groups are reported within each category. Within each category, the online survey data are reported first followed by data from the semi-structured group interviews.

Instructional Use and Changes

This section reports on how special educators in each of the three groups utilized tablets and/or handhelds in their instruction. Specifically, the data identified how tablets and/or handhelds are integrated into instructional settings, locations, and groupings.
Lastly, this section reports the data on the perceptions of the study’s participants on how the use of tablets and/or handholds has changed their instruction.

**Instructional Settings and Groupings**

Special educators service students in a wide-range of educational environments, settings, and locations as well as in a variety of instructional student groupings. Learning how and where special educators use tablets and handhelds contributes to understanding more about the instructional and learning contexts in which tablets and/or handholds are utilized. Participants were surveyed on how often they use tablets and/or handholds in the educational settings of special education classrooms, general education classrooms, unstructured settings (hallways, lunchrooms, playgrounds, etc.), and community settings. The instructional groupings queried in the survey (Appendix C) were individual student instruction/remediation/tutoring, small group student instruction/remediation, large group student instruction, cooperative student group work, and student assessment.

**Instructional settings.** Special educators using tablets and/or handholds daily in a variety of instructional settings may be regularly integrating tablets and handholds into their regular practices with their students. The percentage of special educators in each group reporting daily to extensive use in each of the instructional settings is reported in Table 3. The percentage of group #1 special educators reporting daily and extensive use in unstructured settings is 33.3%, in special education classrooms at 71.4%, and general education classrooms at 23.8%. The percentage of group #2 special educators reporting daily and extensive use is consistently lower: 10.7%, 65.5%, and 25% within those same settings. The educational setting with the largest percentage of each teacher group reporting daily and extensive use is within special education classrooms.
Table 3 Daily and Extensive Use by Group: Instructional Settings

<table>
<thead>
<tr>
<th>Daily and Extensive Use Responses</th>
<th>N</th>
<th>Unstructured Settings n (%)</th>
<th>Special Education Classrooms n (%)</th>
<th>General Education Classrooms n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group #1 Special Educators</td>
<td>21</td>
<td>7 (33.3)</td>
<td>15 (71.4)</td>
<td>5 (23.8)</td>
</tr>
<tr>
<td>(Severe/Profound)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group #2 Special Educators</td>
<td>58</td>
<td>6 (10.7)</td>
<td>38 (65.5)</td>
<td>14 (25)</td>
</tr>
<tr>
<td>(Mild/Moderate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Instructional groupings.** Special educators report using tablets and handhelds daily and extensively within the instructional groupings of individual, small group, large group, and for assessment. Table 4 outlines the percentage of daily and extensive survey responses reported by group #1 and group #2. The percentage of special educators reporting daily and extensive use in their work with individual students is at 70% of group #1 and 44.6% of group #2. Tablets and handhelds are used daily and extensively in small group instruction as reported by 42.9% of group #1 and 26.3 of group #2. A smaller number of special educators reported using tablets and/or handhelds daily or extensively in large groups at 20% and 9.3% for group #1 and group #2 respectively. Lastly, tablets and handhelds are used daily and extensively for assessment as reported by 14.3% of group #1 and 10.1% of group #2.
Table 4: Daily and Extensive Use by Group: Instructional Groupings

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Individual n (%)</th>
<th>Small Group n (%)</th>
<th>Large Group n (%)</th>
<th>Assessment n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group #1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Educators</td>
<td>21</td>
<td>14 (70.0)</td>
<td>9 (42.9)</td>
<td>4 (20.0)</td>
<td>3 (14.3)</td>
</tr>
<tr>
<td>(Severe/Profound)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group #2</strong></td>
<td>56</td>
<td>25 (44.6)</td>
<td>15 (26.3)</td>
<td>5 (9.3)</td>
<td>6 (10.1)</td>
</tr>
<tr>
<td>Special Educators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Mild/Moderate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Instructional changes.** Special educators from the three groups were surveyed to compare their past use of specific instructional technologies/programs with their current use of these same technologies after using tablets and/or handhelds. The percentages of special educators indicating that their use of specific instructional technologies has increased or significantly increased are shown in Table 5. Special education teacher groups #1 and #2 were asked to report on their own use whereas special education administrators in group #3 reported on their perceptions of the use of the teachers they supervised. The list of technologies/programs was customized per teacher group with administrators responding to all listed. The list included instructional technologies that were a mix of those exclusive to digital technology and those used in a variety of formats.

All three groups were surveyed on changes to their use of digital pictures, digital videos, and digital books/textbooks. At least 75% of the special educators in all three groups believed that their use of digital pictures had increased or significantly increased due to tablet and/or handheld use. The next largest percentage reported was the changed use of digital videos with at least 70% of all three groups reporting that their use has increased or significant increased. Lastly, the use of digital books or textbooks has reportedly increased or significantly increased as reported by 66.7% of special educators.
in group #1, 53.6% in group #2, and 70.6% of group #3. Group #2 and group #3 were surveyed on their change of use regarding digital graphic organizers, digital calendars, and digital note making/marking. When compared to their changed use of digital pictures, digital videos, and digital books/textbooks, a smaller percentage of group #2 special educators reported increasing or significantly increasing their use. Increased use and significant increased use of digital graphic organizers, digital calendars, and digital note making/marking were reported at 21.4%, 46.4%, and 41.8% respectively in group #2. Special education administrators in group #3 perceived changes similar to other digital technologies in the area of digital note making/marking with 70.6% responding that use has increased or significantly increased in the special educators they supervise. The percentages for group #3 reporting increased use of digital graphic organizers and digital calendars was 64.7% and 47.1% respectively.

All three groups were surveyed on their changes in the use of the technologies of text-to-speech and speech-to-text. Group #1 reported increased use of 42.9% for text-to-speech and a smaller percentage increase for speech-to-text of 19.1%. Group #2 data indicate 50.9% of special educators report increased use of text-to-speech with 44.6% reporting an increase for speech-to-text. Group #3 survey data denote 76.5% for text-to-speech and 70.6% for speech-to-text.

Some of the technologies listed in Table 5 are not exclusively used with tablets and/or handhelds and can be used in a variety of formats with or without digital technology or electronic tools. The use of picture/icon communication, picture/icon schedules, audio books, and audio recording is not dependent on the use of digital technology. Picture/icon communication and picture/icon schedules are strategies and
tools utilized in a variety of electronic and non-electronic formats. Each list was customized for each student group served. Group #1 and group #3 were surveyed on their changes to their use of these strategies. Special educators in group #2 and serving students with mild or moderate needs were presumed not utilizing these strategies. The percentage of special educators in group #1 reporting increased use of picture/icon communication and schedules was 42.9% for both types. Group #3 perceived greater use changes of the teachers they supervise with 70.6% reporting increased use of picture/icon communication and 58.8% reporting increases in the use of picture/icon schedules.

All three groups were surveyed on their changed use of audio books and audio recording. Group #1, group #2, and group #3 report that their use of audio books has increased or significantly increased with 61.9%, 64.9%, and 82.4% respectively. Audio recording use increase is reported at 52.4%, 47.3%, and 70.6% for special educators in group #1, group #2 and group #3.

In summary, special educators were surveyed regarding changes to their use of specific instructional technologies and strategies since using tablets and handhelds. Group #1 was surveyed on nine strategies and group #2 on ten strategies. Group #3 was surveyed on all twelve. Overall, at least 50% of special educators in both group #1 and group #2 reported increased use of digital pictures, digital videos, digital books/textbooks, and audio books since using a tablet and/or handheld. A higher percentage of group #3 special education directors indicate increased use in all technologies when compared to the percentages of group #1 and group #2. On each of the twelve instructional technologies listed, group #3 special education directors reported
that the special educators they supervised have increased or significantly increased their
use at a higher percentage than each of the groups of special educators reported.

<table>
<thead>
<tr>
<th>Increased or significantly increased Responses</th>
<th>Group #1 Special Educators (Severe/Profound) n (%)</th>
<th>Group #2 Special Educators (Mild/Moderate) n (%)</th>
<th>Group #3 Administrators n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Pictures</td>
<td>16 (76.2)</td>
<td>43 (75.4)</td>
<td>13 (76.5)</td>
</tr>
<tr>
<td>Digital Videos</td>
<td>16 (76.2)</td>
<td>40 (70.2)</td>
<td>13 (76.5)</td>
</tr>
<tr>
<td>Digital Books/Textbooks</td>
<td>14 (66.7)</td>
<td>30 (53.6)</td>
<td>12 (70.6)</td>
</tr>
<tr>
<td>Audio Books</td>
<td>13 (61.9)</td>
<td>37 (64.9)</td>
<td>14 (82.4)</td>
</tr>
<tr>
<td>Audio Recording</td>
<td>11 (52.4)</td>
<td>26 (47.3)</td>
<td>12 (70.6)</td>
</tr>
<tr>
<td>Text-to-Speech</td>
<td>9 (42.9)</td>
<td>29 (50.9)</td>
<td>13 (76.5)</td>
</tr>
<tr>
<td>Picture/Icon Communication</td>
<td>9 (42.9)</td>
<td>NA</td>
<td>12 (70.6)</td>
</tr>
<tr>
<td>Picture/Icon Schedules</td>
<td>9 (42.9)</td>
<td>NA</td>
<td>10 (58.8)</td>
</tr>
<tr>
<td>Speech-to-Text</td>
<td>4 (19.1)</td>
<td>25 (44.6)</td>
<td>12 (70.6)</td>
</tr>
<tr>
<td>Digital Graphic Organizers</td>
<td>NA</td>
<td>12 (21.4)</td>
<td>11 (64.7)</td>
</tr>
<tr>
<td>Digital Calendars</td>
<td>NA</td>
<td>26 (46.4)</td>
<td>8 (47.1)</td>
</tr>
<tr>
<td>Digital Note Making/Marking</td>
<td>NA</td>
<td>23 (41.8)</td>
<td>12 (70.6)</td>
</tr>
</tbody>
</table>

Survey respondents were asked to respond to the open-ended statement, “What changes, if any, have you made in your instruction of students with disabilities as a result of using tablets and/or handhelds?” Responses were sorted and categorized into themes by group and compared among the three groups. A preset number of responses for each group and theme were determined prior to analysis as outlined in Chapter Two of this study. Table 6 outlines the themes that were similar and those that were different between each of the three groups. All groups reported that their instruction has changed as a result of using tablets and handhelds in the area of differentiation and individualization. Statements from group #1 referred to differentiation as the use of specific application or activities for students based on their individual communication, academic, or social needs. Differentiation for group #2 special educators addressed...
customizing specific applications, levels, or activities for individuals or for student groupings for particular classes, subjects, or lessons. Statements made by group #3 special education directors addressed both individualization for specific academic tasks as well as differentiation in grouping. Similarities were noted in common themes of one group appearing in comments from another group, but did not meet the preset number determined for theme selections. For example, the use of independent activities with a tablet and/or handheld surfaced in all three groups, but was most commonly noted in group #2 in relation to grouping.

Differences noted among the three groups were in the areas of technology integration, independence, and technology use as visual learning. Overall, statements from group #1 indicate that these teachers have integrated the use of tablets and/or handhelds into their lesson planning, class schedules, and planning within their school day as well as overall additional technology use. Group #2 special educators reported the increased use of independent activities or individual practice time with their students as a result of using tablets and/or handhelds. Statements included instruction and assessment activities that students could access independently and receive immediate feedback as well as viewing their individual progress data. Group #3 survey respondents were asked to report on the changes that the special educators they supervise have made in their instruction as a result of the use of tablets and/or handhelds. Common to this group were the two themes of increased technology use by special educators and the use of technology for visual learning as in the use of video modeling, visual schedules, and other visual learning strategies.
Table 6 Survey Themes by Group: Instructional Changes

<table>
<thead>
<tr>
<th>Group #1</th>
<th>Group #2</th>
<th>Group #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Educators (Severe/Profound)</td>
<td>Special Educators (Mild/Moderate)</td>
<td>Special Education Administrators</td>
</tr>
<tr>
<td>N = 15</td>
<td>N = 43</td>
<td>N = 13</td>
</tr>
</tbody>
</table>

Similar | Differentiation/ Individualization | Different | Technology Use | Independent Instruction | Technology Use | Visual Learning |

Supporting survey statements from each group are listed in Table 7.

Table 7 Survey Statement Examples by Group: Instructional Changes

<table>
<thead>
<tr>
<th>Group</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Educator Group #1 (Severe/Profound)</td>
<td>“I incorporate the use of the iPad in my instruction for individual use, in group lessons such as the weather, numbers, colors, reading stories. I have students that use iPads to communicate and interact with peers and adults. It is an extensive use to support almost all learning in our classroom for children with severe and multiple disabilities.”</td>
</tr>
<tr>
<td>Special Educator Group #2 (Mild/Moderate)</td>
<td>“As I teach in an elementary resource room, a number of students with varying abilities come to my room to receive Literacy and/or Math instruction at the same time. To most effectively educate these students, we need to group them according to their own ability levels - while keeping realistic staffing in mind. At times, I am commonly teaching 2 different reading or math lessons simultaneously. The use of an educationally appropriate iPad application with minimal monitoring has greatly increased the quality of review/instruction that I can provide to my other group of students that I am not currently engaged with.”</td>
</tr>
<tr>
<td>Special Education Administrator Group #3</td>
<td>“Special educators have more options to assist with differentiation. They can individualize learning by utilizing the many, many different apps that are available.”</td>
</tr>
</tbody>
</table>

**Instructional benefits.** Special educators were surveyed on their level of agreement on a series of statements regarding the instructional benefits of using tablets and/or handhelds with SWD. Agree or strongly agree responses are noted in Table 8.

One hundred percent of survey respondents in all groups surveyed reported that the use of tablets and/or handhelds with student with disabilities supports teachers in differentiating instruction. Likewise 100% of respondents in both group #2 and group #3 reports that
the use of tablets and/or handhelds supports personalized learning. Over 95% of special educators in all three groups reported that they agreed or strongly agreed with the statement that the use of tablets and/or handhelds creates more opportunities for remediation or intervention, and supports the additional use of pictures and visuals, video modeling, and communication programs. Over 83% of group #1, group #2, and group #3 surveyed reports that the use of tablets and/or handhelds supports inclusion in the general education environment. The use of tablets and/or handhelds improves access to the general education curriculum as agreed or strongly agreed to by at least 85% of group #2 and group #3.

Differences in survey responses between group #2 and #3 were noted for the statements “encourages the use of cooperative learning strategies,” “improves access to the general education curriculum,” and “supports the use of project based learning,” with a smaller percentage of group #3 respondents who agreed or strongly agreed to those statements.

Table 8 Agreement by Group: Instructional Benefits

<table>
<thead>
<tr>
<th>Agree and Strongly Agree Responses</th>
<th>Group #1 Special Educators (Severe/Profound) N = 21 n (%)</th>
<th>Group #2 Special Educators (Mild/Moderate) N = 58 n (%)</th>
<th>Group #3 Special Education Administrators N = 18 n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>…supports teachers to differentiate instruction.</td>
<td>21 (100.0)</td>
<td>58 (100.0)</td>
<td>18 (100.0)</td>
</tr>
<tr>
<td>…creates more opportunities for remediation/intervention.</td>
<td>20 (95.2)</td>
<td>56 (96.5)</td>
<td>18 (100.0)</td>
</tr>
<tr>
<td>…supports the additional use of pictures and visuals.</td>
<td>20 (95.2)</td>
<td>NA</td>
<td>18 (100.0)</td>
</tr>
<tr>
<td>…supports the additional use of video modeling strategies.</td>
<td>20 (95.2)</td>
<td>NA</td>
<td>18 (100.0)</td>
</tr>
<tr>
<td>…supports the additional use</td>
<td>20 (95.2)</td>
<td>NA</td>
<td>18 (100.0)</td>
</tr>
</tbody>
</table>
Special educators in each of the three groups were interviewed regarding their instructional use of tablets and/or handhelds as well as changes or differences from their use. Themes identified are noted in Table 9. All three groups interviewed noted changes in how they differentiate and individualize for students. One special educator addressed how tablets and handhelds have helped address differentiation and individualization within a special education classroom:

For one thing I can have a 3rd grade group and a 4th grade group at the same time, and it is not running into each other so some kids will get instruction via the video, some get instruction help with their work, and some work independently. You always have different classes and grade levels coming in. Other kids need more help and support so some kids can have a lesson plus extra instruction, some get one. So it is easier to change instruction that way. Different kids, different classes, and different grade levels. You always have kids coming in. Now you can have a lesson plus a flipped lesson, so instead of the one missed classroom instruction, they can have it different ways. Especially my students with short attention spans. They can get the lesson flipped and then from me. They can rewatch the message, or I can give it to them in a different way. The differentiation is easier and easier to find the time for.

Special educators stated that tablets and/or handhelds have improved their ability to provide differentiated lessons as well as instruction that is individualized to the student. The second theme identified includes the areas of teacher efficiency, all-in-one,
and access to resources. Interviewees noted that tablets and/or handhelds have changed how they are able to access and utilize a variety of resources and technologies, contributing to their overall efficiency. The theme of all-in-one represents statements that tablets are able to combine a variety of programs and uses in one device. Resources are broadly defined as access to applications for a variety of tasks as well as websites, reference information, and instructional information. Differing themes for each group are listed in Table 9.

Special educators in group #1 stated that the use of tablets and/or handhelds has increased their general use of technology and AT. Group #2 and group #3 identified data collection and progress monitoring as practices that have changed through their use of tablets and handhelds. Group #3 special education administrator comments were grouped to create the theme of student groupings indicating that with tablets and handhelds, teachers have changed how they group students for instruction. Table 10 lists sample statements of teacher use and changes from using tablets and/or handhelds.

Table 9 Interview Themes: Teacher Use and Changes

<table>
<thead>
<tr>
<th></th>
<th>Group #1 Special Educators (Severe/Profound) N = 6</th>
<th>Group #2 Special Educators (Mild/Moderate) N = 5</th>
<th>Group #3 Special Education Administrators N = 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Similar</td>
<td>Increased Technology Use</td>
<td>Data Collection/Progress Monitoring Student Groupings</td>
<td>Data Collection/Progress Monitoring Student Groupings</td>
</tr>
<tr>
<td>Different</td>
<td>Teacher Efficiency/All-in-One/Access to Resources</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 10 Interview Statement Examples: Teacher Use and Changes

| Special Educator Group #1 (Severe/Profound) | “It puts all the technology here. Instead of grabbing the video camera when you want to do video modeling, it’s all right here. It’s easy, easy to train others on it so that they can use it.” |
| Special Educator Group #2 | “I think progress monitoring for me has changed a lot. We use aims web a lot in our district. I was really really thankful when...” |
In summary, this section listed the current instructional use of tablets and/or handhelds in current settings and groupings. It also identified the instructional changes that special educators report since their use of tablets and/or handhelds. The Special educators in this study reported the use of tablets and handhelds daily and extensively at a higher percentage in their special education classrooms than in other school settings. They reported a higher percentage of use with individual students than with other student groupings. They reported that since using tablets and/or handhelds their use of a variety of technological strategies has increased, particularly the use of digital pictures, videos, and books. Special educators in all groups reported that they have changed how they differentiate and individualize for SWD. These special educators also agreed that the use of tablets and/or handhelds supports teachers in providing instructional strategies that support learning.

**Assistive Technology Use and Changes**

Special educators in group #1 and group #2 were surveyed regarding their use of AT devices, software, and programs. The survey asked educators to compare how often

| (Mild/Moderate) | they came out with that app. It was so nice that as they are reading to you, you can touch their errors and it does it all for you. I have binders and binders of paper that I was going through week after week after week and then having to type it in. So that was a huge time saver and tree saver for me. Now with Vizzle that also progress monitors so now there are a lot more programs coming out that progress monitor for you and make these beautiful graphs. “ |
| Special Education Administrator: Group #3 | “It comes more individualized for children. They are all in a small group, and you might be doing this for this group and another for another group. You may have to find a different app based on their needs. I think that has made teachers individualize more. It has allowed for more individualized instruction for teachers. I think that has made a difference.” |
they used AT prior to their use of tablets and/or handhelds with how often they use assistive technology now by answering the following open-ended question: “Since using tablets and handhelds, my general use of AT with my students has_____. “ The change in special educator’s frequency of use of AT is listed in Figure 1. Survey data indicate that 90.5% of the special educators in group #1 responded that their frequency of AT use has increased or significantly increased. The percentage of special educators in group #2 reporting an increased frequency use of AT 73.7%.

**Figure 1 Change in Frequency of Assistive Technology Use**

![Bar chart showing changes in frequency of AT use](image)

Special educators were surveyed regarding any changes in the frequency of their recommendations for AT services. Figure 2 outlines the changes reported by group #1 and group #2 in the frequency of AT recommendations. An increase in frequency of recommendations after tablet and handheld use was reported by 90.5% of group #1 and 73.7% of group #2 special educators.
When special educators were surveyed on statements regarding the use of tablets and/or handhelds and AT, 100% of special educators in all three groups believed that the use of tablets and/or handhelds encourages the additional use of AT applications. When surveyed regarding the use of AT in schools for SWD, 90.5% of special educators in group #1, 87.9% of special educators in group #2, and 72.2% of special education directors in group #3 agreed or strongly agreed that with the use of tablets and/or handhelds, schools are more in compliance with the intent of the Individuals with Disabilities Education Act (IDEA). The literature review for this study referenced the concept that the former separate systems of general education technology and special education technology are merging as a result of mobile technologies (Edyburn, 2004). Special educators were surveyed on their agreement to this claim. The majority of group #1, group #2 and group #3 special educators agreed or strongly agreed with this statement.
with group percentages of 90.5%, 94.8% and 88.9% respectively. Lastly, when surveyed on their perception of whether it is easier to learn assistive technologies on a tablet and/or handheld versus a desktop/laptop computer, 81% of group #1, 70.7% of group #2, and 66.7% of group #3 special educators agreed or strongly agreed with this statement. Table 11 gives the percentage of agreement with the four AT questions.

Table 11 Agreement by Group: Assistive Technology Use

<table>
<thead>
<tr>
<th>Agree and Strongly Agree Responses</th>
<th>Group #1 N = 21 n (%)</th>
<th>Group #2 N = 58 n (%)</th>
<th>Group #3 N = 18 n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The use of tablets and/or handhelds with students with disabilities encourages the additional use of AT applications</td>
<td>21 (100.0)</td>
<td>58 (100.0)</td>
<td>18 (100.0)</td>
</tr>
<tr>
<td>Schools are more in compliance with the intent of IDEA regarding the use of assistive technology for students with disabilities due to the use of tablets and/or handhelds with students with disabilities.</td>
<td>19 (90.5)</td>
<td>51 (87.9)</td>
<td>13 (72.2)</td>
</tr>
<tr>
<td>The use of tablets and/or handhelds in education is helping to bring together the systems of general education technology and special education technology.</td>
<td>19 (90.5)</td>
<td>55 (94.8)</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>It is easier to learn assistive technology applications on a tablet and/or handheld than it is on a desktop/laptop computer.</td>
<td>17 (81.0)</td>
<td>41 (70.7)</td>
<td>12 (66.7)</td>
</tr>
</tbody>
</table>

In summary, special educators surveyed reported that their use of AT services has increased or significantly increased as a result of their use of tablets and/or handhelds. They also reported recommending AT services more often. In the opinion of those surveyed, increased frequency, recommendations, and use of AT by special educators improves access for SWD.

Special educators were interviewed regarding their current and past use of assistive technology devices, software, or services with SWD. The three groups of
special educators were asked to compare their current use of assistive technologies with their past use and report on any changes or differences.

Data from the group interviews were grouped into the themes listed in Table 12. All three groups identified that tablets and/or handhelds are much easier to use and program when compared to previous assistive technologies. When referring to former assistive technology devices, software, or programs, special educators referenced attributes of tablets such as portability, cost, versatility, usability, and their associated applications as desirable. Multiple participants addressed the difficulty in programming and individualizing previous assistive technology devices, software, and programs. As a result interviewees stated that the time for professional development needed for each device or program was often extensive resulting in typically one individual per district trained in its use. One special educator summed up past experiences with AT in their school.

Before tablets it was horrible, I cannot even remember what the program was, but it was just horrible. This was not long ago--three or four years ago. Anytime we wanted something read, we had to scan it into the scanner, and then we would have to take it to the computer and download it into the computer. No one used it because it was so awkward to use. To get anything in, it had to be scanned into the computer and put into a format that the kids could use. We got it, the district spends money on it, and then because it is so awkward to use it just sat there being unused. I think we have several of those things sitting there in storage units in the school district. I think it has been hard for our students with disabilities that can’t read and a disservice because, yes, the technology was there, but it was so cumbersome and time consuming to use for us as teachers even to teach them, that it wasn’t utilized.

The second theme that emerged is in how special educators use tablets and/or handhelds to provide assistive technology services. Special educators utilize tablets and handhelds in multiple ways to provide assistive technology to their students. Special educators commented that one tablet could be used to provide multiple assistive
technologies to one or to numerous students. A different theme was identified in group #3 as the concept of the blending of the systems of AT and IT. Special education administrators stated that with tablets and/or handhelds, assistive technology options are now available and utilized by all students and are available more universally thus causing them to ask, “What is considered assistive technology now?”

Table 12 Interview Themes: Assistive Technology Use and Changes

<table>
<thead>
<tr>
<th>Similar</th>
<th>Easy to use/program Multiuse</th>
<th>Different</th>
<th>Blending AT and IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group #1 Special Educators (Severe/Profound) N = 6</td>
<td></td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Group #2 Special Educators (Mild/Moderate) N = 5</td>
<td></td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Group #3 Special Education Administrators N = 7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sample interview statements regarding assistive technology use and changes are listed in Table 13.

Table 13 Interview Statement Examples: Assistive Technology Use and Changes

| Special Educator Group #1 (Severe/Profound) | “I just remember trying to program some communication devices, and it took forever. It was so complicated. You have got to be kidding me. Then you had to change it again, and it wasn’t quite right, and it took hours whereas here it is so fast.” |
| Special Educators Group #2 (Mild/Moderate) | “The time factor that is saved with the handheld portables devices is incredible.” “cause what kids choose to say and what they choose to write is often different. It is hard for them to write. If you go with speech-to-text software with a computer, it was pretty bulky to use, but most of the apps are pretty simple, and the kids pick them up pretty quickly. That has worked real well.” |
| Special Education Administrator Group #3 | “I think we rely on our technology staff, not our special education staff now when we used to work with CESA and go through this long list of what a student would need to do a assistive technology assessment. Now we just go to our IT people and talk about what we want to do and ask, “Is there an app for that?” |
In conclusion, special educators and administrators reported changes to the use and recommendations for AT services. The multi-use capabilities of tablets and/or handhelds along with their easy to use interface was reported as reasons why special educators are using AT more than prior to tablets and/or handhelds. In addition, the regular use of tablet technologies and applications offering traditional-like assistive technologies such as speech-to-text within the general population caused special educators to question exactly “what is the meaning of AT now?”

**Perceived Student Learning Changes and Benefits**

**Perceived Student Learning Changes.**

Special educators were surveyed regarding their perceptions of student learning changes. Each group was given a list of instructional skill areas and asked to indicate their perception on the change in student learning due to the use of tablets and/or handhelds. Table 14 lists the percentage of individuals in each group indicating that, in their opinion, a particular skill had increased or significantly increased due to the use of tablet and/or handhelds. This question on the survey was customized for each of the two special educator groups. Group #3 was presented all the skill areas that groups #1 and #2 were surveyed on. The largest percent of special educators reporting that an area had increased or significantly increased was in the skill area of pre/academic or academic skills. Percentages of group #1 indicating an increase was 95.2% and for group #3 88.9%. Secondly, 94.4% of group #3 and 71.4% of group #1 special educators indicated that communication had increased or significantly increased. In addition to pre-academic/academic, 85.7% of group #1 and 50% of group #3 special educators indicated that an increase in cognition skills had increased or significantly increased.
Results regarding the perceptions of special educators in group #2 and group #3 indicate that special educators believe the academic skills of reading and mathematics have increased or significantly increased. Perceived reading skills have increased or significantly increased as indicated by 67.9% of group #2 and 83.3% of group #3. Lastly, 66.7% of group #2 and 83.3% of group #3 responded that mathematical skills have increased or significantly increased due to the use of tablets and/or handhelds. Increases were reported by over 60% of group #1 for the areas of social interaction and motor skills. Percentages were lower for those same areas for group #2. Over 60% of Group #3 believes social interaction has increased and 50% for the area of motor skills. Both groups #2 and #3 reported higher percentages of educators perceiving increases in reading and math than in writing and study skills. A small percentage of educator in all three groups reported perceived increases in the area of pre-employment/transition.

Table 14  Survey: Perceived Student Learning Increases

<table>
<thead>
<tr>
<th>Increased and Significantly Increased Responses</th>
<th>Group #1 Special Educators (Severe/Profound) N=21 n (%)</th>
<th>Group #2 Special Educators (Mild/Moderate) N=56 n (%)</th>
<th>Group #3 Special Education Administrators N=18 n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Academic/Academic</td>
<td>20 (95.2)</td>
<td>NA</td>
<td>16 (88.9)</td>
</tr>
<tr>
<td>Cognition</td>
<td>18 (85.7)</td>
<td>NA</td>
<td>9 (50.0)</td>
</tr>
<tr>
<td>Communication</td>
<td>15 (71.4)</td>
<td>NA</td>
<td>17 (94.4)</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>14 (66.7)</td>
<td>25 (46.3)</td>
<td>11 (61.1)</td>
</tr>
<tr>
<td>Motor Skills</td>
<td>13 (61.9)</td>
<td>30 (57.7)</td>
<td>9 (50)</td>
</tr>
<tr>
<td>Daily Living/Adaptive</td>
<td>12 (57.1)</td>
<td>NA</td>
<td>8 (44.4)</td>
</tr>
<tr>
<td>Pre-Employment/Transition</td>
<td>6 (30.0)</td>
<td>14 (28.0)</td>
<td>4 (22.2)</td>
</tr>
<tr>
<td>Reading</td>
<td>NA</td>
<td>36 (67.9)</td>
<td>15 (83.3)</td>
</tr>
<tr>
<td>Writing</td>
<td>NA</td>
<td>23 (42.6)</td>
<td>10 (55.6)</td>
</tr>
<tr>
<td>Mathematical</td>
<td>NA</td>
<td>34 (66.7)</td>
<td>15 (83.3)</td>
</tr>
<tr>
<td>Study Skills</td>
<td>NA</td>
<td>23 (44.2)</td>
<td>4 (22.2)</td>
</tr>
</tbody>
</table>
**Perceived student learning benefits.** Survey respondents were asked to rate their level of agreement with statements about the student learning benefits from using tablets and/or handhelds with SWD. Special educator group responses are listed in Table 15. The statement with the largest percentage of participants in all three groups agreeing or strongly agreeing is the statement *improves motivation for learning*, with 95.2% of group #1, 98.2% of group #2, and 100% of group #3 special educators in agreement. All the special educators in group #1 believed that tablets and handhelds *supports students in learning at higher levels* with 77.5% of group #2 and 94.4% of group #3 agreeing. Percentages for the statement *improves communication with non-disabled peers* were similar between group #1 at 95.2% and 94.4% of group #3. Similarities were noted regarding the statement *supports management of behavior* with 95.2% of group #1 and 92.9% of group #2 and 88.9% of group #3 agreeing to that statement.

The group with the highest percentage of special educators agreeing that the use of tablets and/or handhelds *supports student progress on IEP goals and objectives* was group #2 at 94.6% while group #1 and group #2 responses were at 85.7% and 88.9% respectively. Lastly, the percentages of special educators in group #2 and group #3 agreeing that tablets and handhelds *improve students in maintaining focus and attention* were similar at 87.5% for group #2 and 88.9% for group #3. Overall, over 85% of each group agreed or significantly agreed that tablets and/or handhelds offer support or improvement in all areas listed.

<table>
<thead>
<tr>
<th>Agree and Strongly Agree Responses</th>
<th>Group #1 Special Educators (Severe/Profound) N = 21</th>
<th>Group #2 Special Educators (Mild/Moderate)</th>
<th>Group #3 Special Education Administrators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate your level of agreement. The use of tablets</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 15 Agreement by Group: Perceived Student Learning Benefits
Special educators were surveyed with the question, “In what ways, if any, have your students benefited from using tablets and/or handhelds?” Table 16 identifies the themes, both similar and different, for each special educator group. Similar themes in all three groups include the two areas of motivating/engaging/fun and instructional learning. The first theme of motivating/engaging/fun encompasses respondents’ statements that tablets and/or handhelds make activities and lessons motivating and fun for students, engaging them in the activity or lesson.

Separate themes arose in each individual group. Although each of the three groups identified the area of communication, only group #1 met the preset criteria identified. The students served by this group generally utilized tablets and/or handhelds as personal communication devices or as an AT device used in communicating with peers, staff, and family members. Group #2 themes focused around the topic of access. The tablets and/or handhelds assisted the students in accessing the general education environment, curriculum, and materials. Students could also receive classroom and curricular accommodations with the use of the tablet and/or handheld. Lastly, students
were able to access a large assortment of resources or reference material such as dictionaries and research information for class projects or assignments.

Group #3 identified the two areas identified by group #1 and group #2 as well as the theme area of behavior/social skills. This group identified that the use of behavioral monitoring systems, video modeling, and visual social skills instruction as student benefits. Each of the groups at some level identified visual representation of content such as the use of video modeling and the use of pictures and graphics. The same is true for the theme areas of communication and access.

Table 16. Survey Themes: Perceived Student Learning Benefits

<table>
<thead>
<tr>
<th></th>
<th>Group #1 Special Educators (Severe/Profound) N =19</th>
<th>Group #2 Special Educators (Mild/Moderate) N = 51</th>
<th>Group #3 Special Education Administrators N = 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Similar</td>
<td>Motivating/Engaging/Fun Instructional Learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Different</td>
<td>Communication</td>
<td>Access</td>
<td>Communication</td>
</tr>
</tbody>
</table>

Survey themes for perceived student benefits are supported by the examples listed in Table 17.

Table 17 Survey Statement Examples: Perceived Student Learning Benefits

<table>
<thead>
<tr>
<th>Special Educator Group #1 (Severe/Profound)</th>
<th>“I have students who are non-verbal and are now able to use these devices to communicate with their teachers, family members, and their peers. They are able to demonstrate what they know and share opinions during small and large group activities. Additionally, the specific populations I use these devices with find the use of technology very motivating; so when we get to lessons that used to be a fight, we no longer find as much opposition.”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Educator Group #2 (Mild/Moderate)</td>
<td>“Individualizes skills to their level, motivational regarding on-task behavior, and high interest to engage in the skill that we are working on.”</td>
</tr>
</tbody>
</table>
| Special Education Administrator Group #3   | “One of the biggest benefits has been with communication. We have several nonverbal students with autism who use Proloquo2 go to communicate with staff and peers. Bookshare has also been a very nice application for some students who need text-to -speech
Multiple themes arose when interviewing the three groups regarding the perceived student benefits of using tablets and/or handhelds. Themes identified by each of the special educator groups are listed in Table 18. Similar themes identified were the themes of motivation/engagement, communication, participation/access to general education, behavior/social skills, and ease of use. All three groups identified that students demonstrated increased motivation and engagement when using tablets and/or handhelds. One special educator sums up the general theme of motivation/engaging/fun with her comment:

The kids are so motivated. The students really like it. It is awesome. ‘First, you will do your seat work and then you will do the iPad.’ It really works. ‘Hey, you finish this and you get the iPad.’ They will do anything for me to use the iPad. It is awesome. My lessons are more fun for them. I always thought my lessons were wonderful (chuckling). I think that it is just fun. It’s like…’It’s my time on the iPad’. They are still doing reading, telling time, money, comprehension or whatever it is…It’s fun!

The area of communication was similar in all groups. The theme of communication is defined in special educator statements as either a specific communication device or communication as an action. Interviewees in group #1 and in group #3 perceived that student communication abilities improved with peers and adults in their school community as well as in their home environments through the use of tablets and/or handhelds. As a result, some interviewees reported other student benefits such as access to programs, curriculum, and improved behaviors. The third similar theme of participation/access to general education involves the physical access and participation in general education classes for group #1 special educators and some educators in group
#2. For group #2 interviewees, access to general education also referred to access to the general education environment, curriculum, and materials. This group perceived that the use of tablets and/or handhelds has benefited their students through academic and curricular accommodations. Group #3 identified both definitions of participation and access when interviewed on student benefits. All three groups interviewed identified the theme of behaviors/social skills as a perceived student benefit. Statements referenced the use of visuals to assist students in learning positive behaviors as well as programs that would track behaviors for charting purposes. Lastly, each of the three groups identified the theme of ease of use. This theme refers to how easily students can learn and use tablets and/or handhleds.

Each of the three groups identified different themes for perceived student benefits. Group #1 believed that their students’ interactions with peers have improved from the use of tablets and/or handhelds. Statements regarding improved peer interactions were often in context to dialogue regarding improved communication and behaviors. Both teacher groups identified the theme of independence. The interviewees commented that tablets and/or handhelds can be used independently by SWD when the activities are individually tailored to the student. A different theme for group #3 is access to technology and fit-in. This group perceived that tablets and handhelds improve access to technology for SWD. Similarly, they believed that tablets and handhelds helped SWD to ‘fit-in’ and that they are less stigmatized by using similar technology to their peers as opposed to previous, bulkier, larger, and different devices resulting in students appearing substantially different than their peers.
Table 18 *Interview Themes: Perceived Student Learning Benefits*

<table>
<thead>
<tr>
<th>Similar</th>
<th>Motivating/Engaging Communication Participation/Access to General Education Behaviors/Social Skills Ease of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group #1 Special Educators (Severe/Profound) N = 6</td>
<td></td>
</tr>
<tr>
<td>Group #2 Special Educators (Mild/Moderate) N = 5</td>
<td></td>
</tr>
<tr>
<td>Group #3 Special Education Administrators N = 7</td>
<td></td>
</tr>
<tr>
<td>Different</td>
<td>Peer Interactions Independence</td>
</tr>
</tbody>
</table>

Special educators and administrators perceived multiple student benefits from the use of tablets and handhelds with their students. Samplings of statements made from the group interviews are included in Table 19.

Table 19 *Interview Statement Examples: Perceived Student Learning Benefits*

| Special Educator Group #1 (Severe/Profound) | “It allows my students to be in the regular education environment more often and with their peers and more engaged. Some of my students go to social studies and science, and I am able to find apps that relate to what they are doing. They may not be doing the same thing, but they are in that environment. They are participating. Sometimes they have a peer there with them. It has really enhanced their inclusion and their ability to be with their peers more and for their peers to really get to know them more, too.” |
| Special Educator Group #2 (Mild/Moderate) | “My population is more LD and not that far away from the general population. My students have a lot more independence. They are in general education. I record tests at home so that they can take their tests in their classroom. They can take it on their own without me having to help them by reading to them. They really like it when I do this. So this year one of my students takes the math test in the classroom usually and one time the teacher forgot to tell me so she said she would sit down with the students and read it with him, and he said, “My teacher usually has these recorded.” He looks forward to being in his class, being independent, and not being singled out. He wanted to take the test with the students and be independent. I have seen the students become more independent and kids being able to be more in the general education classroom.” |
In summary, survey and interview data revealed commonalities in how special educators perceived the student learning benefits from using tablets and/or handhelds with SWD. All groups perceived student motivation and engagement as benefits. The themes of improved access, communication, independence, social skills, and behaviors are noted within the different groups at varying levels. Also noted was the ease of use with which students could access technology applications.

**School Supports for Technology Integration**

The literature review identified the importance of school supports for the integration of technology in teaching and learning. The six school supports that this study references include (1) strong leadership, including a shared vision and technology plan, (2) professional development, (3) teacher collaboration,(4) quality technical support, (5) resource availability, and a (6) positive school culture.

The teacher groups #1 and #2 were surveyed on questions pertaining to access to resources, professional development, quality technical support, and teacher collaboration, indicating their level of agreement on statements regarding a variety of these school supports with five of the six statements relating to their own school contexts. Table 20 references the percentages of special educators in each group agreeing or strongly agreeing to each statement. When surveyed about resource availability and whether every student in special education should have access to a tablet or handheld, 66.7% of group #1 and 72.4% of group #2 agreed or significantly agreed.
whether their school offers professional development opportunities to help all teachers in using and integrating technology, 66.7% of group #1 and 69% of group #2 agreed or significantly agreed. Special educators were surveyed about the presence of a professional learning community in their schools to assist them in learning and integrating tablet or handheld technology; 52.3% of group #1 and 46.6% of group #2 agreed or significantly agreed that PLC’s are present in their schools. High quality and timely technical support is often needed when experiencing technical difficulties. Quality and timely technical support were addressed in two separate statements. A larger percentage of group #1 and group #2 special educators reported that there is quality support while a smaller percentage agree that the support is timely. Over 70% of survey participants in both groups responded that there is quality support. The percentage of special educators agreeing that there is timely support was 57.1% for group #1 and 56.1% for group 2.

**Table 20 Survey Agreements: School Supports for Technology Integration**

<table>
<thead>
<tr>
<th>Agree and Strongly Agree Responses</th>
<th>Group #1 Special Educators (Severe/Profound) N = 21</th>
<th>Group #2 Special Educators (Mild/Moderate) N = 58</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate your level of agreement…</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Every student enrolled in special education should have access to a tablet or handheld.</td>
<td>14 (66.7)</td>
<td>42 (72.4)</td>
</tr>
<tr>
<td>My school offers professional development opportunities that help all teachers in the utilization and integration of technology.</td>
<td>14 (66.7)</td>
<td>40 (69.0)</td>
</tr>
<tr>
<td>There is a professional learning community in my school that assists me in learning more about integrating tablet and/or handheld technology into my instruction.</td>
<td>11 (52.3)</td>
<td>27 (46.6)</td>
</tr>
<tr>
<td>There is timely support when teachers experience technology difficulties</td>
<td>12 (57.1)</td>
<td>32 (56.1)</td>
</tr>
<tr>
<td>There is quality support when teachers experience technical difficulties.</td>
<td>15 (71.4)</td>
<td>41 (70.7)</td>
</tr>
</tbody>
</table>
Survey participants were asked the open-ended question, “In your opinion, what school supports are necessary for tablet and/or handheld use to be successful for SWD?” Data from each group were sorted and categorized into similar and different themes that are listed in Table 21. All three groups of special educators noted professional development as a similar theme. Different themes for group #1 were teacher collaboration and resource availability. Comments from group #1 referenced professional learning communities, networking, and the ability and time for sharing applications and tools for student learning. Comments that were categorized under resource availability referred to the numbers of tablets available to students, the availability of staff tablets, availability of funds to purchase applications, and the ability to utilize tablets in summer or after school hours for learning purposes. Special educators also referenced the availability and stability of school Wi-Fi networks, which was classified under the category of resource availability rather than under technical support.

Group #2 identified the theme of technical support with numerous comments addressing the difficulty in purchasing, downloading, and updating applications. A number of comments referenced the length of time it took to receive new or updated tablet and handheld applications.

Group #3 comments were categorized into the category of strong leadership, shared vision, and technology planning. Comments focused on the development of a good plan with rules and guidelines for technology use. Other comments were regarding the development of a plan that outlines clear expectations for the purchase of applications. Lastly, interviewees discussed the need for a plan for consistency between grades and classrooms on the use of applications or for the provision of applications for
certain populations progressing through the grades. The categories of leadership/vision/technology plan, teacher collaboration, resource availability, and technical support were identified in each of the groups’ comments, but did not meet the preset criterion for determining themes for each group based on their group participants. Table 22 offers examples of statements from the three groups on the necessary school supports.

Table 21 Survey Themes: School Supports for Technology Integration

<table>
<thead>
<tr>
<th>Group #1 Special Educators (Severe/Profound) N = 18</th>
<th>Group #2 Special Educators (Mild/Moderate) N = 48</th>
<th>Group #3 Special Education Administrators N = 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Similar Professional Development</td>
<td>Different</td>
<td>Leadership/Vision/Technology Plan Technical Support</td>
</tr>
<tr>
<td>Different Teacher Collaboration Resource Availability</td>
<td>Technical Support</td>
<td></td>
</tr>
</tbody>
</table>

Table 22 Survey Statement Examples: School Supports for Technology Integration

<table>
<thead>
<tr>
<th>Special Educator Group #1 (Severe/Profound)</th>
<th>“Professional learning communities for the purpose of learning about and integrating tablets, training regarding devices, [and] networking with other districts to learn about apps and tools available.”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Educator Group #2 (Mild/Moderate)</td>
<td>“There needs to be a system for adding/buying apps that is easy and efficient. I have experienced a time lag in waiting to get new apps added to my iPads. I have an increasing number of resources to find appropriate apps, but not a quick and easy way to get them onto my student iPads.”</td>
</tr>
<tr>
<td>Special Education Administrator Group #3</td>
<td>“Adequate training of staff and teachers using the devices. Clear expectations for the use, purchase of appropriate apps, and tech support for difficulties.”</td>
</tr>
</tbody>
</table>

Special educator groups were interviewed regarding their opinions on the necessary supports for successful use of assistive technology. Statements from each group were sorted, categorized, and assigned a theme. Table 23 lists the similar and different themes from each group. Two similar themes were identified in all three groups. All groups reported that professional development in multiple forms as well as
teacher collaboration is necessary for the successful use of assistive technology. Interviewees identified various forms and levels of professional development and referenced professional development related to specific applications for students. Also identified was the importance of teacher collaboration and professional learning communities regarding the use of tablets and/or handhelds and their applications. Technical support/Application support was the second similar theme identified for all three groups. Specifically, this theme encompassed technical support for application procurement, download, and updates. Individuals in all groups reported that support in this area is necessary for successful integration and use of tablet and/or handhelds.

Different themes were also identified for each of the three groups. Group #1 interviews were categorized in the theme area of resources and availability. Special educators in this group reported additional resources, including additional tablets for their classrooms and students, would be necessary for successful use of assistive technology. Both group #2 and group #3 identified strong leadership, shared vision, and technology planning as key school supports. Both groups commented on the need for district plans and cohesiveness in special education programs by grade, program, and school regarding student with different applications and programs. For example, if a student was successful using the Prologue2go application, that application should be utilized within the next grade, program, or school. Technology planning also refers to comments regarding digital citizenship and guidelines for student use. Positive school culture referred to the comfort level of school staff in using and integrating technology as well as how some educators approach new technologies.

Table 23 Interview Themes: School Supports for Technology Integration

<table>
<thead>
<tr>
<th></th>
<th>Group #1</th>
<th>Group #2</th>
<th>Group #3</th>
</tr>
</thead>
</table>


Table 24 lists examples of statements by interviewees regarding needed school technology supports.

**Table 24 Interview Statement Examples: School Supports for Technology Integration**

<table>
<thead>
<tr>
<th>Role</th>
<th>Group</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Educator</td>
<td></td>
<td>“I never purchase applications because of the cost, being disappointed in it, or the request process. It is a really hard process to get the application cause of the process. It is really hard for me to let it go because it takes so long to get them back. I cringe because that I have to let it go to get it installed or to do updates.”</td>
</tr>
<tr>
<td>Special Educator</td>
<td>Group #2</td>
<td>“I am hoping for more professional development and more collaboration between teachers. Being with the younger students, I really work hard to get them to do a lot with assistive technology, and now at second grade I am starting to hand them off to the next teachers, and I am getting really concerned about the things that he is able to do now if he will make it to the next level. Right now, we do not have the cohesiveness to make (the technology), and we do not have the opportunity to get together like that. So I am really hoping that they will create something like that for us to work to more integrated as the grades go on instead of in your small class community.”</td>
</tr>
<tr>
<td>Special Education Administrator</td>
<td>Group #3</td>
<td>“I think having a shared vision and strong technology plan is huge, too. Like what happens when the lease is up? How are we going to continue this initiative when the money is gone? I think having that all in place is important.”</td>
</tr>
</tbody>
</table>
example of a respondent’s recommendation. Professional development was the overarching theme. Further review revealed two aspects within professional development. The first is a plan for the provision of professional development and the second to assist teachers in using and integrating technology to support their students’ learning.

Table 25  *Survey Statement Examples: Recommendations for Administrators*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Group #3 Special Education Administrators N = 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Development Plan</td>
<td></td>
</tr>
<tr>
<td>Professional Development for Integration</td>
<td></td>
</tr>
<tr>
<td>Special Education Administrator</td>
<td>“Conduct a needs survey to determine what specific training teachers need. All teachers are at a different technology level when it comes to implementation in the classroom. There has to be a purpose to the use of technology as well as specific training on how it is going to be used. Data collection is also important to check if progress is being made.”</td>
</tr>
</tbody>
</table>

Group interview participants were encouraged at various points in the interview process to share positive examples of how their school or district is providing supports for the successful integration of tablet and/or handheld technology. Table 26 lists examples of statements of how technology use in special education is supported within current school contexts.

Table 26  *Interview Positive Examples: Successful School Technology Supports*

<table>
<thead>
<tr>
<th>Special Educator Group #1 (Severe/Profound)</th>
<th>“The IT department is starting to realize that we need them and use them quite frequently in my classroom and are more than willing to come into our room to install applications. That is appreciated and helpful. There is a process to update the apps ourselves without going through the whole process.”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Educator Group #2 (Mild/Moderate)</td>
<td>“Our principal in our building is very strong, and it is making it become a natural part when a new technology was introduced last year. It is becoming more natural. She tries to incorporate in every staff meeting some little technology thing that we might not have seen. Therefore, it is very subtle, but it is frequent. I think that makes it natural and part of the culture.”</td>
</tr>
</tbody>
</table>
| Special Education                         | “We have sent staff to International Society for Technology in
Administrator Group #3

Education (ISTE), and they have learned a lot and have said that they have positive experiences there. Sometimes our staff feel that some of our staff could train some of their staff. We had the apple people come and train our staff, and then we did that for summers and then our staff knew just as much and then we would not have to bring in the Apple people anymore. And they have been asked to be trainers in other schools. It is nice to have the Vanguard Team—that is what they call them—it is nice to have them, and I have 2 special education people on that team. They help update the iPads. They went from having one person on the team to grade level representatives. We have representatives from our department for each grade level.”

| Administrator Group #3 | Education (ISTE), and they have learned a lot and have said that they have positive experiences there. Sometimes our staff feel that some of our staff could train some of their staff. We had the apple people come and train our staff, and then we did that for summers and then our staff knew just as much and then we would not have to bring in the Apple people anymore. And they have been asked to be trainers in other schools. It is nice to have the Vanguard Team—that is what they call them—it is nice to have them, and I have 2 special education people on that team. They help update the iPads. They went from having one person on the team to grade level representatives. We have representatives from our department for each grade level.” |

The overall data from surveys and interviews identified professional development as a main support for the successful integration of technology in special education. Additionally, technical support specific to the procurement, installation, and updating of tablet and handheld applications is needed. Group #1 special educators identified resource availability in both the surveys and interviews. Group #3 survey and interviews identified a leadership/vision/technology plan as important for the integration of AT. Group #2 survey results identified technical support and interview data identified leadership/shared vision/technology planning as well as having a positive school culture as needed technology supports. Reported by special educators were examples of actions and activities that demonstrate successful school supports. When special education administrators in group #3 were asked to make recommendations to a new director initiating a tablet initiative, they identified professional development as their main recommendation.

**Success Stories**

Stories of student success offer rich descriptions of how special educators’ use of tablets and/or handhelds with SWD can offer examples of how technology is integrated to improve teaching and learning. Table 27 identifies student success stories identified in
each group as examples of the successful integration of tablet and/or handheld technology. Each example identifies how the use of technology enabled the student access and participation. For one student this meant access to communication to successfully interact with peers and participate in the general education environment. For the second student it meant reducing barriers to access the general education curriculum. Lastly, technology enabled a middle school student to access higher levels of learning.

As indicated in the following success stories, the successful use and integration of technology through the use of tablets and/or handhelds benefits student learning.

**Table 27 Interview Statement Examples: Student Success Stories**

| Special Educator Group # 1 (Severe/Profound) | “I have a student that got the mini. She has Down syndrome, hearing impairment, and she does not have functional speech. It has allowed her to really participate in communicative activities. We program it for morning meeting. She can greet her friends. She can do that sort of thing. She has a share on there. When she goes into regular education homeroom, she can share with her focus teacher with what she did over the weekend. It gives her a voice instead of someone standing over her shoulder always trying to interpret what she is trying to say. It gives her a way to participate. We do a cooking group, and she has all the kids in the cooking group, their pictures on the iPad, and she gets to pick what order kids get to do things. I think participation is the biggest thing because my kids are pretty low. And she is so proud when she does it. It’s very cute.” |
| Special Educator Group #2 (Mild/Moderate) | “I have nonverbal autistic student that I have known for a couple of years now. We have known that he was very bright. But we had a hard time fully knowing what he understood. With the use of the iPad and the prologue2go app that we use for speech communication, we have had him involved in guided reading groups. He was able to respond to the questions; he was able to interact with his peers. The kids would say, ‘I did not know he could; he knew that’…I was like…’me neither’… It has really allowed them to interact with their teachers, their peers. They are much more socially appropriate. It has helped the other kids know how to interact with him now. They can ask him questions that he can respond to rather than throw a fit because he didn’t know how to interact with them.” |
| Special Education Administrator | “We have a special education student taking an AP class. The content area teacher uses pod casts and can individualize. You can |
look back, and the student can access the podcasts as many times as they want. The student can stay in a study hall to access this and does not have to go to the segregated classroom rather than working with the special education teacher who does not know the content. It will prepare him for learning in high school.”

Conclusion

In summary, special educator perceptions were gathered from three separate groups of special educators through the use of an online survey and semi-structured group interviews. The study examined their perceptions of their current and past practices on: (a) changes to their technology practices as a result of their use of tablets and handhelds, (b) how these changes benefit student learning, (c) how the utilization of tablets and handhelds influences instruction and learning of SWD and lastly, and (d) the necessary school supports for the successful use of assistive technology. Table 28 lists two statements that address the key questions of this study. At least eighty percent of special educators in all three groups agreed or strongly agreed that tablets change the way students learn and the way teachers teach. A larger percentage of group #1 and group #2 agreed or significantly agreed as opposed to the administrator group #3. When asked if tablets changed the way teachers teach, 81% of group #1, 86.2% of group #2, and 72.2% of group #3 survey respondents agreed or significantly agreed.

Table 28 Agreement by Group: Tablets Change Teaching and Learning

<table>
<thead>
<tr>
<th>Agree and Strongly Agree Responses</th>
<th>Group #1 Special Educators (Severe/Profound) N = 21</th>
<th>Group #2 Special Educators (Mild/Moderate) N = 58</th>
<th>Group #3 Special Education Administrators N = 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablets change the way students learn.</td>
<td>19 (90.5)</td>
<td>50 (89.3)</td>
<td>15 (83.3)</td>
</tr>
<tr>
<td>Tablets change the way teachers teach.</td>
<td>17 (81.0)</td>
<td>50 (86.2)</td>
<td>13 (72.2)</td>
</tr>
</tbody>
</table>

The next chapter identifies the overall findings from this study, identifies research that supports the findings, and offers implications for practice and suggestions for future research.
Chapter 4: Discussion and Recommendations

Summary

Educators view new and emerging mobile technologies as having the potential to change teaching and learning in both general and special education environments. With over 250 million iPads and 40 million Android tablets on the market (Cheng, 2015), K-12 and post-secondary schools are in the midst of integrating these new technologies into their schools and programs. Initial literature reviews and research indicate that tablets and handhelds offer promise and benefit for students with disabilities (Kagohara et al., 2013). However, purchasing the newest gadget in education does not necessarily equate to improvements in teaching and learning. The history of technology integration in education demonstrates numerous challenges and barriers. The literature documents the fact that technology integration is complex with a number of factors influencing its successful use in schools. The history of AT use in special education offers a similar pattern. Research details that of the number of students who could benefit from assistive technologies devices or services, only a fraction of them actually have access to and use them (Okolo & Diedrich, 2014; Bausch et al., 2008; Copley & Zivani, 2004).

Research on the challenges and barriers of technology integration brought forth literature on the necessary school supports for technology integration. Researchers have identified multiple supports and strategies that enhance and support technology initiatives (Hew & Brush, 2007; Hughes et al., 2005; Staples et al., 2005, Dexter, Anderson et al, 2002). Use of these supports maximizes technology integration efforts.

The purpose of this study was to examine the use of tablets and handhelds in special education within the schools of CESA #11 to understand why tablets have
become so popular in special education. This study sought information about general and assistive technology utilization before and after tablet and handheld use and their perceived benefits in teaching and learning. Lastly, this study examined the supports necessary for successful integration.

The data collected for this study included quantitative and qualitative data collected from 97 participants in an online survey and 18 participants in semi-structured group interviews. Three special educator groups were represented in the study: (1) special educators working primarily with students with severe and profound needs participating in alternate state assessments and standards, (2) special educators working primarily with students with mild and moderate needs participating in all state assessments and standards, and (3) special education administrators.

The overall results of this study indicated that special educators and administrators perceived that tablets change the way students learn and the way teachers teach. The special educators and administrators in this study perceived access to the general education curriculum and environment as a key benefit from the use of tablets and handhelds. Additionally, teachers and administrators perceived that the ease of use of tablets and handhelds offered increased access to assistive technology (AT) and educational resources and materials for both students and teachers. Samples of student success stories serve as reminders of the value of assistive technology.

Another key finding in this study is that special educators and administrators perceived student learning benefits in motivation, engagement, focus and attention, and independence. Special educators and administrators perceived changes to the pre-academic and academic areas. Improved communication for students with significant
deficits was seen as a key student benefit. Another key finding is that tablet and/or handheld use influenced changes to instruction. Special educators and administrators report that their use of general and assistive technologies has increased as a result of using tablets and handhelds. All three groups perceived that tablets and/or handhelds have changed how special educators differentiate and individualize to meet students’ needs. The changes reported by special educators include planning instruction, scheduling classes, planning of individualized lessons, individual practices, and grouping for instruction. They reported using additional visual representations such as digital pictures and digital videos for instruction. Teachers reported increased efficiency due to the all-in-one characteristic of tablets that allows easy access to a variety of instructional materials and resources. Special educators also perceived that their use of progress monitoring and data collection has increased due to the ease and ability to access progress monitoring tools in applications or on websites.

The special educators and administrators identified the supports necessary for the successful integration of technology in special education. They identified professional development, teacher collaboration, and IT support specifically related to app management as necessary school technology supports. Additional supports noted were strong leadership, vision, and technology planning as well as resource availability.

Overall, the special educators and administrators reported multiple student learning benefits, perceived that tablets and handhelds influenced their teaching, and identified the supports for successful technology integration. Table 29 identifies the study’s findings by research question.
Interpretation of Findings

Table 29 *Summary of Findings by Research Question*

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Findings</th>
</tr>
</thead>
</table>
| How do special educators perceive changes, if any, to their use of technology with students with disabilities as a result of their use of tablets and/or handhelds? | • Special educators and administrators reported that the use of tablets and/or handhelds encouraged the use of additional AT applications, increased use of AT and increased recommendations for AT. They reported increased access to a variety of AT apps and services.  
  • Special educators and administrators reported increases in the use of visual representation, digital pictures, digital videos, audio digital books/textbooks, audio books, and audio recording.  
  • More special educators in the Mild/Moderate group reported increased text-to-speech and speech-to-text than special educators in the Severe/Profound group.  
  • Special education directors perceived greater changes to the use of instructional technologies than special educators reported and perceived all special educators using technology more than before.  
  • Special educators in the Severe/Profound group perceived that tablets and handhelds support additional use of communication programs and apps and increased use of picture/icon communication and schedules. They reported that they use technology more than before.  
  • Special educators and administrators agreed that the systems of general education and special education technology are coming together and that schools are more in compliance with IDEA regarding AT. As the use of tablet and handhelds increase in K-12 education, special educators questioned what constitutes AT. |
| How are these changes perceived to benefit the learning of students with disabilities? | • All groups surveyed reported that tablets and handhelds improved access to general education curriculum and inclusion in the general education environment.  
  • Special educators and administrators reported that tablets and/or handhelds offer student increased access to environments, peers, curriculums, technology, resources, and materials.  
  • Special educators and administrators perceived that their students have benefitted in the following areas:  
    ✓ Motivation, engagement, and having fun |
<table>
<thead>
<tr>
<th>How does the utilization of tablets and handhelds, as perceived by special educators and administrators, affect students?</th>
<th>Special educators and administrators agreed that tablets change the way students learn and that tablets change the way teachers teach. They also reported improved progress on IEP goals.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All special educators and administrators reported changed instruction for:</td>
</tr>
</tbody>
</table>

- Focus and attention
- Independence
- Communication
- Social skills
- Behavior
- Ease of use of technology

- Special educators and administrators agreed that tablets and/or handhelds:
  - Improved progress on IEP goals
  - Supports students in learning at higher levels

- Some special educators and administrators reported improvement in social and interaction, motor.

- Most of the special educators in the Severe/Profound group and most of the administrators perceived student learning benefits in cognition, pre-academic and academic and communication skills.

- Special educators in Mild/Moderate group perceived the benefit of peer interactions. Administrators perceive that tablets and handhelds help students to “fit-in” with their peers.

- Some special educators in the Mild/Moderate group and administrators perceived student learning benefits in reading, math, writing and study skills.

**Samples of student success stories:**

- Student without functional speech now is able to participate and communicate in classroom activities and in regular education homeroom via the iPad mini.

- Student with autism spectrum disorder lacked ability to communicate verbally. Teachers and peers did not know this student’s capabilities. With the use of an iPad communication app, student is involved in guided reading groups in general education classes.

- Student is able to stay in the general education classroom and have tests electronically “read” via the iPad increasing his independence and self-esteem.

- General education teacher provides content via iPod casting to a middle school student with a disability enrolled in an AP class. The student remains in the general education environment and has no need to be segregated.
administrators, influence the instruction and learning of students with disabilities?

- differentiation
- individualization
- remediation
- intervention

- Special educators and administrators identified increased teacher efficiency due to the all-on-one characteristic of tablets and handhelds and increased access to educational resources.
- Special educators in the Severe/Profound group and administrators reported increased use of:
  - pictures and visuals
  - video modeling
  - communication
- Special educators in the Mild/Moderate group and administrators reported changes in:
  - Student groupings
  - data collection
  - progress monitoring
- All special educators in the Mild/Moderate group and administrators agreed that tablet and/or handheld use supports personalized learning, project-based learning and cooperative learning strategies.

What school supports do special educators perceive are necessary for the successful use of assistive technology with students with disabilities?

- Special educators and administrators identified differing important school supports. All groups agreed that the following are needed technology supports:
  - Professional Development
  - Teacher Collaboration
  - Technology Support (IT-App support)
- Most special educators reported that their school offers professional development opportunities and half reported the presence of a professional learning community in their school.
- Most special educators reported that they have quality IT support and half of them report that IT services are timely.
- Most special educators agreed that all special education students should have access to a tablet and/or handheld.
- Administrators reported that a professional development plan that addresses technology integration is necessary when starting a tablet and/or handheld initiative.
Perceived Student Learning Benefits

Special educators and administrators reported changed and increased use of AT, general technology use, and technology-related instructional strategies. These changes are perceived to benefit SWD in a variety of areas. The special educators and administrators in this study reported that with the use of tablets and/or handhelds, the students were motivated, engaged, and were having fun learning. Research confirms that the use of tablets in special education improves motivation (Flewitt et al., 2014; King et al., 2014; Haydon et al., 2012; Milman et al., 2012; O’Malley et al., 2013). Special educators in group #2 and administrators agreed that tablet use improved student focus and attention. Special educators and administrators perceived communication changes that benefit students with disabilities. These data confirmed research that tablets are a valuable tool for communication (Chien et al, 2014; Flores et al., 2012). Special educators and administrators in this study reported improved social skills and behaviors confirming research by O’Malley et al. (2013). Special educators and administrators reported increased use of video modeling. Research supported that using mobile technology with video modeling resulted in changed student behavior (Flores et al., 2012; Burton et al., 2013; Murdock et al., 2013). Students using tablets and/or handhelds demonstrated increased independence (Dougles & Uphold, 2014). The data from this study identified student independence as a benefit from using tablets and/or handhelds. The ease of use of tablets allow students, even those with the most complicated disabilities, to independently access educational apps designed for their interest and functioning levels. Perceived benefits in the academic learning areas of pre-academic, math and reading were reported. Research supports academic skill benefits when
students with disabilities are utilizing tablets and/or handhelds (Burton et al., 2013; Chai et al., 2014; Haydon et al., 2012; McClanahan et al., 2012; Miller et al., 2013). Increased access to the general education environment and curriculum was a benefit noted in this study. Burton et al., (2013) identified that students gained access to the core curriculum while using tablets. In conclusion, several research studies note that integrating tablet and handhelds with students with disabilities leads to change and benefits supporting these data from this study.

**Influence on Instruction.**

The special educators and administrators in this study reported that they changed their instruction after using tablets and/or handhelds. Special educators perceived that their use of tablets and/or handhelds has resulted in changes in differentiating and individualizing instruction influencing the instruction of students with disabilities. Research supports that the use of a tablet and/or handheld influences the ease in which teachers differentiate (O’Malley et al., 2013). Data from this study supported the claim that teachers are using tablets and handhelds to create and offer additional opportunities for remediation and intervention. Special educators noted changes in how they group students for instruction. Special educators reported using increased individual practice time and independent activities for instructional activities with students with disabilities. Special educators also believe that tablets and handhelds support the use of differing instructional approaches such as personalized learning, project-based learning and cooperative learning. The special educators in this study expanded their ability to provide differentiated, individualized, and independent learning activities for their students. Research supports incorporating tablets and/or handhelds into instruction can
lead to teachers moving from a teacher-centered to a student-centered learning approach (Liu et al., 2014).

Technology Use

The special educators and administrators in this study reported on their use of technology after their use of tablets and/or handhelds. The data indicate that special educators reported increased use of AT, AT apps and recommendations for AT services. AT use is known to benefit students with disabilities (Kagohara et al., 2013; Peterson-Karlan et al., 2006; Mirenda, 2003; VanLaarhoven et al., 2009).

This increased use of technology equates to using an additional variety of digital technologies with their students. The special educators and administrators report that using tablets and handhelds changed their instruction in how often they use digital pictures, videos and other means of visual representation.

Using tablets and handhelds for instruction for students with disabilities reportedly influenced teacher efficiency. Participants identified that tablets and handhelds offered an efficient and easy way to access educational resources and information for planning for instruction. For those who previously used visual/icon pictures schedules, the time saved in cutting, pasting into a communication board or schedule was significant. This offered them additional time for working with students and planning for instruction. Research supports the notion that the use of tablets and/or handhelds influenced teacher efficiency. Chien et al. (2014) noted that with the increased time that the tablet use offered, the teachers in their study were able to “work on other child-centered tasks” (Chien et al., 2014).
Special educators also reported changes in the collection of data and in student progress monitoring. Many of the new apps offer built in monitoring and feedback for both students and teachers. In addition, multiple assessment apps have been developed that reduce the teachers’ use of paper and pencil recording of multiple short assessment probes while recording the data on a student’s digital profile. Teachers reported assessing and using additional tools for data collection and progress monitoring. The operating system and interface of tablets offers teachers and students to move easily from app to app enabling the student or teacher to use and store data in each of the apps within the cloud. Therefore, a student can work independently in an app at their instructional level that provides immediate feedback, offers additional practices, and documents their progress for teacher review.

The literature supports the importance of school supports for successful technology integration (Hew & Brush, 2007). For this study, supports from Hew and Brush’s model combined with other key research were combined to create six supports that include: (1) strong leadership, including a shared vision and a technology plan, (2) professional development, (3) teacher collaboration, (4) quality technical support, (5) resource availability, and (6) positive school culture. The data from this study supported the value of these categories of support for technology integration in special education. Data from this study are grouped in these categories for reporting.

Strong leadership, shared vision, and technology planning comprise the leadership category. Special educators in the Mild/Moderate group and special education administrators identified the importance of leadership, a vision, and a technology plan. Special education administrators further identified that a plan should specifically address
the integration of technology as necessary when starting a tablet and/or handheld
initiative. Data from this study indicated that the special educators in this study value
leadership in technology integration. These data supported the research on the
importance of strong leadership and vision (Staples et al., 2005; Dexter et al., 2002).

The second category of key support is in the area of professional development.
All special educators and administrators in this study identified professional development
as a needed support. The data from this study identified professional development
opportunities in many of the schools in the study area with half of the participants
indicating the presence of a PLC in their school. Teacher collaboration and professional
learning communities, both forms of professional development, were noted in the data as
needed school supports. The presence and use of professional learning communities,
inquiry groups, and other forms of teacher collaboration reportedly leads to greater
integration of technology and offers the supports educators need to learn new practices
(Hughes et al., 2005; Smith & Robinson, 2003; Dexter, Seashore et al., 2002). Data
identified that teacher collaboration at the district level is necessary to develop a cohesive
plan that offers students progressing through the grades and programs with similar
programs and devices.

The special educators and administrators in this study also identified technical
support as a necessary school support. Many noted that they have access to quality
technical support with less agreeing that the support is timely. The technical support
specifically identified by special educators and administrators in this study related to
support for apps. Data identified difficulties with downloading, managing, and updating
applications. This information confirms the recent information regarding tablet use in
education (Liu et al., 2014; Raths, 2013). These data are similar to examples in the literature of unintended barriers created by district process and procedures (Newton & Dell, 2009). Special educators and administrator in this study found this to be a barrier to doing their work with students with disabilities. Special educators noted that the Tablet technology allows for the free download and use of many apps. This allows special educators to experiment and try multiple assistive technologies with many students on only one device without having to purchase a new device or a new app. Data from this study indicated that most special educators and administrators noted difficulties with app procurement, download, and updating. Special educators also noted that they have difficulty letting their tablets go because of the time it takes for them to be returned. Research about past assistive technology integration notes that special educators demonstrated a lack of expertise due to the lack of experimentation on differing devices (Copley & Ziviani, 2004). One district in this study resolved this barrier and serves as a positive example. The IT department came to special education classrooms when installing new applications thus not removing the tablets and further allowed special educators to download free apps and update apps themselves. This district action mitigates the issues identified by Edyburn (2004) referring to the dual systems of IT and AT and issues related to power, authority and control (Edyburn, 2004). The districts recognized the importance and value tablet use for this population. As noted by Dexter et al. (2002) quality technical support is important to technology integration.

Resource availability is identified in the literature as one of Hew and Brush’s (2007) supports for technology integration. Special educators for the Severe/Profound group identified this area as it pertains to the availability of tablets for each of the
students they serve. Resource availability also refers to access and stable Wi-Fi systems in the area’s schools. These data are consistent with previous data identified in the literature (Sze, 2009).

Positive school culture was identified as a needed support by special educators in the Mild/Moderate group. School culture as it relates to technology did not surface in other groups as a key theme but was identified by a few participants. The literature reports that teacher beliefs about technology are aligned with their practices in the classroom (Ertmer et al., 2012). The fact that it did not emerge as a theme for the other two groups may indicate that it was not as pressing or important for them as the other themes identified.

Past research on the barriers of technology integration state that technology was used as support rather than integrated into the curriculum (Wozney et al., 2006; Zhao & Frank, 2003; Kleiman, 2004; Cuban et al., 2001; CEO Report, 1999). This does not appear to be evident in these data. These data indicate that special educators and administrators use technology daily and extensively in a variety of student groupings. Tablets and/or handhelds are utilized for differentiating instruction for individual instruction, group instruction, and remediation. The teachers in this study use tablets and/or handhelds to support the additional use of instructional technologies and strategies

In summary, the four research questions sought to understand the “digital revolution” in special education as perceived by the special educators and administrators in northwestern Wisconsin. This study examined the perceived changes to special educators’ use of assistive technology and the perceived benefits to student learning. It sought understanding in how tablet and handheld use influences instruction and learning.
Data from this study indicates that the special educators and administrators believe that tablet and handheld use changes teaching and learning. Finally, the findings note the needed school supports of professional development and IT support as key supports in addition to other supports consistent with the literature for successful school technology integration.

**A Framework for Tablet and Handheld Use in Special Education**

The data obtained from this study combined with the research on supporting the integration of technology depict promise for the future integration of mobile technologies to benefit students with disabilities. Figure 3 offers a visual representation of how the special educators and administrators in this study perceived the use of tablets and handhelds for teaching and learning. This diagram represents a three-dimensional model that details the perceived changes and benefits for students and teachers identified in this study after their use of tablets and handhelds in special education. The outer circle represents the goal for all students to access the general education environment and curriculum.

The second circle represents special education services. On the top half of the circle are listed the perceived student learning benefits such as changes to motivation, engagement, independence, communication, participation, academics, social skills, and behavior. The lower half of the circle represents the instructional changes that were perceived as a result of tablet and/or handheld use. The inner circle represents all the potential challenges and barriers documented in the research and in this study that negatively impact school and assistive technology efforts. The large center arrow, represents a bridge or path that transcends above and over the challenges symbolizing the
increased access that tablet and handheld use in special education offers students with disabilities. The teachers and administrators in this study reported stories of student success. When the students had access to tablets and handhelds, the special educators and administrators perceived student access to the general education curriculum and environment had changed. Changed access for the special educators was reported.

Teachers indicated the ease of use of tablets and handhelds as compared to previous AT, changed how they accessed assistive technology, instructional materials and resources. **Access** is a key finding of this study. The foundation of the bridge is the six supports for technology integration that include IT, positive school culture, teacher collaboration, leadership, professional development, and resources. The participants in this study perceived changes to their teaching and to the learning of their students. The integration of tablets and handhelds made learning accessible. Valstad & Rydland, (2010) states, “The education aim is to not just to make information accessible to students but to make learning accessible” (Valstad & Rydland, 2010, p. 44).
Implications for Practice

The following recommendations offer ways to mitigate any challenges with technology integration and maximize use for students with disabilities.

**Use tablet technology to support teaching and learning in special education**

The students, teachers, and administrators in this study perceived multiple benefits in using tablets and handhelds in special education. A relationship exists between the benefits of students and the benefits to teachers. Tablets and handhelld
easy access to additional materials and resources utilized in teaching and learning. The physical characteristics as well as the increased ability to offer visual representation of content influenced student learning. Tablets and handhelds influenced the learning of students with significant communication and interactive disorders such as autism spectrum disorders and assisted them in a variety of ways. In comparison to previous AT devices and technology, the participants in this study indicated daily and extensive use of tablets and handhelds. The data from this study confirmed that tablets and handhelds are being actively utilized for teaching and learning in the study area. Districts and schools determining budgets for technology can look to this study to find that their dollars were well spent and offered benefits to students and teachers.

**Blend school infrastructures of AT and IT**

The “digital revolution” in schools has further blended the lines between AT and IT as the use of mobile technologies expands in education. Schools that view mobile technologies as tools to assist all students in reaching high levels of achievement provide strong infrastructure that supports the use of technology from a universal perspective. Dual systems of AT and IT further separate the two, often providing “silos” of use. School district policies and procedures can unintentionally contribute to how technology initiatives are “rolled” out in general and special education. An example of this might be in the purchasing of new devices. In special education, federal funding can often contribute to the creation of silos by designating special education devices as different from general education devices. The end result is often the divide between the two systems that further impacts how devices are maintained, updated, and repaired. Blend AT and IT by providing districtwide technology initiatives that offer equitable resources...
and services while acknowledging the unique needs of students and their teachers in special education.

**Combine UDL and technology initiatives**

Schools considering new technology initiatives may find value in incorporating the Universal Design for Learning (UDL) principles. UDL (CAST, 2015) offers a framework for educators to consider when planning instruction that eliminates barriers for all students in a learning environment. The framework focuses on instructional design and removing any barriers in how students learn. It focuses on the why, what and how of learning and is based in brain research. The utilization of this framework when planning instruction will assist educators in understanding the importance of engagement, multiple means of representation and expression (CAST, 2015). This framework, when combined with new school and district technology initiatives, helps teachers with a planning framework for integrating their newly learned skills to benefit all students.

**Consider school supports for technology integration**

The research base as well as the data from this study identified school technology supports that assist in the successful integration of mobile learning technologies. Data from the participants of this study offered suggestions and recommendations for schools utilizing tablets and handhelds with students with disabilities. These implications for practice are grouped into six areas with recommendations from this study.

1. **Strong Leadership, Shared Vision, and Technology Planning**
   - Include professional development focusing on technology integration into school technology plans. Assess teacher needs and use data to determine progress.
   - Plan for consistent device and app use as SWD progress through the grades and schools.
   - Plan and teach digital citizenship.
2. Professional Development

- Plan for leveled professional development for various needs in special education.
- Customize training on devices and apps according to specific student populations.
- Incorporate regular and small bits of professional development in the form of tech tips and practice into teacher collaboration time.

3. Teacher Collaboration

- Provide teacher collaboration by student populations, device or app needs.
- Structure time during the school day or calendar for teacher collaboration on technology integration.
- Seek out opportunities for teacher collaboration and networking via web-based training, groups or social networks, twitter or wiki (Ertmer, 2012).
- Utilize short periods of time during the day when special educators and general educators are working together to model the apps they use for instruction.
- Develop a core group of teachers to include special educators to train and collaborate with other teachers around technology integration. Use this “Vanguard” team to offer professional development as well as immediate support for minor technical difficulties.

4. Quality Technical Support

- Allow special educators the ability to download and update free trial applications.
- Provide financial resources and a quick requisition process for purchasing apps
- Provide IT support for procurement, downloading and updating apps within the special education classroom.
- Inventory devices and apps within the special education classroom.
- Maintain and update Wi-Fi networks to maintain stability.

5. Resource Availability

- Increase ratio of tablets to students especially in classrooms of students with high needs.
• Consider 1:1 ratio for use as a communication device for some students.

6. Positive School Culture

• Consider teacher attitudes and beliefs when planning technology initiatives. Teacher beliefs are connected to whether the technology will assist them in their learning (Ertmer et al, 2012).

Technology is rapidly changing. Schools are trying to keep pace with the technology in society and the tools of their students. With wearable technologies, brain-computer interface, and gamification as potential new technologies in society, schools have a continued need to update their technology integration strategies. Adopting a plan that identifies and provides for technology supports may well overcome barriers that are identified in the research.

Suggestions for Future Research

Further research on the use of assistive technologies in this new era of mobile learning may offer clarity to the field. Further definitions that outline which students, under what conditions, and when to use AT are necessary for special educators. Currently defining AT as any technology used with students with disabilities does not provide the delineation needed in working in rich technology environments.

Research comparing the use of AT between schools that offer 1:1 student tablet initiatives and those that do not may delineate differences that influence the use of AT for students with disabilities. Some participants in this study referenced school-wide tablet initiatives that offered different systems of support than schools without 1:1 tablet initiatives.

The Universal Design for Learning (UDL) model offers educators a framework for planning the elimination of learning barriers in the classroom. Comparison studies
may offer educators more information about the value of such models and their influence on students with disabilities. Examining the learning of students with disabilities in schools that utilize the principles of UDL compared with student learning in schools that offer rich technology environments independent of UDL may offer the field additional information about the benefits of UDL.

In this study, the use of tablets and/or handhelds for students with significant communication needs due to autism spectrum disorders or intellectual disabilities provided a voice to students that enabled them to access new learning. Flewitt et al. (2014) describes a “sense of empowerment” for some of the students that came from the new learning accessed by the use of tablet technology. Future research and case studies that examine students communication prior to their use of tablets and handhelds and after may offer additional insights into how tablet and/or handheld technology helps students break through previous barriers to access new learning.

Conclusion

The data from this study supported technology research literature identifying tablets and handhelds as valuable learning tools for students with disabilities. Data from this study indicated that tablets and handhelds offered access to students and teachers that supported teaching and learning. The ease of use of tablets and handhelds helped special educators to integrate tablets into their instruction. The perceived student benefits from the use of tablets and handhelds in this study were in the areas of motivation, engagement, focus and attention, independence, communication, behavior, and social skills.

Perceived changes to student learning in the areas of pre-academics, cognition, reading, and math were noted by some special educators as well. The data from this
study indicated that after tablet and/or handheld use, the special educators increased their AT use and recommendations for AT services for their students. Data indicated that the teachers and administrators changed how they differentiated, individualized, and remediated as well as how they grouped students for instruction after tablet and handheld use. Tablets and handheld use by the special educators increased their use of instructional strategies specifically the use of visual representation, pictures, and video modeling.

Teachers and administrators reported that tablets and handhelds use has offered them access to AT, instructional materials, and resources that resulted in changes to their efficiency. Teachers and administrators agreed the two systems of AT and IT are coming together causing them to question what is considered assistive technology. The data from this study supported research that confirms the importance of key school technology supports for successful technology integration in education. Implications for practice provide suggestions from the data that will assist school districts to support technology use in special education. Suggestions for future research are given that can expand the research base on technology use in special education.

Increasing and improving access to the general education environment and curriculum has been a long withstanding goal in the education for students with disabilities. Multiple models, devices, and theories have been utilized to try to improve this access. Due to the child-friendly interface, all-in-one characteristic, and ability to make learning “visible”, tablet technology has improved access to both special educators and to students with disabilities. It provided the ability to “break-through” learning that many special educators and students needed to transcend learning barriers. Access for
one student began with having a “voice” that tablets provided; for another student tablets provided the bridge to access higher learning and for another it was the “break-through” tool that caught their interest and pulled them into a new world of learning.
References


CAST.org http://www.cast.org/our-work/about-udl.html#.VTVEBiFViko


Conley, J. (2012, March). Can the iPad address the needs of students with cognitive impairments by meeting IEP goals? In *Society for Information Technology & Teacher Education International Conference 1*, 3986-3990.


Individuals with Disabilities Education Improvement Act, Amendments of 2004, Public Law No. 108-446, § 602, USC 1401.


Appendix C

1. Invitation to participate in survey: Tablets and Handhelds in Special Educa...

You are invited to participate in a research study sponsored by the University of Minnesota examining the use of tablets and/or handhelds in special education within the CESU #11 geographical area of Northwestern Wisconsin.

It will take approximately 15 minutes to complete. Your responses are very important and could lead to improvements in your special education programs and technology practices. Thank you in advance for your time and attention.

How are you using tablets and/or handhelds with your students with disabilities? What applications would you recommend to use with your students? In what ways, if any, has the use of tablets and/or handhelds changed technology use in special education? How are your students benefiting, if at all, from the use tablets and/or handhelds?

You were selected as a participant because you work in one of the following special education groups:

Group #1: Special education teachers and related service providers mostly serving students that meet the same IEP requirements for participation in the Wisconsin Alternate Assessment (WAA-SwD).

Group #2: Special education teachers and related service providers mostly serving students that meet the same IEP requirements for participation in the Wisconsin Knowledge and Concepts Examination (WKCE - SwD).

Group #3: Directors of Special Education/Pupil Services/ Designees

For your time completing this survey, your name will be entered into a drawing for a $250.00 Best Buy gift certificate. (Information at completion of survey)

INFORMATION FOR RESEARCH

Privacy:
This survey is anonymous. The record kept of your survey response does not contain any identifying information about you. There is no way of matching specific individuals with survey responses in this survey. Please do not use student, school or district names.

Confidentiality:
The records of this study will be kept private. Any report generated will not include any information that will make it possible to identify individual respondents. Research records will be stored securely and only the researcher will have access to the records. Your name will not be included on the survey and your information cannot be personally identified when the researcher accesses and analyzes the information gathered during this process.

Voluntary nature of the study:
Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relationships with the University of Minnesota or the school districts in which you are employed. If you decide to participate, you are free to skip answering any question or withdraw at any time without affecting those relationships.

Contacts and Questions:
You are encouraged to contact the researcher or the researcher's advisor if you have any questions.

1. Sue Curtis, Researcher/Doctoral Student, University of Minnesota
   email: curt0002@umn.edu Phone: (715) 222-1701

2. Jean A. King, Ph.D., Advisor, University of Minnesota
   email: king04@umn.edu Phone: (612) 626-1614

If you have any questions or concerns about this study and would like to talk with someone other than the researcher or the researcher's advisor, you are encouraged to contact the Research Subjects' Advocate Line, 5528 Mayo, 420 Delaware Street Southeast, Minneapolis, MN 55455; (612) 626-1650

Note: You may also email the researcher if you need a copy of this survey for your records.
1. I agree to participate in the University of Minnesota research study being conducted by Sue Curtis and sponsored by advisor Dr. Jean King regarding the use of tablets and/or handhelds with students with disabilities.

☐ Yes
☐ No
2. Definitions

Definitions for this study:

A **HANDHELD** is a portable information technology device that typically fits into the hand or palm of the hand. Examples include: iPods, palm pilots, and pocket personal computers. For this study, this definition does NOT include cell phones.

A **TABLET** is a mobile computer larger than a handheld ranging from 7 to 10 inches. It is operated by touching the screen or onscreen keyboard. (Examples: Apple iPad-all versions, Motorola Xoom, Kindle Fire, Galaxy Tab, Nexus, Kindle Fire.) For the purposes of this study, Chromebooks are NOT tablets.

**Assistive Technology Device:** “Assistive technology device means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability.”
(Authority: 20 U.S.C. 1401(1)- IDEA 2004)

**Assistive Technology Services:** “Assistive technology service means any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device. (Authority: 20 U.S.C. 1401(2)- IDEA 2004)
3. Directions

This survey will ask you your opinion on changes, if any, on teaching and learning from the use of tablets and/or handhelds in special education.

This survey will ask you to identify yourself with ONE of the three groups of special educators below. Please choose your group based on your primary role and/or the majority of the students you serve. You will complete this survey with this group or role in mind. These groupings serve to sort the questions only. There are no questions specific to the Wisconsin Knowledge and Concepts Examination (WKCE) or the Wisconsin Alternate Assessment (WAA).

Group #1- Special educators serving WAA-SwD.
This group of special educators primarily serves students that have significant limitations in cognitive functioning, adaptive behavior and academic functioning. The majority of the students served are eligible for the Wisconsin Alternate Assessment (WAA-SwD) as indicated on the student’s IEP. These students generally have a Cognitive Disability; however, students may also be identified with other types of disabilities (e.g., Autism, Traumatic Brain Injury, etc.) Typically the curriculum and daily instruction for these students focuses on knowledge and skills from the Extended Grade Band Standards or Common Core Essential Elements not from the general education curriculum.

Group #2- Special educators serving WKCE-SwD.
This group of special educators primarily serves students that are eligible for the WKCE with or without accommodations. The students are generally served through the general education curriculum, Wisconsin Standards and/or the Common Core Curriculum Standards. Regardless of the setting or the materials used, the focus of instruction is on the general education curriculum and/or standards.

Group #3- Directors of Special Education/Pupil Services and/or Designees.
These special educators and administrators currently are responsible for oversight and supervision of the special education programs, staff and students within their respective buildings or districts.

If you serve students from both groups #1 and #2, choose only one group as you complete this survey. If you are a teacher or related services personnel serving in multiple roles or schools/districts, choose the one group that you work with most often with tablets and/or handhelds.

2. Choose the group that describes the majority of students you serve or your selected role. (See above for information on group definitions.)

- Group #1-Special Educators serving students taking the WAA-SwD/Students receiving alternate curriculum
- Group #2-Special Educator serving students taking the WKCE/Students receiving the general education curriculum
- Group #3-Special Education Director/Pupil Services/Designee
4. Group #1-Special Educators serving WAA-SwD focused on an alternate curricul...

This section asks questions about your use of tablets and/or handhelds for instruction and student learning. It will ask for your recommendations for applications for students and for teachers.

3. What tablet and/or handheld applications would you recommend for use with the students you serve?

1. 
2. 
3. 
4. 
5. 

4. What instructional tablet and/or handheld applications would you recommend for use by staff?

1. 
2. 
3. 
4. 
5. 

5. On average, how often do you use tablets and/or handhelds for the following instructional settings with students with disabilities?

<table>
<thead>
<tr>
<th></th>
<th>No Use</th>
<th>Monthly (1-2 x/mo)</th>
<th>Weekly Use (average 1-3x/wk)</th>
<th>Daily Use (average 1x/day)</th>
<th>Extensive Use (multiple x/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual student instruction/remediation/tutoring</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Small group student instruction/remediation</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Large group student instruction</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Cooperative student groupwork</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Student assessment</td>
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</tr>
</tbody>
</table>
6. On average, how often do you use tablets and/or handhelds in these educational settings/locations with students with disabilities?

<table>
<thead>
<tr>
<th></th>
<th>No Use</th>
<th>Monthly (1-2 x/mo)</th>
<th>Weekly Use (average 1-3x/wk)</th>
<th>Daily Use (average 1x/day)</th>
<th>Extensive Use (multiple x/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Education Classrooms</td>
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<tr>
<td>General Education Classrooms</td>
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<tr>
<td>Unstructured Settings (hallways, lunchrooms, playground, etc.)</td>
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<td></td>
<td></td>
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<tr>
<td>Community Settings</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

7. In what ways, if any, have your students benefited from using tablets and/or handhelds?


8. Please review each instructional skill area and indicate how student learning has changed (decreased or increased) through the use of tablets and/or handhelds.

<table>
<thead>
<tr>
<th></th>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Skills</td>
<td></td>
<td></td>
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<tr>
<td>Cognitive Skills</td>
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<tr>
<td>Social Interaction Skills</td>
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<tr>
<td>Daily Living/Adaptive Skills</td>
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<tr>
<td>Pre-Academic/Academic Skills</td>
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<tr>
<td>Transition/Pre-Employment Skills</td>
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<tr>
<td>Motor Skills</td>
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</tbody>
</table>
9. DIRECTIONS:
Indicate your level of agreement with each statement below. Begin each statement below with the following....The use of tablets and/or handholds with students with disabilities......

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>.....supports the management of behavior</td>
<td>○</td>
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<td>.....supports students in maintaining focus and attention.</td>
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<td>.....supports students in learning at higher levels.</td>
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<tr>
<td>.....improves student progress on IEP goals and objectives.</td>
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<tr>
<td>.....improves motivation for learning.</td>
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</tr>
<tr>
<td>.....improves communication with non-disabled peers.</td>
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<td>○</td>
</tr>
</tbody>
</table>

10. DIRECTIONS:
Indicate your level of agreement with each statement below. Begin each statement below with the following....The use of tablets and/or handholds with students with disabilities......

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>.....supports teachers to differentiate instruction.</td>
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<tr>
<td>.....encourages the additional use of assistive technology applications.</td>
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<td>.....supports inclusion in the general education environment.</td>
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<td>.....creates more opportunities for remediation/intervention.</td>
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<td>.....supports the additional use of pictures and visuals.</td>
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<td>.....supports the additional use of video modeling strategies.</td>
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<td>.....supports the additional use of communication programs/systems.</td>
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<td>.....supports sensory needs.</td>
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</tbody>
</table>
11. What changes, if any, have you made in your instruction of students with disabilities as a result of using tablets and/or handhelds?

12. Compare your use of these instructional technologies/programs before you began using tablets and/or handhelds with your use of instructional technologies/programs after. Indicate how your use has changed (decreased or increased) since using a tablet and/or handheld.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Do Not Use</th>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
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<tbody>
<tr>
<td>Picture/icon communication</td>
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<td>Picture/icon schedules</td>
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<td>Speech to Text</td>
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<td>Text to Speech</td>
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<td>Digital Pictures</td>
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<td>Digital Videos</td>
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<td>Audio Books</td>
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<tr>
<td>Digital Books</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio Recording</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. Compare your use of assistive technology devices, software and programs prior to your use of tablets and handhelds with how often you use them now when answering this question.

Since using tablets and handhelds, my general use of assistive technology with my students has ____________.

<table>
<thead>
<tr>
<th>Use</th>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. Compare how often you would recommend assistive technology services prior to your use of tablets and/or hand handhelds with how often you recommend them now when answering this question.

Since my use of tablets and handhelds, I recommend assistive technology services ____________

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Much Less Often</th>
<th>Less Often</th>
<th>The Same</th>
<th>More Often</th>
<th>Much More Often</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 15. DIRECTIONS: Read each complete statement and indicate your level of agreement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Schools are more in compliance with the intent of IDEA regarding the use of assistive technology for students with disabilities due to the use of tablets and/or handhelds with students with disabilities.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>2. The use of tablets and/or handhelds in education is helping to bring together the systems of general education technology and special education technology.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>3. Every student enrolled in special education should have access to a tablet or handheld.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>4. It is easier to learn assistive technology applications on a tablet and/or handheld than it is on a desktop/laptop computer.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>5. Tablets change the way teachers teach.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>6. Tablets change the way students learn.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>7. My school offers professional development opportunities that help all teachers in the utilization and integration of technology.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>8. There is timely support when teachers experience technology difficulties.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>9. There is quality support when teachers experience technical difficulties.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>10. There is a professional learning community in my school that assists me in learning more about integrating tablet and/or handheld technology into my instruction.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
16. In your opinion, what school supports are necessary for tablet and/or handheld use to be successful for students with disabilities?

17. Is there anything else you would like to share regarding your use of tablets and/or handhelds students with disabilities?
5. Group #2-Special Educators serving WKCE-SwD focusing on general education c...

This section asks questions about your use of tablets and/or handhelds for instruction and student learning. It will ask for your recommendations for applications for students and for teachers.

18. What tablet and/or handheld applications would you recommend for use with the students you serve?

1. 
2. 
3. 
4. 
5. 

19. What instructional tablet and/or handheld applications would you recommend for use by staff?

1. 
2. 
3. 
4. 
5. 

20. On average, how often do you use tablets and/or handhelds for the following instructional settings with students with disabilities?

<table>
<thead>
<tr>
<th></th>
<th>No Use</th>
<th>Monthly (1-2 x/mo)</th>
<th>Weekly Use (average 1-3/wk)</th>
<th>Daily Use (average 1x/day)</th>
<th>Extensive Use (multiple x/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual student instruction/</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>remediation/tutoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small group student instruction/</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>remediation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large group student instruction</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Co-operative student group work</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Student assessment</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>


21. On average, how often do you use tablets and/or handhelds in these educational settings/locations with students with disabilities?

<table>
<thead>
<tr>
<th></th>
<th>No Use</th>
<th>Monthly (1-2 x/mo)</th>
<th>Weekly Use (average 1-3x/wk)</th>
<th>Daily Use (average 1x/day)</th>
<th>Extensive Use (multiple x/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Education Classrooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Classrooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unstructured Settings (hallways, lunchrooms, playground, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Settings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22. In what ways, if any, have your students benefited from using tablets and/or handhelds?

23. Please review each instructional skill area and indicate how student learning has changed (decreased or increased) through the use of tablets and/or handhelds.

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematical Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transition/Employment Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Interaction Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 24. DIRECTIONS:
Indicate your level of agreement with each statement below. Begin each statement below with the following.

**The use of tablets and/or handhelds with students with disabilities**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>___supports the management of behavior.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___supports students in maintaining focus and attention.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___supports students in learning at higher levels.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___improves student progress on IEP goals and objectives.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___improves motivation for learning.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### 25. DIRECTIONS:
Indicate your level of agreement with each statement below. Begin each statement below with the following.

**The use of tablets and/or handhelds with students with disabilities**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>___supports teachers to differentiate instruction.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___encourages the additional use of assistive technology applications.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___supports inclusion in the general education environment.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___creates more opportunities for remediation/intervention.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___encourages the use of cooperative learning strategies.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___improves student access to the general education curriculum.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___supports the use of project based learning strategies.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>___supports personalized learning.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
26. What changes, if any, have you made in your instruction of students with disabilities as a result of using tablets and/or handhelds?

27. Compare your use of these instructional technologies/programs before you began using tablets and/or handhelds with your use of instructional technologies/programs after. Indicate how your use of has changed (decreased or increased) since using a tablet and/or handheld.

<table>
<thead>
<tr>
<th>Digital Graphic Organizers</th>
<th>Do Not Use</th>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Calendars</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Notetaking/Marking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech to Text</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text to Speech</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Pictures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Videos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio books/textbooks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital books/textbooks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio Recording</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

28. Compare your use of assistive technology devices, software, and programs before your use of tablets and/or handhelds when answering this question.

Since using tablets and/or handhelds, my general use of assistive technology with my students has _________.

<table>
<thead>
<tr>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

29. Compare how often you would recommend assistive technology services prior to your use of tablets and/or hand handhelds with how often you would recommend them now when answering this question.

Since my use of tablets and handhelds, I recommend assistive technology services (fill in blank)_________.

<table>
<thead>
<tr>
<th>Much Less Often</th>
<th>Less Often</th>
<th>Stayed the Same</th>
<th>More Often</th>
<th>Much More Often</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**30. DIRECTIONS: Read each complete statement and indicate your level of agreement.**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Schools are more in compliance with the intent of IDEA regarding the use of assistive technology for students with disabilities due to the use of tablets and/or handhelds with students with disabilities.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. The use of tablets and/or handhelds in education is helping to bring together the systems of general education technology and special education technology.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Every student enrolled in special education should have access to a tablet or handheld.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. It is easier to learn assistive technology applications on a tablet and/or handheld than it is on a desktop/laptop computer.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. Tablets change the way teachers teach.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. Tablets change the way students learn.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7. My school offers professional development opportunities that help all teachers in the utilization and integration of technology.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>8. There is timely support when teachers experience technology difficulties.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>9. There is quality support when teachers experience technical difficulties.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>10. There is a professional learning community in my school that assists me in learning more about integrating tablet and/or handheld technology into my instruction.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>11. The use of tablets and/or handhelds with students with disabilities in the general education classroom, &quot;levels the</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
31. In your opinion, what school supports are necessary for tablet and/or handheld use to be successful for students with disabilities?

32. Is there anything else you would like to share regarding the use of tablets and/or handhelds with the students you serve?
6. Group #3-Special Education Director/Pupil Services/Desigee

These questions are directed towards those in a leadership and supervision role. These questions are based on your work with special educators in the school(s) you supervise.

33. What applications would you recommend for use by SPECIAL EDUCATORS for instructional purposes?

1. 
2. 
3. 
4. 
5. 

34. In what ways, if any, have students with disabilities benefited from the use of tablets and/or handhelds?

35. Please review each instructional skill area and indicate how student learning has changed (decreased or increased) through the use of tablets and/or handhelds.

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Interaction Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Living/Adaptive Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Academic Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transition/Pre-Employment Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematical Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
36. **DIRECTIONS:**

Indicate your level of agreement with each statement below. Begin each statement below with the following:

**The use of tablets and/or handhelds with students with disabilities...**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>...supports the management of behavior.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>...supports students in maintaining focus and attention.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>...supports students in learning at higher levels.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>...improves student progress on IEP goals and objectives.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>...improves motivation for learning</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>...improves communication with non-disabled peers.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
37. **DIRECTIONS:**

The following questions ask you to rate your level of agreement with statements relating to instruction.

Indicate your level of agreement with each statement below. Begin each statement below with the following:....The use of tablets and/or handhelds with students with disabilities......

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>.....supports teachers to differentiate instruction.</td>
<td></td>
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<tr>
<td>.....encourages the additional use of assistive technology applications.</td>
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<tr>
<td>.....supports inclusion in the general education environment.</td>
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<tr>
<td>.....creates more opportunities for remediation/intervention.</td>
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<tr>
<td>.....encourages the use of cooperative learning strategies.</td>
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<tr>
<td>.....improves student access to the general education curriculum.</td>
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<tr>
<td>.....supports the use of project-based learning strategies.</td>
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<tr>
<td>.....supports personalized learning.</td>
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<tr>
<td>.....supports the additional use of pictures and visuals.</td>
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<tr>
<td>.....supports the additional use of video modeling strategies</td>
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<tr>
<td>.....supports the additional use of communication programs/systems.</td>
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<tr>
<td>.....supports sensory needs.</td>
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</tbody>
</table>

38. **What school supports, in your opinion, are necessary for tablet and/or handheld use to be successful for students with disabilities?**
39. Compare the use of these instructional technologies/programs by special educators before their use of tablets and/or handhelds with their use of these technologies/programs after. Indicate how their use has changed (decreased or increased) since using tablets and/or handhelds.

<table>
<thead>
<tr>
<th>Technology</th>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture/Icon Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Picture/Icon Schedules</td>
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<tr>
<td>Speech to Text</td>
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<tr>
<td>Text to Speech</td>
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<tr>
<td>Digital Pictures</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Digital Videos</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Audio books/textbooks</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Digital books/textbooks</td>
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<tr>
<td>Digital Graphic Organizers</td>
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<tr>
<td>Digital Calendars</td>
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<tr>
<td>Digital Notetaking/Marking</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio Recordings</td>
<td></td>
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</tr>
</tbody>
</table>

40. Consider the use of assistive technology devices, software and programs prior to the use of tablets and/or handhelds when answering this question.

Since using tablets and/or handhelds, the use of assistive technology by special educators serving students with disabilities has _________.

<table>
<thead>
<tr>
<th>Significantly Decreased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
<th>Increased</th>
<th>Significantly Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

41. Compare how often special educators recommend assistive technology services prior to their use of tablets and/or handhelds with how often they recommend them now when answering this question.

Since the use of tablets and/or handhelds, special educators recommend assistive technology services ________(fill in blank)_________.

<table>
<thead>
<tr>
<th>Much Less Often</th>
<th>Less Often</th>
<th>The Same</th>
<th>More Often</th>
<th>Much More Often</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tbody>
</table>
42. What changes, if any, have special educators made in their instruction of students with disabilities as a result of using tablets and/or handhelds?

43. DIRECTIONS: Read each complete statement and indicate your level of agreement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Schools are more in compliance with the intent of IDEA regarding the use of assistive technology for students with disabilities due to the use of tablets and/or handhelds with students with disabilities.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. The use of tablets and/or handhelds in education is helping to bring together the systems of general education technology and special education technology.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Every student enrolled in special education should have access to a tablet or handheld.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. It is easier to learn assistive technology applications on a tablet and/or handheld than it is on a desktop/laptop computer.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. Tablets change the way teachers teach.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. Tablets change the way students learn.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7. The use of tablets and/or handhelds with students with disabilities in the general education classroom, &quot;levels the playing field&quot; and offers the supports that reduce the barriers to student learning.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
44. What general recommendations do you have for Directors of Special Education/Pupil Services/Designees initiating a tablet and/or handheld program in their schools?

45. Is there anything else you would like to share regarding the use of tablets and/or handhelds students with disabilities?
7. Section #5: Demographics

Demographic information will assist in understanding differences, if any, in the categories of special educators and administrators using tablets and/or handhelds with students with disabilities.

46. Which answer best describes your role?

- Special Education Teacher (Severe and profound disabilities eg. CDS, Blind, Deaf, Autism, etc)
- Special Education Teacher (Mild to Moderate disabilities eg. LD, CDB, EBD, OHI, Autism, etc)
- Special Education Teacher: (Autism)
- Special Education Teacher (Deaf/Hard of Hearing)
- Special Education Teacher (Blind/Low Vision)
- Special Education Teacher (Early Childhood)
- Speech and Language Pathologist/Therapist/Teacher
- Occupational Therapist
- Physical Therapist
- Director of Special Education/Pupil Services/Designee
- Other (please specify)

47. What is the highest degree that you hold?

- Bachelors Degree
- Masters Degree
- Education Specialist
- Doctoral Degree

48. When was the last University Class or class for college credit that you have taken?

- Within this past year
- 1 to 2 years ago
- 3 to 5 years ago
- 6 to 10 years ago
- 11 to 20 years ago
- 20+ years ago
49. What is the approximate total district student enrollment in the district in which you are primarily employed?

- Small (Under 499 students)
- Small-Medium (500 to 1000)
- Medium (1001 to 2500 students)
- Medium-Large (2501 to 4000 students)
- Large (4001 and above)
- I am employed by multiple districts or CES#11

50. Teachers/Related Services Personnel: Check each grade level of the students in your assignment(s). (May choose more than one.)

Directors/Supervisors/Designees: Check the grade levels of students you supervise.

- PreK
- K
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Grade 6
- Grade 7
- Grade 8
- Grade 9
- Grade 10
- Grade 11
- Grade 12
- Grade 13+
51. Check all student disabilities served in your current program/assignment?

- Specific Learning Disabilities
- Cognitive Disabilities-Borderline or Mild/Moderate
- Cognitive Disabilities-Severe
- Significant Developmental Delay
- Emotional/Behavioral Disabilities
- Speech and Language Impairment
- Other Health Impairments
- Orthopedic Impairments
- Low Vision
- Blind
- Hearing Impaired
- Deaf
- Traumatic Brain Injury
- Autism-Severe Profound
- Autism- Mild/ Moderate (eg, Aspergers)

52. Which category below includes your age?

- 20-29 years old
- 30-39 years old
- 40-49 years old
- 50-69 years old
- 60-69 years old
- 70+ years

53. Which category below includes the number of years you have been working with students with disabilities?

- This is my first year as a teacher
- 1-3 years
- 4-10 years
- 11-20 years
- 21-30 years
- 31+ years
8. Certificate of Completion! Thank You!

Thank you for completing this survey on tablets and/or handheld use with students with disabilities.

Your information will help in understanding the current status of tablet and/or handheld use in our area of Northwestern Wisconsin. Your opinions will also help shape the future use of tablet and handheld technology with your fellow educators.

To thank you for your assistance you are now eligible for a drawing to win a $250.00 Best Buy Certificate.

Print, copy or scan this page with your completed information. (By printing this page you do not reveal any survey information to me. You can be assured that your information cannot be traced back.)

All entries received by May 1st, 2014 will be included in the drawing.

Name:
Telephone Number(s): Daytime/Evening
Email Address:

Send your copy or scan either by email or US mail to:

US Mail: Sue Curtis 1101 37th Street Hudson, WI 54016

Email: Curt0002@umn.edu
9. Survey Exit

You have chosen to exit this survey by checking that you do NOT agree to participate in this research survey. We appreciate your time and attempt.

If your choice was in error, you may return to the survey link and try again. It may be necessary to visit the link from another computer and browser.

Thank You.
Appendix D
Semi-structured Interview Question Guides

Group #1 and #2: Special educators

1. Please share your name, your position, the type of tablet and/or handheld you utilize with students with disabilities and for how long.

2. What tablet and/or handheld applications are you currently utilizing with students with disabilities? What top applications would you recommend to a teacher new to tablets and/or handhelds in a similar position?

3. Tablets have been purchased in record numbers by school districts for use in special education. Share why you think this is happening.

4. What does access to tablets and/or handhelds mean for you and your students?
   a. Share a story about student learning using a tablet or handheld with students with disabilities within the special education environment.
   b. Share a story about student learning of using a tablet or handheld with students with disabilities within the general classroom environment.
   c. What changes/differences, if any, have you noticed in students with disabilities from their use of tablets and/or handheld and its applications?
   d. Share a story about how the use of tablets and/or handhelds has changed, if at all, your instruction of students with disabilities.
   e. How have these changes benefited, if at all, the learning of your students?
5. Compare your current use of tablets and/or handhelds with your past use of technology and/or assistive technology devices, software or services with students with disabilities. What are the changes/differences, if any, in the following?

a. The ease of use of devices, software or assistive technology services.
b. How often (frequency) you utilized assistive technology devices or services with students with disabilities.
c. The frequency of your recommendations for assistive technology services or devices.
d. Your instructional practices.

<table>
<thead>
<tr>
<th>Changes/Differences</th>
<th>Before Tablets/Handhelds Past Use of AT Services/Devices</th>
<th>After Tablets/Handhelds Current Use of AT Services/Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of Use (device, software, AT services)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of Use of AT devices or services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of recommendations for AT services/devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your instructional practices</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. How have these changes/differences benefited, if at all, the learning of your students?

7. What school sponsored supports are necessary for the successful use of assistive technology with students with disabilities? (see list for possibilities)

**School Supports for Technology Integration**

- Strong Leadership, Shared Vision and Technology Plan
- Professional Development
- Teacher Collaboration
- Quality Technical Support
- Resource Availability
- Positive School Culture

8. Share an example or story of how a school or district has successfully provided one or more of these supports resulting in the successful integration of technology for students with disabilities.
9. Are there any other thoughts you would like to add regarding the use of tablets and handhelds with students with disabilities?

Semi-structured Interview Question Guide

Group # 3 Directors of Special Education/Pupil Services/Designees

1. Please share your name, your position and the types of tablets and handhelds in use within the programs you supervise.

2. Tablets have been purchased in record numbers by school districts for use in special education. Share why you think this is happening.

3. Consider a time when you observed tablets and/or handhelds being utilized with a student with a disability.
   a. What were the instructional benefits, if any, that you observed?
   b. What were the student learning benefits, if any, that you observed?

4. Consider teacher use of assistive technology with students with disabilities prior to the time of tablets and handhelds and currently with the use of tablets and handhelds. What are the changes/differences, if any, in the following:
   a. The frequency in your teacher or classroom observations in which assistive technology was utilized with students with disabilities.
   b. The ease of use in which teachers were learning and utilizing assistive technologies.
   c. The number of requests for assistive technology services and/or devices by teachers.
   d. Instructional practices of teachers.

<table>
<thead>
<tr>
<th>Changes/Differences</th>
<th>Before Tablets/Handheld Use</th>
<th>After Tablet/Handheld Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT use with SwD-frequency</td>
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<td></td>
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<tr>
<td>Ease of use (learning and using) AT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requests for AT service and/or devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Instructional Practices</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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5. How have these changes/differences benefited, if at all, the learning of students with disabilities?

6. What school sponsored supports are necessary for the successful use of assistive technology with students with disabilities? (see list for possibilities)

**School Supports for Technology Integration**
- Strong Leadership, Shared Vision and Technology Plan
- Professional Development
- Teacher Collaboration
- Quality Technical Support
- Resource Availability
- Positive School Culture

7. Share an example or story of how a school or district has successfully provided one or more of these supports resulting in the successful integration of technology for students with disabilities.

8. Are there any other thoughts you would like to add regarding the use of tablets and/or handhelds with students with disabilities from your perspective as a supervisor?