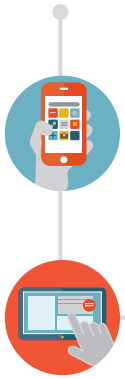

Use and perceptions of **mobile applications** and **technologies** by those interested in **SPECIAL EDUCATION**

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ABSTRACT

Research has documented the potential positive impact of mobile devices and apps across multiple formal and informal learning environments. Less is known about the role of mobile technologies for the use of engaging learners with special needs or disabilities. The purpose of this report is two-fold:

1. to describe the findings from a review that was conducted examining literature at the intersection of mobile technologies and special education; and
2. to present results from a survey that was disseminated to learn more about technology and mobile app use by those interested in or working in special education.

The literature review produced findings supporting the role of mobile device and app use in special education, but also demonstrated a critical and urgent need for more research and development. The survey results pointed to a dearth of professional development related to apps for special education and a need for better policy, research, and practice regarding training, creation, and access to such tools. The report ends with a description of an open-access, collaborative database for professionals called *SpedApps* (http://spedapps.kent.edu).

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OR

Ferdig, R.E., Pytash, K.E., Kosko, K.W., Gandolfi, E., & Mathews, R. with Bedesem, P., Harjusola-Webb, S., Sansosti, F., Lu, C.C, Kratcoski, A., Mulvey, B., and Boyle, S. (2016). *Use and perceptions of mobile applications and technologies by those interested in special education*. Kent, OH: Kent State University. Retrieved from http://spedapps.kent.edu/2016survey.pdf.

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EXECUTIVE SUMMARY

Mobile technologies have become ubiquitous in personal use and—in some cases—to reach educational objectives. Research has provided some evidence that mobile apps and devices are also being used to support learners with special needs and disabilities. There were two goals of this research study.

First, a literature review was conducted to examine peer-reviewed, research articles at the intersection of mobile technology and special education. The articles were then synthesized into 7 literature review findings.

LR1 Mobile technology can provide multiple avenues for representation, expression, and engagement.

LR2 Mobile technology can teach and reinforce communication skills.

LR3 Mobile applications can help students navigate and manage tasks in a variety of environments including school, work, and informal settings.

LR4 Designers often develop mobile applications with particular theoretical and pedagogical views of disabilities.

LR5 Mobile technology can bridge school and home environments.

LR6 Mobile technology can be beneficial to educators; however, teacher education and professional development are necessary for effective implementation.

LR7 More research is needed at the intersection of mobile technology and special education.

Second, a survey was disseminated and data were collected regarding the beliefs towards and the use of technology and mobile apps/devices by those interested in special education. The data outcomes were then synthesized into 17 research findings.

RF1 Many education professionals have still not received any formal training in the use of technology for instructional purposes.

RF2 A majority of those responding to the survey indicated a desire to receive more formal training in the use of technology for instructional purposes.

RF3 There may be misperceptions about what counts as being an innovator or early adopter of technology in general and special education.

RF4 General and special education teachers' use of technology varies according to the affordances and constraints of the technology and the personal, administrative, or instructional goals of the teacher.

RF5 General and special education teachers differ in what technologies they use for instructional purposes; general education teachers report using technology more often than special education teachers.

RF6 An unhealthy number of participants have not received training of any kind in the use of apps for instructional purposes; however, a majority would like to use apps more often.

RF7 Special educators and therapeutic professionals are more likely than others in education to have used mobile devices to support students with special needs; however, app use with special needs learners is not the norm.

RF8 General and special education teachers use apps for personal and administrative use; there is very limited instructional implementation beyond some use of web browsing, mathematics, and literacy apps.

RF9 Special education teachers are more likely than general education teachers to use apps for social media use, content area acquisition, and IFSP/IEP planning or implementation.

RF10 Special education teachers are more likely to believe in the value of mobile apps for special education, but are also more realistic about its current availability and use; neither special nor general education teachers feel strongly prepared to use them.

RF11 Teacher educators and pre-service teachers differed in their beliefs about the use of mobile apps to support students with special needs; teacher educators more strongly valued the possibilities while pre-service teachers believed more in their current use.

RF12 Therapeutic professionals value mobile devices and apps for their potential for students with special needs, but they want more professional development and are cautious in their assessment of what exists.

RF13 Administrators strongly value the potential role of technology and mobile apps; however, they see less actual use by and availability to such tools from district/center teachers and therapeutic professionals.

RF14 Parents value the role of technology in the lives of their students who have special needs; they are uncertain about the availability of such devices.

RF15 Those interested in special education and mobile applications are most likely to find apps through friends and social networks.

RF16 Those interested in special education and mobile applications are excellent resources to find information about useful apps.

RF17 Age does not really make a difference in the use of mobile apps and devices for those interested in special education.

Given the literature review synthesis as well as the analyses of the survey data, three important implications are recommended:

- **There needs to be more professional development for all personnel working at the intersection of mobile technologies and special education.**
- **There needs to be more research at the intersection of mobile technologies and special education.**
- **There needs to be more access to tools at the intersection of mobile technologies and special education.**

A team of researchers at Kent State University was partially funded by a corporate gift from AT&T to create a project called ***SpedApps*** to respond to these critical needs. In addition to conducting research on the use of apps and building new apps, the research team created an online database of apps (available online at: http://spedapps.kent.edu). These apps contain objective editor reviews of apps created to meet student learning needs and disabilities or content area acquisition objectives. Perhaps one of the most important parts of the website is the opportunity for researchers, educators, parents, administrators, teachers, IT staff, and therapeutic professionals to join the discussion to provide their own research and practice-based experiences using apps for special education.

INTRODUCTION

Technology has the potential to *support* all learners. However, technology is not necessarily *accessible* to all learners. There are obvious cases where technologies are created to support learners with special needs (e.g. Bausch, Ault & Hasselbring, 2015). However, in many cases technology must be retrofitted to meet the diverse needs of all learners (Sanchez-Gordon & Luján-Mora, 2016). The same is true with mobile devices and apps.

Research has provided evidence that mobile technology provides educators and students many affordances when teaching and learning in educational settings. Scholars have investigated the ease of personalized and collaborative learning with mobile devices, as well as an increase in students' motivation (Al-Hmouz, Shen, Yan, & Rami Al-Hmouz, 2010; Alvarez, Alarcon, & Nussbaum, 2011; Chiang, Yang & Hwang, 2014). Educators also note that mobile technology allows for teaching and learning to occur in informal settings (Jones, Scanlon, & Clough, 2013).

However, researchers, educators, and developers must take into account a number of considerations when implementing technology for learners, particularly when teaching students with disabilities or special needs. For instance, researchers have noted that mobile applications are typically used on small screens with limited capabilities (Prasad Babu, Sukesh, & Deepika, 2014). In addition, with the massive quality of mobile applications available, practitioners must continually evaluate which applications are most appropriate for supporting students' learning given their individual needs and the capabilities of each app (Green, Hechter, Tysinger, & Chassereau, 2014).

The constraints and affordances of mobile technology in learning environments prompted an investigation into research focused on mobile technology for students with special needs. This study was completed in two parts. First, a literature review was conducted to learn more about what the field knows regarding mobile technologies and special education. Second, a survey was disseminated to gain more information from actual users of mobile devices in special education settings. This report describes findings from both activities and then concludes with implications for research, policy, and practice.




LITERATURE REVIEW

A literature review was conducted to learn more about existing research on mobile technologies and special education. A search was conducted by using the following databases and search engines: Google Scholar (https://scholar.google.com/), LearnTechLib (https://www.learntechlib.org/), and Discovery@Kent State (http://libguides.library.kent.edu/Discovery). Additionally, searches were completed using the Association for Computing Machinery's (ACM) Digital Library (http://dl.acm.org), and the Institute of Electrical and Electronics Engineers (IEEE) Xplore Digital Library (http://ieeexplore.ieee.org/Xplore/home.jsp). The reference lists of the articles retrieved were also examined in order to find further contributions not identified in the targeted databases.

The databases and online tools were explored using terms like: "special education", "special needs", "mobile learning", "apps", "informal learning", "mobile design", "mobile rubrics", "disabilities", and "mobile testing". Search terms were searched both alone and in combination with other terms; only contributions written in English were considered.

A final step in the review process involved the creation and dissemination of a special issue of a journal. Several members of the *SpedApps* research team at Kent State University completed a guest editorship for *Interaction and Architectures (IxD&A)* on the topic of 'Mobile Learning and Special Education' (Gandolfi, Ferdig, Bedesem, & Lu, 2016). The issue was proposed and completed given the relative dearth of knowledge found in the initial stages of the literature review. The articles and guest editorial provided new findings on the topic that helped situate and contextualize the field as well as add new articles to the reference list.

Once the database searches were completed, the articles were read and synthesized to collect a set of findings. The seven literature review (LR) findings listed here provide specific considerations for administrators, educators, paraprofessionals, and parents working with students with disabilities.

LR1 Mobile technology can provide multiple avenues for representation, expression, and engagement.

(Amudha, Nandakumar, Madhura, Reddy, & Kavitha, 2015; Cantón, González, Mariscal & Ruiz, 2012; Carrington, Hurst, & Kane, 2014; McNaughton & Light, 2013; Puccini, Puccini, & Chang, 2013; Reid, Strnadova, & Cumming, 2013).

Educators note students with disabilities need opportunities to learn through multiple modalities (Amudha, Nandakumar, Madhura, Reddy, & Kavitha, 2015). Researchers have found mobile technology can provide multisensory learning opportunities (Puccini, Puccini, & Chang, 2013; Reid, Strnadova, & Cumming, 2013). These varying ways to interact with the material provides students with disabilities a range of ways to learn content and skills.

Researchers have specifically looked at the various interfaces that allow users to engage with devices through speech inputs, touch, or swiping movements. Specifically, studies explore learning when students engage with technology that has gesture-based interfaces, therefore providing touch gestures or touchless gestures (Cantón, González, Mariscal & Ruiz, 2012). These multiple ways of interacting, engaging and learning through mobile technology provides extensive opportunities for students with disabilities.

LR2 Mobile technology can teach and reinforce communication skills.

(Goulart, Castillo,Valado, Caldeira,Trauernicht, Bastos-Filho, 2014; Marco, Cerezo, & Baldassarri, 2013).

When working with students who have particular communicative learning needs such as students with autism, mobile technology can provide opportunities for them to interact with their environment and the people in their environment (Goulart, Castillo, Valado, Caldeira, Trauernicht, Bastos-Filho, 2014). Researchers have found mobile technology can, therefore, teach and reinforce the communicative skills necessary for learning (Marco, Cerezo, & Baldassarri, 2013).

LR3 Mobile applications can help students navigate and manage tasks in a variety of environments, including school, work, and informal settings.

(Blood, Johnson, Ridenour, Simmons, & Crouch, 2011; Brown, McHugh, Standen, Evett, Shopland, & Battersby, 2011; Bereznak, Ayres, Mechling, & Alexander, 2012; Cihak, Kessler, & Alberto, 2007; Cihak, Kessler, & Alberto, 2008; Cihak, Wright, & Ayres, 2010; Cihak, Fahrenkrog, Ayres & Smith, 2010; Davies, Stock, & Wehmeyer, 2002; Davies, Stock, Holloway, & Wehmeyer, 2010; Epstein, Willis, Conners & Johnson, 2001; Fage, Pommereau, Consel, Balland & Sauzeon, 2014; Gulchak, 2008; Mechling, Gast, & Fields, 2008; Mechling, Gast, & Seid, 2009; Mechling, Gast, & Seid, 2010; Mechling & Savidge, 2011; Mechling & Seid, 2011; Hammond, Whatley, Ayres, & Gast, 2010; Van Laarhoven, Johnson, Laarhoven-Myers, Grider, & Grider, 2009).

Researchers have documented the ways mobile applications can be used to effectively support students as they manage their daily activities and independently complete tasks in classroom and mainstream environments (Blood, Johnson, Ridenour, Simmons, & Crouch, 2011; Cihak, Wright, & Ayres, 2010; Cihak, Fahrenkrog, Ayres & Smith, 2010; Epstein, Willis, Conners & Johnson, 2001; Fage, Pommereau, Consel, Balland & Sauzeon, 2014; Gulchak, 2008; Mechling, Gast, & Fields, 2008; Mechling, Gast, & Seid, 2009; Mechling, Gast, & Seid, 2010; Hammond, Whatley, Ayres, & Gast, 2010).

In addition, as students transition into vocational settings, researchers have found mobile technology can support students as they accomplish vocational tasks (Bereznak, Ayres, Mechling, & Alexander, 2012; Cihak, Kessler, & Alberto, 2007; Cihak, Kessler, & Alberto, 2008; Davies, Stock, & Wehmeyer, 2002; Mechling & Savidge, 2011; Van Laarhoven, Johnson, Laarhoven-Myers, Grider, & Grider, 2009).

Finally, mobile technology can help students navigate environment in informal learning settings. For example, researchers have explored how using location-based technology can engage individuals with disabilities in life-long learning through travel (Brown, McHugh, Standen, Evett, Shopland, & Battersby, 2011; Davies, Stock, Holloway, & Wehmeyer, 2010; Mechling & Seid, 2011).

LR4 Designers often develop mobile applications with particular theoretical and pedagogical views of disabilities.

(Alper, Hourcade, & Gilutz, 2012; Azenkot, Prasain, Borning, Fortuna, Ladner & Wobbrock, 2011; Dawson, Antonenko, Sahay, & Lombardino, 2016; Fernández-López, Rodríguez-Fórtiz, Rodríguez-Almendros & Martínez-Segura, 2013; Gkatzidou, Pearson, Green, & Perrin, 2011; Madeira, Macedo, Reis, & Ferreira, 2014; Park, Goh, & So, 2015; Rello, Bayarri &Gorriz, 2013; Wobbrock, Kane, Gajos, Harada, & Froehlich, 2011).

It is important for educators to recognize that apps are designed with specific theoretical and pedagogical perspectives in mind. A number of studies have documented how mobile apps were conceptualized and designed.

Researchers discuss how design-based decisions are concerned with how individuals with specific disabilities engage and learn with apps, both cognitively and physically based on their disability (Alper, Hourcade, & Gilutz, 2012; Fernández-López, Rodríguez-Fórtiz, Rodríguez-Almendros & Martínez-Segura, 2013; Madeira, Macedo, Reis, & Ferreira, 2014). In these studies, designers and educational researchers work together to investigate the ways people with specific disabilities engage with mobile technology as a means for informing the field and providing recommendations for future technology development (Park, Goh, & So, 2015; Rello, Bayarri & Gorriz, 2013).

Designers and developers must therefore be mindful of considering people's disabilities before the design process begins to create a more inclusive and responsive platform. Some researchers, scholars, and game designers are using the term *ability-based design* as they re-conceptualize how technology can be designed from the beginning of the design process to focus on the individuals' abilities, rather than their disabilities (Wobbrock, Kane, Gajos, Harada, & Froehlich, 2011, p. 12). Other scholars refer use the term *person-centered multimedia computing* to promote the idea that developers need to understand people with disabilities' needs to truly create multimedia that is effective and engaging for people with disabilities (Panchanathan, McDaniel, & Balasubramanian, 2012).

Furthermore, some scholars view this work as participatory design opportunities (Alper, Hourcade, & Gilutz, 2012). For example, scholars involved in projects such as *Widgets for Inclusive Distributed Environment* (WIDE) extend this notion by inviting students with disabilities into the design process. This participatory scholarship positions students as designers, as well as users, of technology (Gkatzidou, Pearson, Green, & Perrin, 2011).

This is critical knowledge for teachers; how developers perceive certain disabilities will influence how they conceive and develop particular apps (Dawson, Antonenko, Sahay, & Lombardino, 2016). Therefore, teachers need to make sure their instructional goals align with the pedagogy of the app.

LR5 **Mobile technology can bridge school and home environments.**
(Beecher & Buzhardt, 2016; Carey, Friedman, Bryen, 2005; Judge, Floyd, & Jeffs, 2015).

Mobile technology provides students opportunities to learn across multiple environments. Researchers note that using mobile technology at home can increase parent engagement in students' learning (Beecher & Buzhardt, 2016; Judge, Floyd, & Jeffs, 2015).

Educators know the importance of learning in the home environment extends into adulthood. Although the percentages of adults with disabilities who use technology is lower than adults without disabilities, technology can also provide opportunities for adults with disabilities to have continued learning (Carey, Friedman, Bryen, 2005). Researchers do note, however, that while technology use can increase parents' and caretakers' engagement, technology use in the home is indicative of the perceptions of those people who socially support the individual with a disability. If those people who support the individual do not see the value of technology, it is likely the person with the disability may not use or engage frequently with technology.

LR6 **Mobile technology can be beneficial to educators; however, teacher education and professional development are necessary for effective implementation.**
(Balderaz & Rosenblatt, 2016; Mariani & Spallazzo, 2016; McMahon & Walker, 2014; Rivera, Jabeen & Mason, 2016).

Mobile devices can offer educators specific affordances such as flexibility when designing instruction for multiple students and ease of differentiating instruction (McMahon & Walker, 2014; Rivera, Jabeen & Mason, 2016). In order to know how to effectively implement mobile technology in the classroom, teachers need educational experiences during teacher education programs and in professional development (Balderaz & Rosenblatt, 2016).

And, while teachers are teaching with technology, mobile technology can also be used to prepare people, including educators, for better understanding the needs of students with disabilities (Mariani & Spallazzo, 2016).

LR7 **More research is needed at the intersection of mobile technology and special education.**
(Kagohara et al., 2013; Stendal, 2012).

Research specifically examining mobile technology in learning environments with students with disabilities has found many benefits, including the learning of skills such as, communication, employment, transitioning, leisure, and academics (Ayres, Mechling, & Sansosti, 2013; Kagohara, et al., 2013; Mechling, 2011). Researchers have also noted the value of using mobile devices for self-monitoring in inclusive settings (Bedesem & Dieker, 2014). Finally, special education researchers have documented the use of mobile devices for task completion and task performance (Sansosti and Bedesem, 2015).

However, with the growth of 1:1 technology implementations as well as the increased use of assistive technologies, there is an urgent need for additional research focused on how students with disabilities and special needs *learn to use* technology and how they *learn with technologies* like mobile applications (Walser, Ayres, & Foote, 2012). Currently, too few studies include empirical data and those that do often have small sample sizes making generalization difficult (Kagohara et al., 2013; Stendal, 2012). Research is needed to leverage the benefits of mobile technology while exploring new possibilities for teaching and learning.

Literature Review Summary

A review of the literature related to special education and mobile technologies supports the notion that mobile technologies are not only useful for general audiences but also for students with special needs and disabilities. Mobile devices and apps can be useful for communication, engagement, and school and life-based tasks. They can also be useful in both formal and informal environments, helping learners, parents, and educators bridge home and school environments.

However, there are some caveats to these benefits. First, professional development is necessary for effective implementation in home, school, and other professional settings. Parents, educators, and therapeutic professionals cannot simply rely on the device or the app to effectively engage the learner, particularly as designers may have their own views of special needs, disabilities, and accessibility. Second, although the research is promising, it is still limited in scope. More research is needed to explore if, when, and how mobile devices can be effectively used for special education and with what audiences.

RESEARCH STUDY

Given both the ubiquity of mobile technologies and yet the relative dearth of research-knowledge, a study was created to learn more about app use. The study consisted of a survey that was created by the *SpedApps*[2] team at Kent State University with support from the project's internal and external advisory boards. The goal was to learn more about perceptions and use of mobile technologies by PreK-12 general and special education teachers, therapeutic professionals, parents of children with special needs, administrators, and others who might address special education in their personal and professional lives.

The survey is available in Appendix A. It was disseminated through multiple national and international email lists (e.g. email lists of national organizations). It was also distributed to pre-service and in-service teachers, parents, administrators, and therapeutic professionals through network connections of faculty, staff, and advisory board members.

General Results and Demographics

A total of 683 respondents began the survey in fall, 2015; 619 of those participants completed the survey. A general description of the participants and related findings are presented, followed by a more comprehensive analyses and discussion of each finding.

Consistent with many findings and surveys related to education, respondents were mostly female (503; 81.58%) and white (n=565; 91.42%; see Table 1). Participants ranged in age from 19 to 72 with a mean age of 40.84 (sd = 13.21). There were a high number of participants in the 20 to 24 age range given the inclusion of pre-service teachers (n=95; 15%; see Chart 1). Survey respondents mainly came from the United States. A majority of those willing to take the survey came from Ohio and Florida, which is not surprising given the location and background of the *SpedApps* personnel and board members (see Figures 1 and 2).

RACE	FREQUENCY	PERCENT
White/Caucasian	565	91.42
African-American	11	1.78
Hispanic/Latino/Latina	22	3.56
Asian/Pacific Islander	10	1.62
Native American	2	.32
Other	8	1.29
Total	*618*	*100.0*

Table 1 Race distribution of participants.

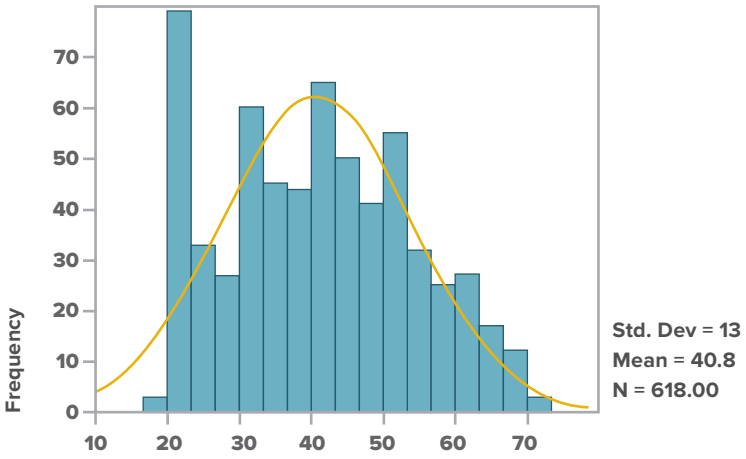


Chart 1 Frequency distribution of ages for survey respondents.

[2] http://spedapps.kent.edu

Figure 1 Worldwide geographic distribution of survey respondents.

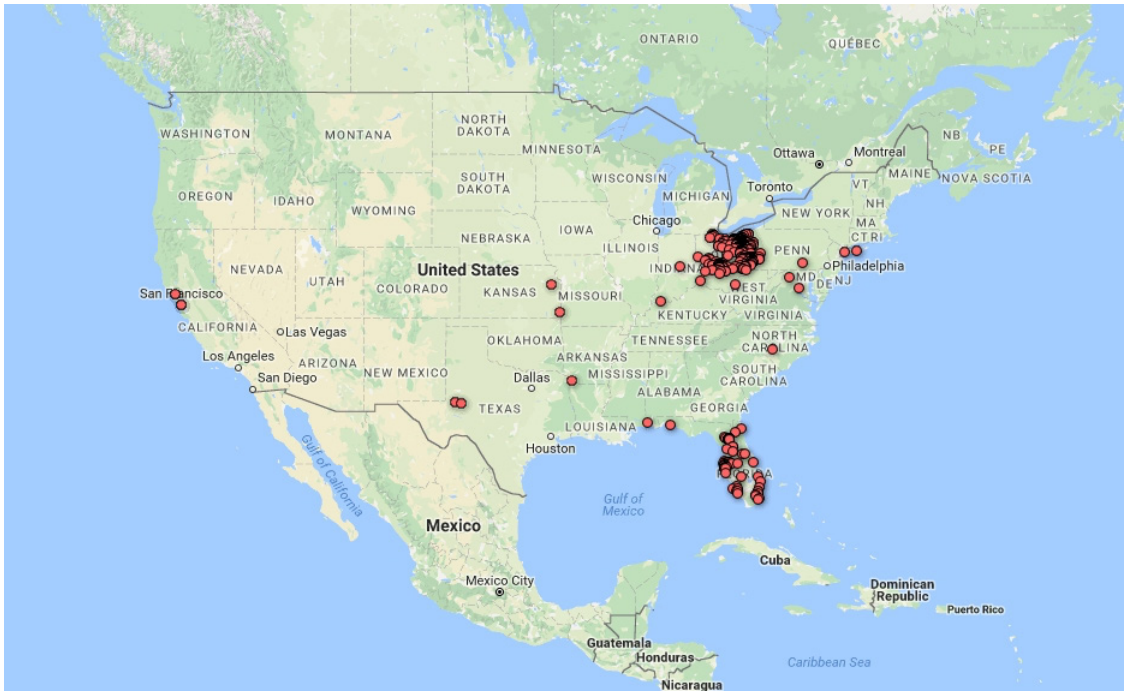


Figure 2 Geographic distribution of respondents within the United States.

The main goal of the survey was to reach educators working or interested in special education. This audience would include pre-service and in-service teachers in both general and special education PreK-12. However, the survey was also sent through communication channels that included therapeutic professionals, administrators, parents, and others interested in the topic. A distribution of roles is presented in Table 2. The highest level of education obtained by the participants is presented in Table 3. Participants worked across the entire Pre-K to postsecondary spectrum (Chart 2).

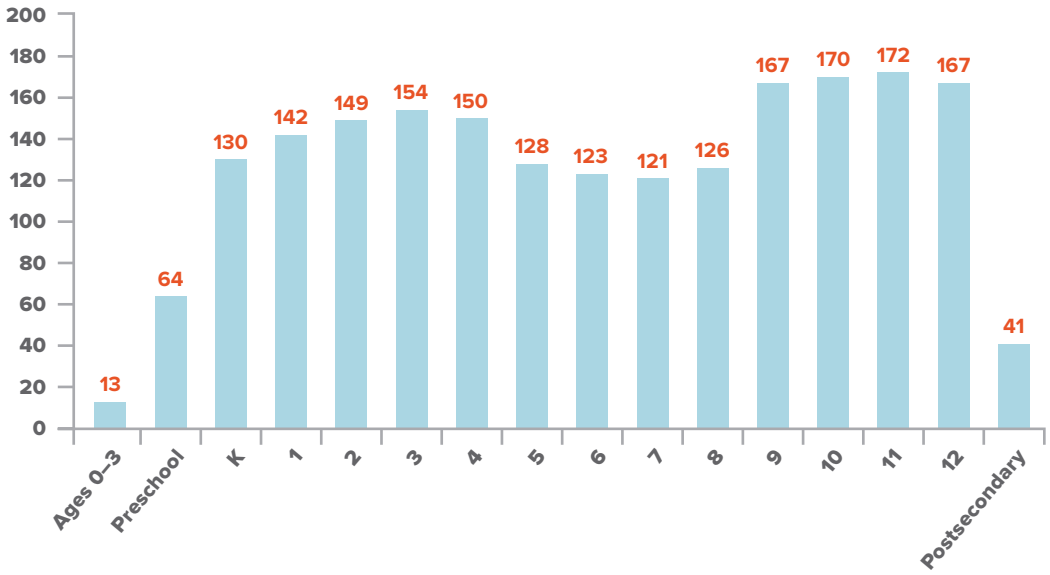
Table 2 Distribution of survey participants by role.

CURRENT ROLE	FREQUENCY	PERCENT
General Education Teacher	187	30.26
Special Education Teacher	164	26.54
Teacher Educator	47	7.61
Administrative (Non-Therapeutic Support)	43	6.96
Parent/Caregiver	10	1.62
Therapeutic Professional	87	14.08
IT Professional	5	.81
Student or Pre-service Teacher	55	8.90
Other	20	3.24
Total	*618*	*100.0*

Table 3 Distribution of survey participants by highest degree obtained.

HIGHEST DEGREE OBTAINED	FREQUENCY	PERCENT
Associate's Degree	50	8.09
Bachelor's Degree (B.A.; B.S.)	152	24.60
Master's Degree (M.A; M.Ed.)	317	51.29
Educational Specialist Degree (Ed.S.)	10	1.62
Doctoral Degree (Ed.D.; Ph.D.; Psy.D.)	25	4.05
Other	60	9.71
Total	*618*	*100.0*

Chart 2 Distribution of grades and ages that participants currently work with.



Participants were asked to list the number of years worked in their current profession as well as the total numbers of years worked in their current profession. There was a relatively flat distribution of participants across experience (see Chart 3). However, a majority of the respondents were relatively new to their current position (see Chart 4).

Participants who worked directly with students with special needs (e.g. special education teachers or therapeutic professionals) were asked to select all the needs that they primarily addressed. Autism and specific learning disability were the most frequently selected; deafness and deaf-blindness were the least addressed (see Table 4).

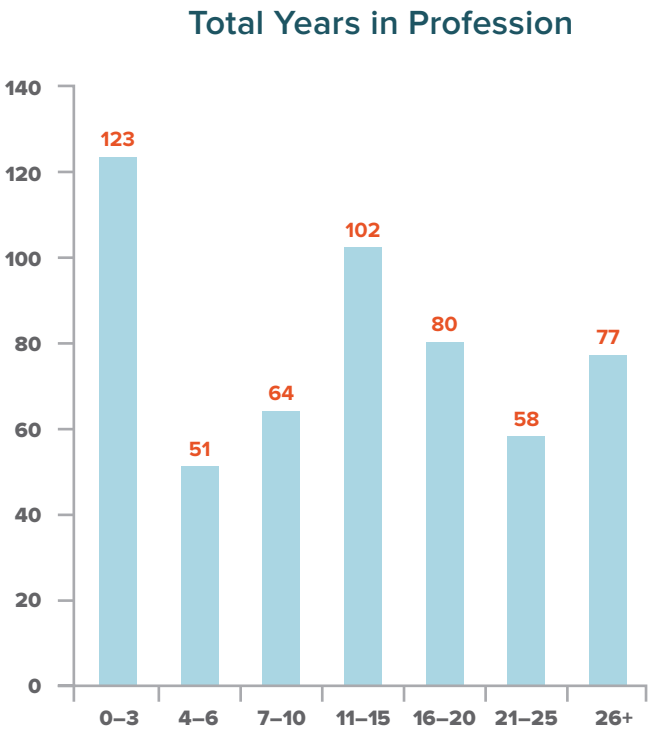


Chart 3 Total years worked in the respondents' respective profession.

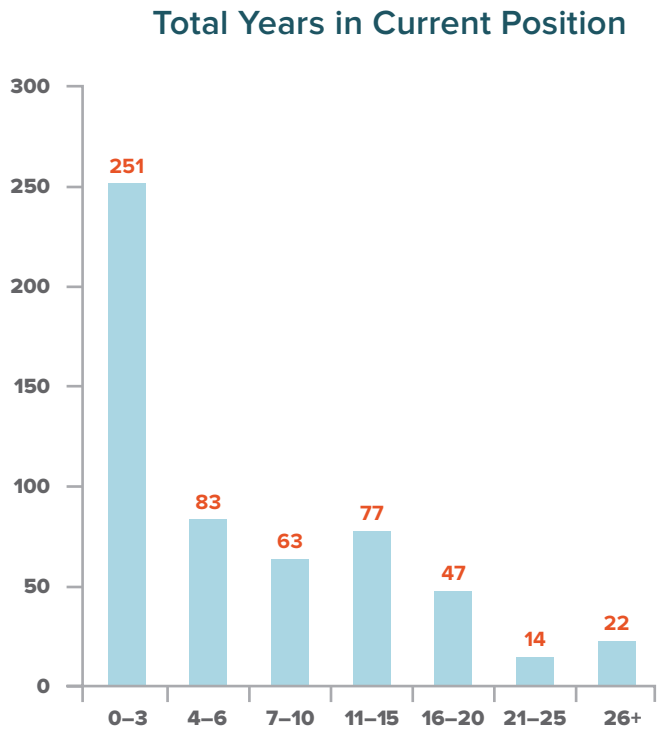


Chart 4 Total years worked in the respondents' current profession.

Table 4 Needs most frequently addressed by survey respondents.

NEED ADDRESSED	TOTAL #
Autism	220
Specific Learning Disability	200
Developmental delay	177
Intellectual Disability	174
Emotional Disturbance	171
Multiple Disabilities	163
Speech or Language Impairment	158
Other Health Impaired	151
Orthopedic Impairment	67
Hearing Impairment	64
Traumatic Brain Injury	55
Visual Impairment (including blindness)	55
Deafness	33
Deaf-blindness	12

Research Findings

Data were collected from the survey and analyzed. Quantitative methods such as t-tests, ANOVAs, frequencies, and descriptive statistics were used to better understand participant responses. These responses were then formatted into seventeen research findings (RF).

RF1 Many education professionals have still not received any formal training in the use of technology for instructional purposes.

The survey was created to help learn more about the role of mobile apps, particularly in special education. However, the survey included questions about technology to better contextualize the responses. The hypothesis was that due to a greater national focus on professional development on technology implementation (e.g. US DOE, 2016), those surveyed would have been trained with technology but perhaps not educated on the use of mobile apps.

The hypothesis was not confirmed; the results showed that only 62.29% (n=299) of all survey participants reported receiving training in technology for instructional purposes.

That leaves nearly 40% (n=181) of respondents without formal educational technology training. A natural response is to suggest that this was due to the diversity of survey participant roles (e.g. teacher vs. parent). The assumption would be that educators (e.g. general and special education teachers, teacher educators, administrators, and teacher education students) would have received formal training.

The data do not support this assumption. When separated by role, the numbers for teachers and teacher educators do rise slightly; however there is still a sizeable percentage of education-related professionals that have not received training (25–30%). Perhaps more startling is the high percentage of therapeutic professionals and teacher education students that have yet to receive professional development or formal training on the use of technology for instruction. Caution must be exercised when evaluating these numbers as there were only 38 teacher education students and 73 therapeutic professionals who answered this question. However, 71.05% of future teachers and 57.53 % of therapeutic professionals (all who came from geographical diverse regions) stated they had not received formal technology training (see Chart 5).

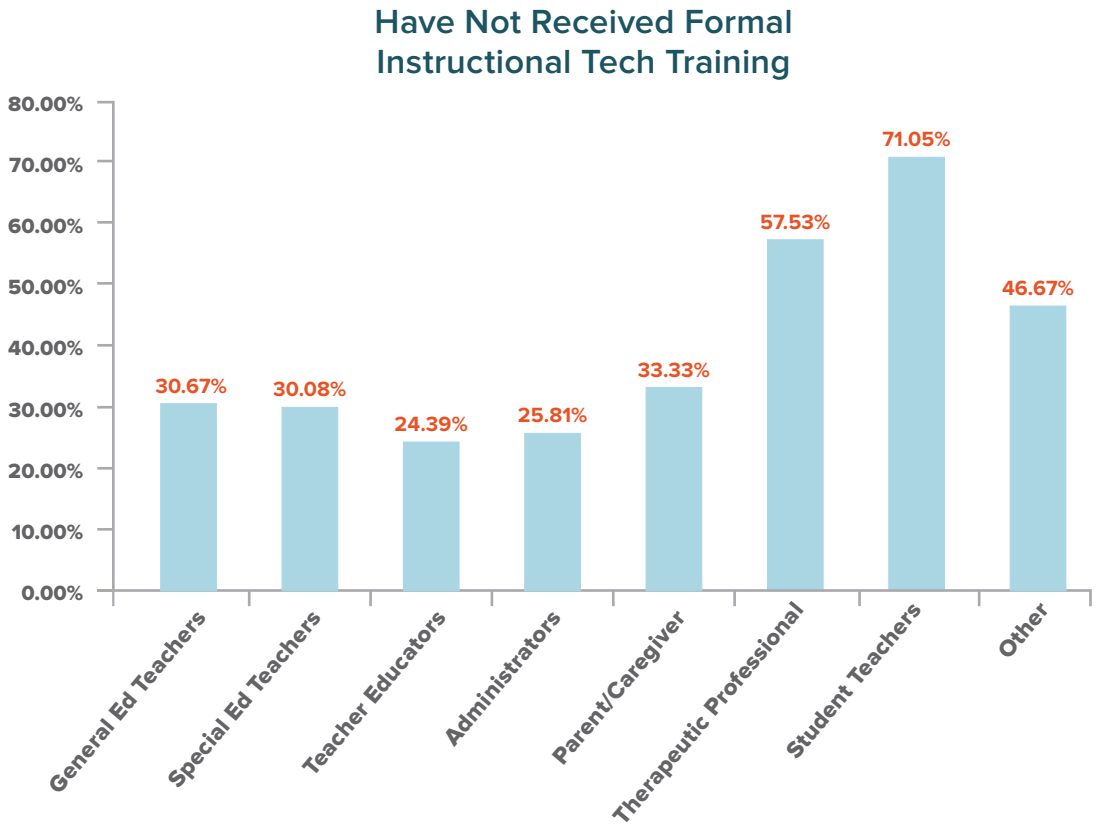


Chart 5 Percentage of participants who have received training on using technology for instruction.

RF2 **A majority of those responding to the survey indicated a desire to receive more formal training in the use of technology for instructional purposes.**

Over 87% (n=418) suggested that they would like to receive more training in the use of new technologies for instructional purposes. There were no significant differences in self-reported technology ability, age, role, years in position or any other factors in the 12.73% (n=61) who did not wish to receive formal training.

Participants were not directly asked about the area of technology in which they would like to receive training. However, survey respondents were asked if and how often they used various technologies for personal, administrative, and instructional uses. Table 5 provides a listing of various technologies and what percentages of survey participants used the technology for some purposes. It is not surprising that desktops, laptops, and phones/tablets, are at the top of the list. It is a little more surprising, particularly given the audience surveyed, that specific assistive technology devices were only used by 18.09% of participants. This information can be used to think more directly about future technology instruction.

Do you use any of these for personal, administrative or instructional use?	YES
TV/DVD Player	85.45%
Facebook Account	76.92%
PC Desktop or Laptop	71.93%
iPhone	67.57%
iPad	53.01%
SmartBoard or other Interactive whiteboard	45.32%
Digital camera/video recorder	42.41%
Apple Desktop or Laptop	38.67%
Other Social Media Account	37.01%
Chromebook	36.38%
Light table/overhead projector and screen	31.19%
Twitter Account	27.03%
E-book reader (e.g. Kindle)	26.82%
Android Smartphone	25.78%
Audio-player (e.g. Mp3 player)	19.96%
Home gaming consoles (e.g., Wii)	18.09%
Specific assistive technology devices (for special needs)	**18.09%**
Your Own Website	14.35%
Android Tablet	8.52%
Microsoft Tablet	6.44%
Smart-watch	5.61%
Unix-based Desktop or Laptop	4.99%
Handheld gaming systems (e.g., PSP)	3.53%
3D printer	3.12%

Table 5 Personal, administrative, and instructional use of technologies by all participants.

SCALE	TITLE	%	#
1	**INNOVATOR** i.e., someone who adopts and experiments new and potentially groundbreaking technologies before their success or failure.	12.32%	69
2	**EARLY ADOPTER** i.e., someone who is open to use and promote new technologies but in a more cautious way in comparison with innovators.	45.54%	255
3	**MASS FOLLOWER** i.e., someone who adopts new technologies after shared legitimization and approval.	31.96%	179
4	**LATE ADOPTER** i.e., someone who adopts new technologies after average consumers and mass diffusion.	9.82%	55
5	**SKEPTIC** i.e., someone who refuses to utilize technologies.	0.36%	2
	Total	*100%*	*560*

Table 6 Self-ratings of participants regarding their technology knowledge and use.

RF3 There may be misperceptions about what counts as being an innovator or early adopter in general and special education.

Participants were asked to rate themselves based upon technology consumption and use. A majority of participants considered themselves 'Early Adopters' (45.54%). The second highest rated was 'Mass follower' (31.96%; see Table 6).

There are a number of 'innovative' technologies that have been around for many years. For instance, in addition to being in existence and accessible for a general audience, there are published research and practitioner-oriented articles on the use of games, gaming systems, audio recording tools, assistive technologies, Android technologies, personal websites, and 3D printers. Yet given this availability, less than 20% of all participants reported using these for personal, administrative, or instructional uses. Compare that to the nearly 58% of participants who identified themselves as innovators or early adopters.

Arguably integrating 3D printers into instruction and using gaming devices for student learning may not be considered common practice. It is, therefore, understandable that many respondents have not used them for instructional objectives. However, there are questions that need to be asked about why such a high percentage of respondents would identify themselves as innovators or early adopters and yet have not even tried these tools for personal reasons. This points to a need for increased professional development.

RF4 General and special education teachers' use of technology varies according to the affordances and constraints of the technology and the personal, administrative, or instructional goals of the teacher.

A total of 187 general education and 164 special education teachers responded to the survey. On a scale of technology consumption, both groups fell between 'Early Adopter' and 'Mass Follower' with general education teachers having a mean of 2.35 (n=175; sd=.84) and special education teachers self-reporting 2.42 (n=152; sd=.84).

Both groups were asked to describe how often they use a variety of technologies as well as how often they use those technologies for personal use, administrative use, and instructional use. Applicants were asked if they used technologies for specific purposes and for what duration in hours per week. Much like Table 5, Table 7 contains a detailed percentage of every category but only for the 266 general and special education teachers who responded to these questions. Table 7 lists whether the teachers used the tools in a binary 'yes or no' format (Appendices B and C contain all of the percentages of special education and general education teachers' technology use by hour).

TV/DVD players, Facebook accounts, PC desktops and laptops, iPhones, and iPads were used by both sets of teachers most frequently for personal use. Administrative use of technology was relatively limited, with PC desktops and laptops, iPhones, iPads, and interactive whiteboards being the most common. Finally, instructional use of apps centered around PC desktops and laptops, interactive whiteboards, Chromebooks, and iPads. There was very little use of newer tools like smart watches, 3D printers, and gaming for instructional purposes.

This finding is not surprising; research has already provided evidence that technologies have different affordances that make them useful for various aspects of working with learners (Ferdig, 2006). However, this finding and this table are included to begin to get a baseline for understanding what tools teachers are using to accomplish varying goals. This baseline analysis could lead to further research, practice, and professional development questions. For instance, why is there so much social media use for personal outcomes and relatively little for administrative and instructional purposes? There are teachers who use gaming for personal value; why do those same teachers leave it out of working with students? Why are so few teachers using websites for administrative purposes, particularly when collaboration with parents of students with special needs is so important (Dunn, Constable, Martins, & Cammuso, 2016)?

TECHNOLOGIES AND % OF TEACHERS WHO USED THEM	PERSONAL	ADMINISTRATIVE	INSTRUCTIONAL
3D printer	2.63%	1.88%	3.76%
Android Smartphone	25.94%	11.28%	9.02%
Android Tablet	7.89%	2.26%	2.63%
Apple Desktop or Laptop	38.35%	21.05%	21.80%
Apple iPad	**57.14%**	**27.44%**	**45.11%**
Apple iPhone	**66.92%**	**28.95%**	25.19%
Audio-player (e.g. Mp3 player)	21.05%	3.38%	12.03%
Chromebook	14.29%	15.41%	**46.99%**
Digital camera/video recorder	42.11%	11.28%	21.05%
E-book reader (e.g. Kindle)	26.69%	2.63%	9.77%
Facebook Account	**75.56%**	5.26%	6.39%
Handheld gaming systems (e.g., PSP)	3.38%	1.13%	2.63%
Home gaming consoles (e.g., Wii)	17.67%	1.13%	1.88%
Light table/overhead projector and screen	6.02%	10.53%	38.35%
Microsoft Tablet	6.02%	3.76%	4.14%
Other Social Media Account	39.10%	6.39%	9.77%
PC Desktop or Laptop	**73.68%**	**70.30%**	**83.83%**
SmartBoard or other Interactive whiteboard	6.77%	**23.31%**	**63.53%**
Smart-watch	3.38%	1.88%	2.26%
Specific assistive technology devices (for special needs)	4.51%	4.89%	21.43%
TV/DVD Player	**85.71%**	10.90%	36.47%
Twitter Account	28.57%	6.02%	6.02%
Unix-based Desktop or Laptop	3.76%	3.76%	6.02%
Your Own Website	7.89%	14.29%	18.80%

Table 7 Technology use reported by general and special education teachers (n=262).

RF5 **General and special education teachers differ in what technologies they use for instructional purposes; general education teachers report using technology more often than special education teachers.**

In order to compare the different forms of technology use between general and special education teachers, a set of 72 independent t-test statistics were calculated. This required a correction to the p-values in order to avoid a Type I error (false positive). Simes' (1986) adjustment was used since it corrects for the potential of a Type I error, while also accounting for the potential of a Type II error (false negative) which the Bonferroni correction is prone. Furthermore, examination of the Simes correction suggests it is a reliable and robust approach to correcting p-values (Sarkar & Chang, 1997).

The analyses produced four differences that were statistically significant. General educational teachers were more likely than special education teachers to use: a) light tables/overhead projector and screen; and b) their own websites. Special education teachers responding to this survey were more likely than general educators to: a) use the iPad and other assistive technologies for instructional purposes. Table 8 contains the questions and means for both general and special education teachers for the statistically significant differences. Appendix D contains the statistical analyses of all of the technology uses.

On one hand, this is not surprising. General education teachers may end up in larger classrooms or working with more students at once, which necessitates a projection device and often the use of websites for dissemination of content (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012). Special education teachers often use iPads for their learners (e.g. Kagohara et al., 2013) and are more likely to make use of specific assistive technology devices.

On the other hand, taken as a whole, general education teachers report using technology more often than special education teachers. This occurs in 19 of the 24 technology categories. iPhones, iPads, audio players, eBook readers, and specific assistive technology tools are the only 5 categories with more reported and frequent use by special education teachers. Although 20 of the 24 differences are not statistically significant, it points to a larger trend and begs deeper questions about the availability of technology and the professional development of special education teachers.

	General Ed	Special Ed	*t*-Statistic	Unadjusted *p*-value	Simes Adjusted *p*-value
iPad	*M* = 1.44 *SD* = .76	***M* = 1.98** *SD* = 1.10	-4.74***	0.000	0.000
Light table / overhead projector and screen	***M* = 2.01** *SD* = 1.38	*M* = 1.59 *SD* = 1.06	2.83*	0.005	0.03
Specific assistive technology device (for special needs)	*M* = 1.21 *SD* = .66	***M* = 1.54** *SD* = .93	-3.43**	0.001	0.008
Your own website	***M* = 1.45** *SD* = .88	*M* = 1.11 *SD* = .48	3.84***	0.000	0.000

*[a] p < .10, *p < .05, **p < .01, ***p < .001*

Table 8 Comparison of technology use reported by general and special education teachers (n=272).

RF6 **An unhealthy number of participants have not received training of any kind in the use of apps for instructional purposes; however, a majority would like to use apps more often.**

Nearly 70% (n=299) of participants who were asked about app training responded that they had not received instruction in the use of apps or mobile devices. However, almost 87% (n=364) of the same respondents said they would like to use apps more often (see Chart 6).

This lack of mobile training and the desire to receive more training cuts across all groups surveyed. Chart 7 reveals two glaring differences. First, the lowest scoring group were the teacher education students. Only 13.51% (n=37) of those surveyed had received training in the use of mobile devices and apps. This was surprising given the fact that these students were currently in education classes. A second outlier was the administrator group. Over 65% had received professional development in the use of apps and mobile devices. These numbers have to be considered with caution given the low number of participants who answered this question and identified themselves as administrators (n=26). However, it is a shocking comparison in relation to future educators (13.51%), therapeutic professionals (33.87%), and teachers/teacher educators (27.41%–38.24%).

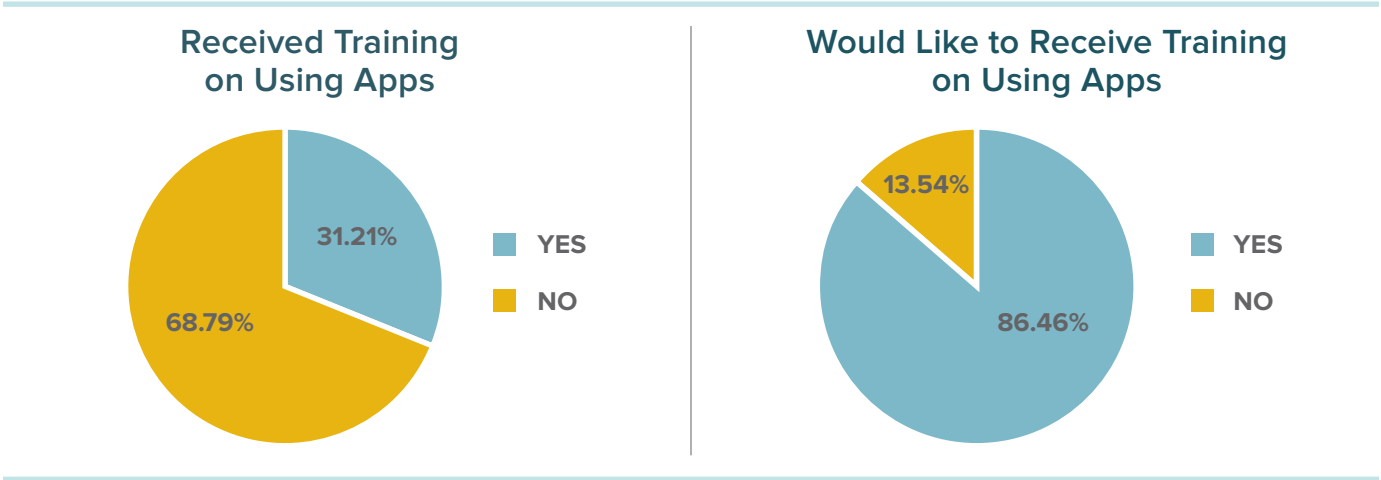


Chart 6 Comparison of app training and desire to be trained.

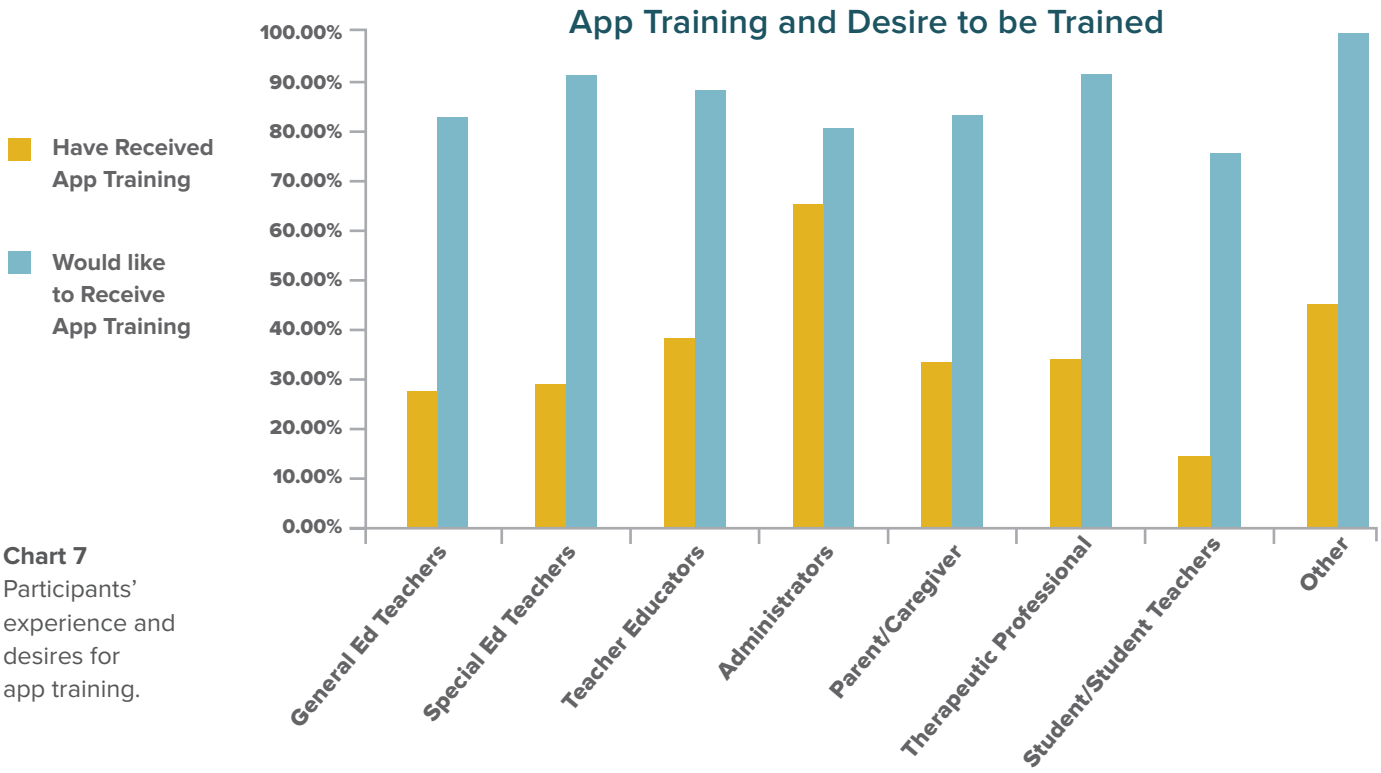


Chart 7 Participants' experience and desires for app training.

RF7 Special Educators and therapeutic professionals are more likely than others in education to have used mobile devices to support students with special needs; however, app use with special needs learners is not the norm.

Survey participants were asked to select a statement that best described their use of mobile technologies while working with learners with special needs.

They were asked to choose one of the following five sentences:

1. I have never used mobile devices and apps to support a learner with special needs and I do not want to try.
2. I have never used mobile devices and apps to support a learner with special needs but I am interested in learning how.
3. I rarely use mobile devices and apps to support a learner with special needs.
4. I sometimes use mobile devices and apps to support a learner with special needs.
5. I frequently use mobile devices and apps to support a learner with special needs.

A one-way ANOVA was conducted using all groups except for parents, IT professionals, and the 'other' category (given their low representation in the survey). A Levene statistic was calculated to confirm that the homogeneity of variance assumption was not violated (1.53, p = .18). Table 9 contains the mean and standard deviations of the groups.

ROLE	N	MEAN	STD. DEVIATION
Special Education Teacher	119	3.65	1.08
Therapeutic Professional	68	3.50	1.06
Administrative (Non-Therapeutic Support)	27	3.19	1.27
Teacher Educator	39	2.97	1.11
General Education Teacher	143	2.90	1.15
Student or Pre-service Teacher	37	2.65	.98

Table 9 Mean scores of statements about mobile app use with special needs learners.

A statistically significant difference between groups was found (F (df=5) = 9.21, p < .001). A Tukey post hoc analysis was conducted to examine which differences between groups were statistically significant. Five such differences were found to be statistically significant. Special education teachers reported higher scores than any other group. These scores were found to be statistically significantly higher than three of the five other groups: general education teachers (p < .001), teacher educators (p = .01), and preservice teachers (p < .001). Therapeutic professionals had the second highest score, which was found to be statistically significantly higher than general education teachers (p = .003) and preservice teachers (p = .003). All other group differences in scores were statistically similar to one another.

The differences between groups are not necessarily surprising. Special education teachers and therapeutic professionals may have more opportunities to engage learners with special needs—or more time directly engaged with such learners. As such, they have more chances to use apps and/or mobile devices. On the other end of the spectrum, future teachers and college students interested in special education have yet to spend significant amounts of time being able to engage others with apps.

The discouraging number is not the differences between groups but rather the overall means. At best, the highest group (special education teachers) rarely to sometimes used apps and mobile devices with learners with special needs. Taken as an entire group, the overall mean of 3.19 (n=456; sd=1.17) demonstrates apps and mobile devices are more rare than the norm in such settings.

RF8 **General and special education teachers use apps for personal and administrative use; there is very limited instructional implementation beyond some use of web browsing, mathematics, and literacy apps.**

General and special education teachers (n=272) were asked about their personal, administrative, and instructional use of apps. Table 10 contains a summary of whether the teachers used the apps in a binary 'yes/no' format. Appendices E and F contain all of the percentages of general education and special education teachers' use of apps by hours.

Apps were used by both sets of teachers most frequently for personal use for email, web browsing, social media, and organization. Administrative use of apps focused on email and web browsing. Finally, instructional use of apps centered around web browsing, mathematics, and communication, language, and literacy. Certain topics saw higher percentages based on their relationship to the question asked. In other words, 41.95% of respondents used mathematics apps for instructional purposes while only 22.46% and 17.80% used mathematics apps for personal and administrative uses (respectively).

USE OF APPS BY PURPOSE	PERSONAL	ADMINISTRATIVE	INSTRUCTIONAL
Apps for Approaches Towards Learning	20.76%	17.80%	31.36%
Apps for Classroom Management	19.49%	27.12%	36.02%
Apps for Communication, Language and Literacy	22.03%	19.49%	**40.25%**
Apps for Email	**78.81%**	**50.42%**	37.29%
Apps for Gaming and Gamification	33.05%	8.05%	21.61%
Apps for IFSP/IEP planning or implementation	13.56%	13.14%	18.64%
Apps for Mathematics	22.46%	17.80%	**41.95%**
Apps for Organization	**53.39%**	31.78%	32.20%
Apps for Physical and Motor Skill Development	13.56%	6.36%	16.10%
Apps for Science	16.53%	11.44%	26.69%
Apps for Social and Emotional Development	12.71%	7.20%	16.53%
Apps for Social Media (e.g. Facebook, Twitter)	**75.00%**	12.29%	15.68%
Apps for Social Studies	11.86%	8.90%	22.88%
Apps for Teaming and Collaboration	19.49%	17.37%	21.61%
Apps for Web Browsing	**77.54%**	**42.37%**	**46.19%**
Other Apps	44.49%	19.07%	27.97%

Table 10 Personal, administrative, and instructional app use by general and special education teachers.

RF9 **Special education teachers are more likely than general education teachers to use apps for social media use, content area acquisition, and IFSP/IEP planning or implementation.**

An analysis was completed to measure whether there were any significant differences between general and special education teachers in their instructional use of apps. Differences were examined with 16 independent t-test statistics. Simes' (1986) adjustment was used to correct p-values to avoid Type I (false positive) and Type II (false negative) errors.

In all four cases, special education teachers were significantly more likely than general education teachers to use apps for instructional purposes. This included apps for social media (e.g. Facebook and Twitter), apps for content area growth in mathematics and literacy, and apps for IFSP/IEP planning and/or implementation.

Some of these outcomes make sense given the needs of special education teachers who might be working with students who are struggling with math or literacy. And, special education teachers are probably more likely than general education teachers to use apps for IFSP/IEP planning. However, content area acquisition through apps is an area that deserves further exploration. Not all differences were statistically significant, but special education teachers were more likely to use apps in 11 of the 16 areas asked about in the survey. This includes being more likely to use apps in math, science, social studies, and communication, language and literacy. General education teachers were more likely to use apps in management topics like email, web browsing, organization, classroom management, and collaboration.

	General Ed	Special Ed	*t*-Statistic	Unadjusted *p*-value	Simes Adjusted *p*-value
Apps for Social Media (e.g. Facebook or Twitter)	*M* = 1.18 *SD* = .49	***M* = 1.27** *SD* = .62	2.72[a]	0.024	0.096
Apps for Mathematics	*M* = 1.46 *SD* = .76	***M* = 1.70** *SD* = .90	-2.30[a]	0.023	0.096
Apps for Communication	*M* = 1.41 *SD* = .69	***M* = 1.74** *SD* = .98	-3.10*	0.002	0.032
Apps for IFSP/IEP planning or Implementation	*M* = 1.16 *SD* = .49	***M* = 1.32** *SD* = .67	-2.28[a]	0.023	0.096

[a] *p < .10, *p < .05, **p < .01, ***p < .001*

Table 11 Comparisons of apps use between special and general education teachers.

RF10 Special education teachers are more likely to believe in the value of mobile apps for special education, but are also more realistic about its current availability and use; neither special nor general education teachers feel strongly prepared to use them.

General and special educators were asked a series of questions related to their perspectives on mobile apps and devices. They were asked to agree or disagree with a set of statements (1=strongly disagree; 5=strongly agree). Given the large number of statistical analyses (17 questions in total) and the corrections that needed to be completed, none of the mean differences were statistically significant at $p<.05$.

However, there are some interesting trends in the difference of thought between the two groups—trends that deserve further exploration. Special educators agreed more strongly with almost all of the questions that were related to the possibilities of using mobile technologies in their personal and professional lives (see Table 12). For instance, special educators more strongly agreed that mobile technologies were important tools for personal growth, for helping all students learn, and for helping students with special needs. They also agreed more strongly than general education teachers that students with special needs were ready to use mobile devices and apps, that they had access to the technology to do so, and that mobile tools could be useful for pedagogical strategies (e.g. supplemental or targeted/intensive approaches).

Conversely, general education teachers had a stronger belief that students were already using such devices. They also more strongly agreed with the idea that most apps were accessible and that there were a sufficient number of apps to help with customization, differentiation, and to support students with a wide range of needs.

It is unclear how to make sense of these two trends. If general education teachers are right to more strongly believe in the availability of apps for special education and their current use by students with special needs, then why are they less likely to agree with it being an important tool for that population? Conversely, if special education teachers are more likely to agree with its potential, are they better or less informed about the current lack of availability of apps? This inquiry is important as either outcome requires continued professional development for educators and app developers.

One additional outcome that deserves attention is the question asked to teachers about their preparedness to use mobile devices and apps to teach students with special needs. Special education teachers slightly agreed with this statement, but both groups hovered around the ‘neither agree nor disagree’ response. Once again this points to the need to find more ways to engage educators in understanding the use of mobile devices for engaging all students.

#	Questions about Mobile devices and applications (1=Strongly Disagree; 5=Strongly Agree)	General Education	Special Education
1	If I wanted to implement mobile devices and apps for working with students with special needs, I would have access to the technology to do so.	3.37	**3.45**
2	I consider mobile technology (e.g. smartphones) and related apps an important tool for my personal enjoyment/growth.	3.73	**3.97**
3	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping all students.	3.81	**3.94**
4	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping students with special needs.	3.87	**4.07**
5	I consider myself to be prepared to use mobile devices and apps in teaching students with special needs.	2.99	**3.21**
6	I believe students with special needs already use mobile devices and apps in their lives.	**3.74**	3.68
7	I believe students with special needs already use mobile devices and apps in their learning.	**3.25**	3.20
8	I believe students with special needs are ready to use mobile devices and apps.	3.61	**3.84**
9	I believe most apps are accessible to all students.	3.28	3.28
10	I believe most apps are accessible to students with special needs.	**3.21**	3.16
11	I believe most educational apps are accessible to students with special needs.	**3.21**	3.14
12	I believe mobile devices and apps can be used with a universal approach to teaching and learning.	3.83	3.83
13	I believe mobile devices and apps can be used with a supplemental approach to teaching and learning.	4.02	**4.12**
14	I believe mobile devices and apps can be used with an intensive/targeted approach to teaching and learning.	3.88	**3.94**
15	I believe there are a sufficient number of apps to help with student differentiation.	**3.38**	3.37
16	I believe there are a sufficient number of apps to help with customization of student learning.	**3.42**	3.31
17	I believe there are a sufficient number of apps to help students across the entire range of special needs.	**3.37**	3.25

Table 12 Special education and general education teachers' perspectives on mobile technologies.

RF11 **Teacher educators and pre-service teachers differed in their beliefs about the use of mobile apps to support students with special needs; teacher educators more strongly valued the possibilities while pre-service teachers believed more in their current use.**

A total of 47 teacher educators responded to the survey. On a scale of technology consumption, the group fell between 'Early Adopter' and 'Mass Follower' with a mean of 2.28 (n=43; sd=.88). There were 55 student teachers that also responded to the survey. The pre-service teachers also fell between 'Early Adopter' and 'Mass Follower' with a mean of 2.51 (n=45; sd=.79).

Both groups were asked the same mobile device perspective questions that were asked to general and special education teachers. And, once again due to the large number of comparisons and needed statistical corrections, no mean difference was statistically significant ($p<.05$). However, there were two differences that could best be categorized as trends worthy of further exploration; both trends mirrored the trends mentioned between general and special education teachers. Teacher educators more strongly agreed with every category that dealt with the possibility of using mobile devices and apps for working with students with special needs (see Table 13). This included a stronger belief in the importance of such tools, the current use of such tools by students with special needs, and mobile device readiness of students, and the potential pedagogical impact of mobile apps (e.g. supplemental or targeted/intensive approach to teaching/learning).

Conversely, pre-service teachers more strongly agreed with the importance of such tools in their own lives. They also had a stronger belief that apps—including educational apps—were accessible to all students, including those with special needs. These statements showed their stronger belief in the ability of apps for customization and differentiation across a wide range of needs.

Although these mean differences were not statistically significant, they raise questions about the professional development of both teacher educators and future teachers. Do future teachers, particularly those who put a stronger value on mobile devices and apps, have a stronger grasp on the availability and features of apps for learners? If so, why do they not more strongly agree with the value and potential of such tools? Or, do teacher educators have a better understanding of the existing limitations of such tools? If the latter, how can developers create tools that are more accessibility, customizable, and that can be used for differentiation?

#	**Questions about Mobile devices and applications** (1=Strongly Disagree; 5=Strongly Agree)	**Teacher Educators**	**Student Teachers**
1	If I wanted to implement mobile devices and apps for working with students with special needs, I would have access to the technology to do so.	**3.79**	3.65
2	I consider mobile technology (e.g. smartphones) and related apps an important tool for my personal enjoyment/growth.	3.85	**4.00**
3	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping all students.	**4.03**	3.73
4	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping students with special needs.	**4.10**	4.00
5	I consider myself to be prepared to use mobile devices and apps in teaching students with special needs.	**3.23**	3.08
6	I believe students with special needs already use mobile devices and apps in their lives.	**3.79**	3.30
7	I believe students with special needs already use mobile devices and apps in their learning.	**3.41**	2.95
8	I believe students with special needs are ready to use mobile devices and apps.	**3.59**	3.49
9	I believe most apps are accessible to all students.	3.21	**3.41**
10	I believe most apps are accessible to students with special needs.	3.10	**3.11**
11	I believe most educational apps are accessible to students with special needs.	3.23	**3.32**
12	I believe mobile devices and apps can be used with a universal approach to teaching and learning.	**4.05**	3.70
13	I believe mobile devices and apps can be used with a supplemental approach to teaching and learning.	**4.08**	3.97
14	I believe mobile devices and apps can be used with an intensive/targeted approach to teaching and learning.	**4.03**	3.81
15	I believe there are a sufficient number of apps to help with student differentiation.	3.31	**3.51**
16	I believe there are a sufficient number of apps to help with customization of student learning.	3.33	**3.46**
17	I believe there are a sufficient number of apps to help students across the entire range of special needs.	3.26	**3.30**

Table 13 Teacher educators and pre-service teachers' perspectives on mobile technologies.

RF12 **Therapeutic professionals value mobile devices and apps for their potential for students with special needs, but they want more professional development and are cautious in their assessment of what exists.**

A total of 87 non-administrative, therapeutic professionals (e.g. Intervention Specialist, School Psychologist, OT, PT, SLP, EI, etc.) responded to at least some parts of this survey. On a scale of technology consumption, the group fell between 'Early Adopter' and 'Mass Follower' with general education teachers having a mean of 2.58 (n=80; sd=.74). Respondents held certifications in specialist areas (e.g., Behavior Analyst/Specialist; Intervention Specialist), professional pupil services, multi-age (PK-12), early childhood (PK-3), and adolescence/young adult (7–12). The survey participants worked across a wide variety of ages and grades, ranging from birth to postsecondary (see Chart 8).

Similar to other roles in this survey, a majority of respondents had not been trained in the use of technology (65.81%; n=23) but wanted to receive such training (91.43%; n=32). As highlighted in Table 9, they scored a mean of 3.5 in current mobile technology use (3 = rare use and 4 = sometimes use mobile devices and apps to support a learner with special needs). A majority had not been trained to use apps (65.63%; n=21) but sought professional development in that area (93.75%; n=30).

Most of the instructional use of general technologies focus on PC desktops/laptops, iPads, and other specific assistive technology devices (see Table 14 and Appendix H). The highest instructional app uses (Table 15 and Appendix I) centered around mobile devices for communication, social/emotional development, and web browsing.

Therapeutic professionals surveyed agreed that mobile technologies had value in their personal lives and in the lives of students with special needs (see Table 16). This included valuing mobile apps for universal, supplemental, and intensive approaches to learning. However, they were cautious in neither agreeing nor disagreeing about app availability and app accessibility.

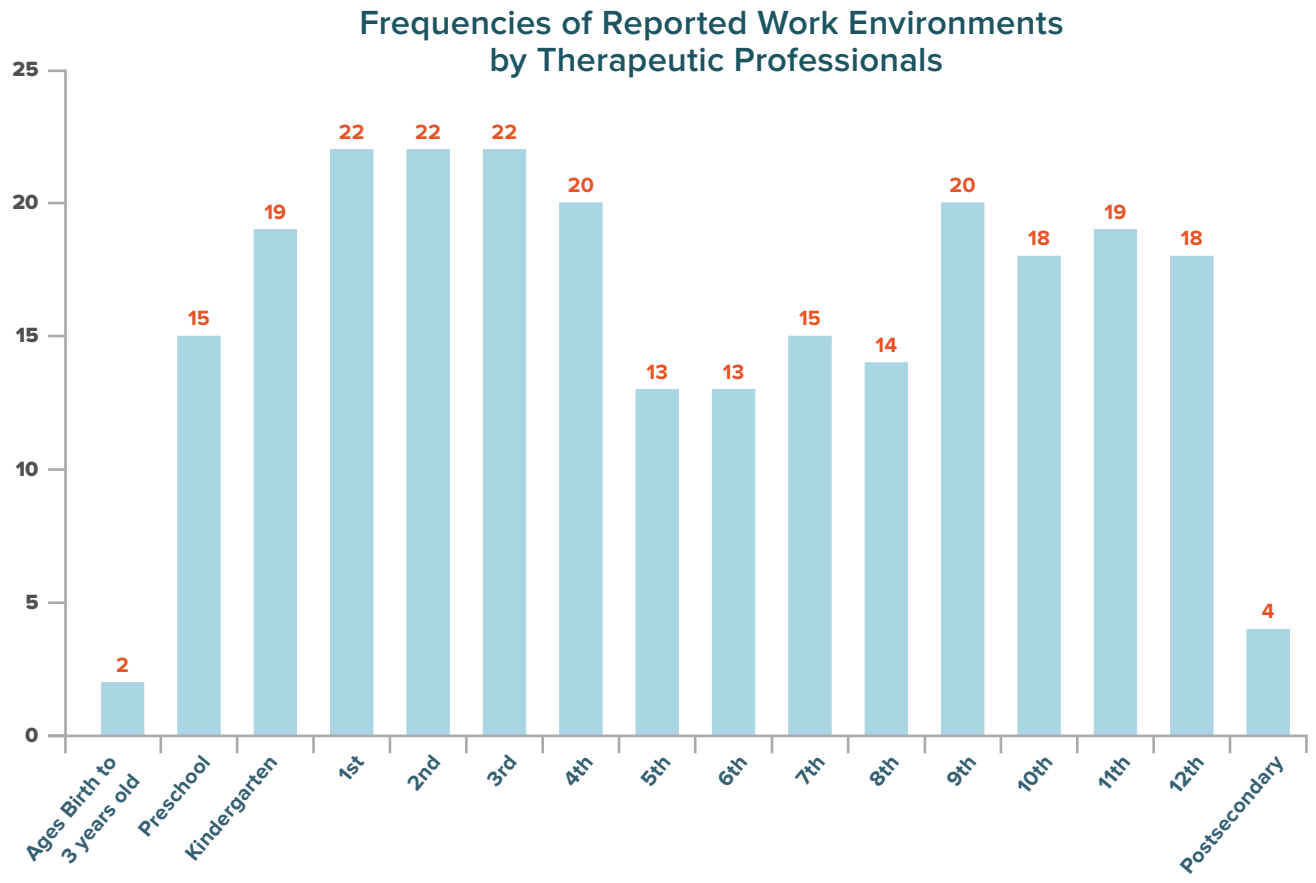


Chart 8 Ages and grade ranges where therapeutic professionals did their work.

TECH AND % OF THERAPEUTIC PROFESSIONALS WHO USED THEM	PERSONAL	ADMINISTRATIVE	INSTRUCTIONAL
3D printer	0.00%	0.00%	0.00%
Android Smartphone	25.71%	20.00%	8.57%
Android Tablet	5.71%	0.00%	5.71%
Apple Desktop or Laptop	31.43%	14.29%	5.71%
Apple iPad	48.57%	34.29%	**62.86%**
Apple iPhone	71.43%	37.14%	25.71%
Audio-player (e.g. Mp3 player)	28.57%	5.71%	11.43%
Chromebook	2.86%	11.43%	17.14%
Digital camera/video recorder	68.57%	8.57%	20.00%
E-book reader (e.g. Kindle)	34.29%	5.71%	5.71%
Facebook Account	82.86%	8.57%	5.71%
Handheld gaming systems (e.g., PSP)	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	11.43%	0.00%	0.00%
Light table/overhead projector and screen	5.71%	8.57%	17.14%
Microsoft Tablet	8.57%	5.71%	0.00%
Other Social Media Account	22.86%	11.43%	8.57%
PC Desktop Laptop	74.29%	88.57%	**74.29%**
SmartBoard or other Interactive Whiteboard	0.00%	11.43%	17.14%
Smart-watch	2.86%	0.00%	0.00%
Specific assistive technology devices (for special needs)	5.71%	22.86%	**42.86%**
TV/DVD Player	91.43%	2.86%	8.57%
Twitter Account	25.71%	0.00%	8.57%
Unix-based Desktop or Laptop	2.86%	2.86%	2.86%
Your Own Website	2.86%	5.71%	0.00%

Table 14 Personal, administrative, and instructional technology use by therapeutic professionals.

USE OF APPS BY PURPOSE	PERSONAL	ADMINISTRATIVE	INSTRUCTIONAL
Apps for Organization	59.37%	34.37%	28.12%
Apps for Classroom Management	3.12%	9.37%	18.75%
Apps for Email	87.50%	75.00%	25.00%
Apps for Web Browsing	87.50%	62.50%	**40.62%**
Apps for Social Media (e.g. Facebook, Twitter)	81.25%	9.37%	12.50%
Apps for Physical and Motor Skill Development	6.25%	3.12%	21.87%
Apps for Social and Emotional Development	3.12%	12.50%	**43.75%**
Apps for Mathematics	9.37%	6.25%	12.50%
Apps for Science	0.00%	0.00%	0.00%
Apps for Social Studies	0.00%	0.00%	3.12%
Apps for Communication, Language and Literacy	18.75%	21.87%	**46.87%**
Apps for Approaches Towards Learning	6.25%	25.00%	21.87%
Apps for Teaming and Collaboration	9.37%	25.00%	15.62%
Apps for IFSP/IEP planning or implementation	6.25%	28.12%	21.87%
Apps for Gaming and Gamification	15.62%	3.12%	18.75%
Other Apps	34.37%	25.00%	25.00%

Table 15 Personal, administrative, and instructional app use by therapeutic professionals.

#	**Questions about Mobile devices and applications** (1=Strongly Disagree; 5=Strongly Agree)	**Therapeutic Professionals**
1	If I wanted to implement mobile devices and apps for working with students with special needs, I would have access to the technology to do so.	3.36
2	I consider mobile technology (e.g. smartphones) and related apps an important tool for my personal enjoyment/growth.	3.96
3	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping all students.	3.91
4	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping students with special needs.	4.14
5	I consider myself to be prepared to use mobile devices and apps in teaching students with special needs.	3.26
6	I believe students with special needs already use mobile devices and apps in their lives.	3.69
7	I believe students with special needs already use mobile devices and apps in their learning.	3.54
8	I believe students with special needs are ready to use mobile devices and apps.	3.79
9	I believe most apps are accessible to all students .	3.03
10	I believe most apps are accessible to students with special needs.	2.97
11	I believe most educational apps are accessible to students with special needs.	3.07
12	I believe mobile devices and apps can be used with a universal approach to teaching and learning.	3.79
13	I believe mobile devices and apps can be used with a supplemental approach to teaching and learning.	4.03
14	I believe mobile devices and apps can be used with an intensive/targeted approach to teaching and learning.	3.84
15	I believe there are a sufficient number of apps to help with student differentiation.	3.13
16	I believe there are a sufficient number of apps to help with customization of student learning.	3.13
17	I believe there are a sufficient number of apps to help students across the entire range of special needs.	3.10

Table 16 Therapeutic professionals' perspectives on mobile technologies.

RF13 **Administrators strongly value the potential role of technology and mobile apps; however, they see less actual use by and availability to such tools from district/center teachers and therapeutic professionals.**

Forty-three administrators (non-therapeutic support) responded to the survey. The mean score of their self-technology assessment fell near the 'early adopter' stage with a mean of 2.12 (n=34; sd=.64). The were asked to strongly disagree (1) or strongly agree (5) with 17 statements about mobile apps and devices. Much like the therapeutic professionals, they agreed that mobile devices and apps were important to their personal lives ($\bar{x}$ =4.26), and for helping students with special needs ($\bar{x}$=4.11). However, they were more cautious about app accessibility ($\bar{x}$=3.31) and the availability of apps for students with special needs ($\bar{x}$ =3.44; see Appendix J for a full table of results).

The administrators who responded to the survey were also asked a series of questions unique to their role as administrators. They were asked to agree (5) or disagree (1) to statements about both their technology beliefs and their perspectives on current technology use. The data provides an interesting dichotomy between administrator beliefs about how technologies should be used (and what they are prepared to do) compared to what they believe teachers and therapeutic professionals can do or have access to in their district or center. Questions 1–6 and 12 in Table 17 that focused on general or personal beliefs had a mean combined score of 4.02. Questions 7–11 that focused on teacher or therapeutic interactions or technology access had a lower combined mean score of 3.52. Given the low total number respondents (n=27), more research is required. However, this is an area that deserves exploration as this data is supported by teachers and therapeutic professionals' beliefs about their preparedness to use mobile devices to support learners with special needs (see Table 12 and Table 16).

#	**Questions about Technology** (1=Strongly Disagree; 5=Strongly Agree)	**Administrator Responses**
1	Digital technologies are important in my personal life.	4.38
2	Digital technologies are fundamental for student learning.	3.97
3	Teachers or therapeutic professionals need to use digital technologies to improve their teaching.	3.94
4	Teachers and therapeutic professionals need to use digital technologies for IFSP/IEP planning/implementation/progress monitoring.	4.18
5	Students or children with special needs are best supported when digital technologies are used as a part of their teaching or learning environments.	4
6	Students or children with special needs are best supported when digital technologies are used as a part of their home environments.	3.85
7	My teachers strongly support the use of technology in teaching and learning.	3.82
8	My therapeutic professionals strongly support the use of technology in teaching and learning.	3.56
9	My district or center provides multiple opportunities to learn more about technology for supporting special education.	3.61
10	My teachers capitalize on professional development opportunities to learn about the use of new technologies for teaching and learning.	3.41
11	My therapeutic professionals capitalize on professional development opportunities to learn about the use of new technologies for teaching and learning.	3.24
12	I am fully prepared to use technologies to support teachers and therapeutic professionals of students with special needs.	3.82

Table 17 Administrator beliefs and perspectives on technology use.

RF14 Parents value the role of technology in the lives of their students who have special needs; they are uncertain about the availability of such devices.

Parents were not necessarily the intended audience for this survey. Nevertheless, this survey was distributed through channels that included access to parents of children with special needs. A total of 10 parents responded to the survey. Extreme caution needs to be taken given the low number of respondents. However, there are some interesting trends that deserve further exploration. Namely, parents of children with special needs value the role and potential of technology in their own lives as well as in the lives of their children. At the same time, they are apprehensive about its availability and use at their child's school or center (see Table 18).

They were also apprehensive about having access to mobile devices and apps for their children ($\bar{x}$=3.26; Table X) and whether they were prepared to use them for instructional purposes ($\bar{x}$=3.26). Parent participants believed in the potential value of mobile devices and apps but were cautious about the availability and accessibility of apps, particularly as they related to differentiation, customization, and range of use. There are some attempts being made at engaging parents with professional development (e.g. Rodriguez, Strnadová & Cumming, 2013), but this is an area that deserves more attention.

#	Questions about Technology (1=Strongly Disagree; 5=Strongly Agree)	Parent Responses
1	Digital technologies are incredibly important in my personal life.	4.43
2	Digital technologies are fundamental for student learning.	4.57
3	Teachers or therapeutic professionals need to use digital technologies to improve their teaching.	4.14
4	Teachers and therapeutic professionals need to use digital technologies for IFSP/IEP planning/implementation/progress monitoring.	4
5	Students or children with special needs are best supported when digital technologies are used as a part of their teaching or learning environments.	4
6	Students or children with special needs are best supported when digital technologies are used as a part of their home environments.	3.86
7	There are numerous technologies available for students with special needs at my child's school or center.	3.14
8	My child's teachers are highly prepared to use technology to support my child's needs.	4
9	The professionals are able to support me to use technology at home.	3.86
10	I feel prepared to use technology to support my child at home.	4

Table 18 Parent beliefs and perspectives on technology use.

#	**Questions about Mobile devices and applications** (1=Strongly Disagree; 5=Strongly Agree)	**Parent Responses**
1	If I wanted to implement mobile devices and apps for working with students with special needs, I would have access to the technology to do so.	3.36
2	I consider mobile technology (e.g. smartphones) and related apps an important tool for my personal enjoyment/growth.	3.96
3	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping all students.	3.91
4	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping students with special needs.	4.14
5	I consider myself to be prepared to use mobile devices and apps in teaching students with special needs.	3.26
6	I believe students with special needs already use mobile devices and apps in their lives.	3.69
7	I believe students with special needs already use mobile devices and apps in their learning.	3.54
8	I believe students with special needs are ready to use mobile devices and apps.	3.79
9	I believe most apps are accessible to all students.	3.03
10	I believe most apps are accessible to students with special needs.	2.97
11	I believe most educational apps are accessible to students with special needs.	3.07
12	I believe mobile devices and apps can be used with a universal approach to teaching and learning.	3.79
13	I believe mobile devices and apps can be used with a supplemental approach to teaching and learning.	4.03
14	I believe mobile devices and apps can be used with an intensive/targeted approach to teaching and learning.	3.84
15	I believe there are a sufficient number of apps to help with student differentiation.	3.13
16	I believe there are a sufficient number of apps to help with customization of student learning.	3.13
17	I believe there are a sufficient number of apps to help students across the entire range of special needs.	3.10

Table 19 Parents' perspectives on mobile technologies.

RF15 Those interested in special education and mobile applications are most likely to find apps through friends and social networks.

Survey participants were asked to identify where they found apps to use for working with students and children with special needs. Not all participants answered this question as not all respondents currently use apps. A total of 117 responded; a majority of those reported that their friends/social networks were the most likely place for them to find new apps (48%; see Chart 9). The second highest likely location reported was generalist websites (35%). Only 4% of participants suggested that they found apps through professional development.

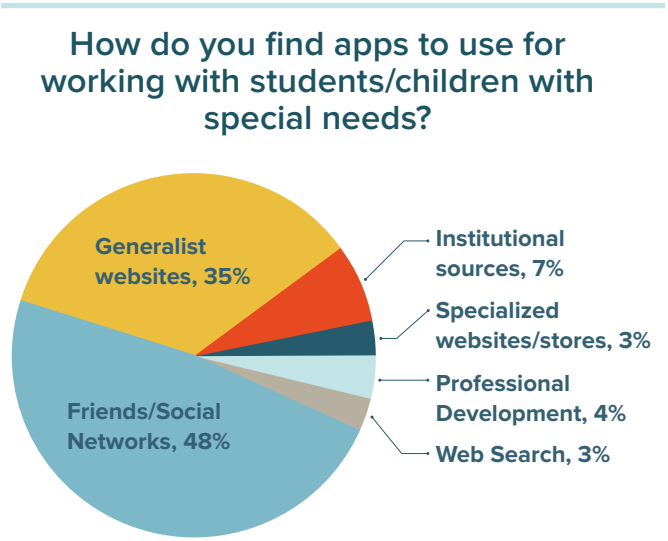


Chart 9 Locations where survey respondents found new apps.

RF16 Those interested in special education and mobile applications are excellent resources to find information about useful apps.

Survey participants were asked the top three apps they use for personal, administrative, and instructional uses. A complete list of all apps used appears in Appendices K, L, and M. A sampling of the top 10 cited apps for each category appears in Table 20. It is worth noting two themes within these lists. First, there are a significant higher number of personal apps shared than administrative or instructional. These fits within other trends (see Table 7, 10, 14, 15) that demonstrate that those interested in special education often use technology for their individual purposes more quickly than for administrative or instructional goals.

A second trend is related to the diversity of apps used within each category. For personal apps, there were 944 responses, 190 unique app names, and 126 apps with only 1 response (66.3%). Participants gave 435 administrative responses, 121 unique app names, and 78 apps with only 1 response (64.4%). Finally, there were 465 app responses about instruction, 235 unique app names, and nearly 72% (169) apps with only 1 response. This speaks to the diversity of apps available. It may also speak to the difficulty researchers have in understanding long-term app impact and teachers, parents, therapeutic professionals, and tech coordinators have in finding or hearing about apps.

Table 20
Top ten reported apps used for personal, administrative, and instructional outcomes.

PERSONAL (944)		ADMINISTRATIVE (435)		INSTRUCTIONAL (465)	
Name	**Number**	**Name**	**Number**	**Name**	**Number**
Facebook	177	Gmail	49	ClassDojo	16
Email	56	Email	48	Google Docs/Drive	16
Pinterest	56	Calendar	28	Google Classroom	13
Instagram	50	Google Drive	22	Kahoot!	13
Gmail	35	Google Docs	17	YouTube	11
Twitter	35	Chrome	14	Google	10
Weather	34	Pinterest	13	Quizlet	10
Fitness	28	Remind	12	MobyMax	9
Calendar	24	Google	10	Remind	9
Safari	21	Safari	10	BrainPOP	8

RF17 Age does not really make a difference in the use of mobile apps and devices for those interested in special education.

Educators often refer to the 'digital native' (Prensky, 2006)—students who grew up with technologies and therefore might be more likely to use those in settings range from home to school to work. For the most part, researchers have debunked this myth (e.g. Brown & Czerniewicz, 2010). For instance, researchers have provided evidence that although they may have more access to such tools and devices, it does not mean younger generations are more likely to use them for educational purposes and outcomes (Ferdig, Pytash, Merchant, & Nigh, 2014).

Crosstab analyses were run to compare age with personal use of both general technologies and mobile apps mentioned in this survey. The same analyses were not conducted with administrative and instructional uses of such devices for the obvious reason that younger survey respondents were more likely to still be in school. As such, they would have had almost no opportunity to employ such tools for administrative or instructional purposes.

There was only one statistically meaningful relationship observed between respondents' age and the type of technology or app used. The younger a participant, the more likely they were to make personal use of 'other social media' ($r = -.35$, $p < .001$). Other social media here could refer to *SnapChat* or *Periscope* but not more common tools like *Facebook* and *Twitter* (which were listed as their own categories).

More research should examine the types of apps being taught in teacher and special education programs and the transition to employment. However, this finding provides additional support to the argument that all users need support in learning how to use mobile devices and apps, regardless of their age or a digital native label.

Summary of Research Findings

Statistical analyses were run on data collected from completed surveys of 619 educators, students, administrators, parents, therapeutic professionals, and others interested in the intersection of mobile devices/apps and special education. Seventeen research findings emerged that provided evidence of both the promise and the needs related to mobile apps and devices for learners with special needs and/or disabilities. Survey respondents noted a gap in technology-related training, and more importantly, an incredibly low amount of professional development completed regarding mobile apps and devices. The positive news is that an overwhelming majority of all participants wanted future training in both areas. This desire to be educated is critical as many respondents listed themselves as early innovators while then demonstrating that they very infrequently used innovative tools (including mobile devices and apps).

There were significant differences between both how participants used technology (including mobile tools) and their beliefs about their current and future use and potential. This was often based on their personal experiences or their administrative and instructional goals. The main problem identified throughout these findings was that app use for students with special needs was more rare than the norm. It existed for math, literacy, social media use, and IFSP/IEP planning in limited doses.

IMPLICATIONS

There are three broad implications that can be derived from examining the literature review (LR) as well as the research findings provided from the survey (RF). At the intersection of mobile technology and special education, there needs to be additional: 1) professional development; 2) research; and 3) access.

IMPLICATION 1: There needs to be more professional development for all personnel working with mobile technologies and special education (RF 1, 2, 6, 11, 12, 13, 14, and 17).

Research has provided evidence that technologies have affordances and constraints that make them more or less useful for teaching and learning (Ferdig, 2006). Said differently, no technology, mobile device, or mobile app is going to serve as a single solution to all educational situations, applications, or needs.

Having said that, research has provided evidence that mobile technologies have the potential to positively impact teaching and learning. This evidence includes research supporting learners with special needs (LR 1, 2, 3, and 5). Teachers (general education, special education, and pre-service), parents, teacher educators, therapeutic professionals and administrators all have a responsibility to learn about the potential advantages and concerns of mobile tools; as such, they also have a right to quality professional development to learn about such tools.

Researchers contend that effective professional development must be sustained (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). This is particularly important for professional development related to mobile learning as technology changes quickly (RF 3; Gray, Thomas, & Lewis, 2010; Pytash, Ferdig, & Rasinski, 2013). New apps and mobile tools emerge daily. One-time trainings do not support the longitudinal professional growth of educators, parents, therapists, administrators, and paraprofessionals. They need opportunities to begin to see all technologies, and particularly mobile tools, as integral and integrated with learning and teaching objectives (Hutchison & Reinking, 2011).

IMPLICATION 2: There needs to be more research at the intersection of mobile technology and special education (LR7).

The literature review in this report provided references to existing research on mobile devices and apps for special education. Almost all of the articles referenced ended with a call for more research on this important area. This report concludes with a similar call. However, this research call is specific to some of the reported findings that deserve further exploration. For instance, a recent report demonstrated that Advanced Placement and National Writing Project teachers use mobile devices 73% of the time (Purcell, Heaps, Buchanan, Friedrich, 2013). Participants who responded to this survey reported far less mobile use for administrative and instructional purposes. Further research could explore these differences. Is this simply a descriptive variance based on the methodology of the study, or are there equity issues related to teacher, professional, and student use of apps (research finding 9)? Are current or future educators and other professionals using apps less because of availability, professional knowledge/development, or because of their beliefs (e.g. personal use, value, or their beliefs about student proficiency; research finding 10)?

This report began to explore the how often apps are used by those interested in special education. It divided those apps into personal, administrative, and instructional purposes and even asked respondents to include specific apps they use. However, future research needs to dig deeper into the use of specific apps. Such research would help answer not just if, but also how apps are being used in special education. Instead of asking if apps are beneficial, research could dig deeper into what apps are useful for what goals and with what types of student needs (RF4). Research could then examine the impact of the developer's perspectives (and related developer training) on that use (LR4).

IMPLICATION 3: There needs to be more access to tools at the intersection of mobile technology and special education (RF7).

A majority of survey participants find their apps through friends/social networks. Finding apps through social networks could be good or bad depending on the depth and breadth of one's network. The field needs better ways to access tools, devices, and apps that have been or could be used for special education (RF5). Access here could refer to actually physically access where there is funding for getting hardware and software. Access could also mean knowledge about what tools to use (RF 15 & 16). Finally access could mean getting to use tools that don't currently exist. The field needs developers to understand accessibility in developing apps; but the field also needs companies (for-profit and not-for-profit), universities, and government institutions to build or to fund the development of apps that meet the needs of parents, teachers, and therapeutic professionals (RF 10, 11, & 12).

CONCLUSION

This research project provided evidence from two data sources (a literature review and a survey) to document the need for additional professional development related to mobile devices and apps. It also highlighted the need for more research on the topic across multiple age levels and formal/informal settings. Finally, it noted the desire to have better access through knowledge dissemination and app development.

This report concludes with the introduction of the *SpedApps* project (http://spedapps.kent.edu) created at Kent State University and partially funded by a corporate contribution from AT&T. The project team consists of approximately eighteen faculty, staff and students, five external advisory board members, and three affiliated faculty. The project was created to address multiple goals in three specific phases:

1. To learn more about the current use of mobile technologies for special education.
2. To study the use of apps for special education.
3. To create new apps for use in special and general education learning environments.

The *SpedApps* project is mentioned here in the conclusion as its current projects are attempting to respond to the needs highlighted in this report. For instance, the team is currently building two free apps to study: a) multiplicative reasoning; and b) mobile-based professional development (see Figure 3). Anyone interested in either app will be able to download them at: http://spedapps.kent.edu/ourapps.php.

Number Line Touch: Multiplication

iPD: Professional Development

Figure 3 Two new apps being developed by *SpedApps* to respond to the need for more access.

More importantly and more related to this report, the project team has built a searchable, online database for anyone interested in app use for special education (http://spedapps.kent.edu; see Figure 4). The database currently contains over 430 apps related to both individual learner needs and content area acquisition. The database contains the app name, publisher, price, objective, content area, subdomain, intended audience, and disability tag. Most of the apps also contain an objective review of the app, focusing on whether the app provides practice, feedback, progress monitoring, usability affordances, and customization (see Figure 5). The database can be accessed through an alphabetical list, a keyword search, a simple search of topics, or an advanced search of any of the categories mentioned.

Two research findings emerged in this report that suggested that people interested in special education and mobile apps: **1**) find apps through social networks; and **2**) are a great resource for providing app insight to other users. Given these needs, one of the greatest potential features of the *SpedApps* website is the ability for users to create a username and participate in the uploading and review of apps. Much like an *Amazon* customer review, *SpedApps* allows users to make suggestions about apps. Additionally, logged-in users can provide their ratings of apps. Users are asked to provide an overall number rating, but they are also asked to provide specific details about when and how apps can be useful for various teaching and learning scenarios. It is hoped that such tools will promote conversation about and professional knowledge of apps that can fundamentally improve research, policy, and practice.

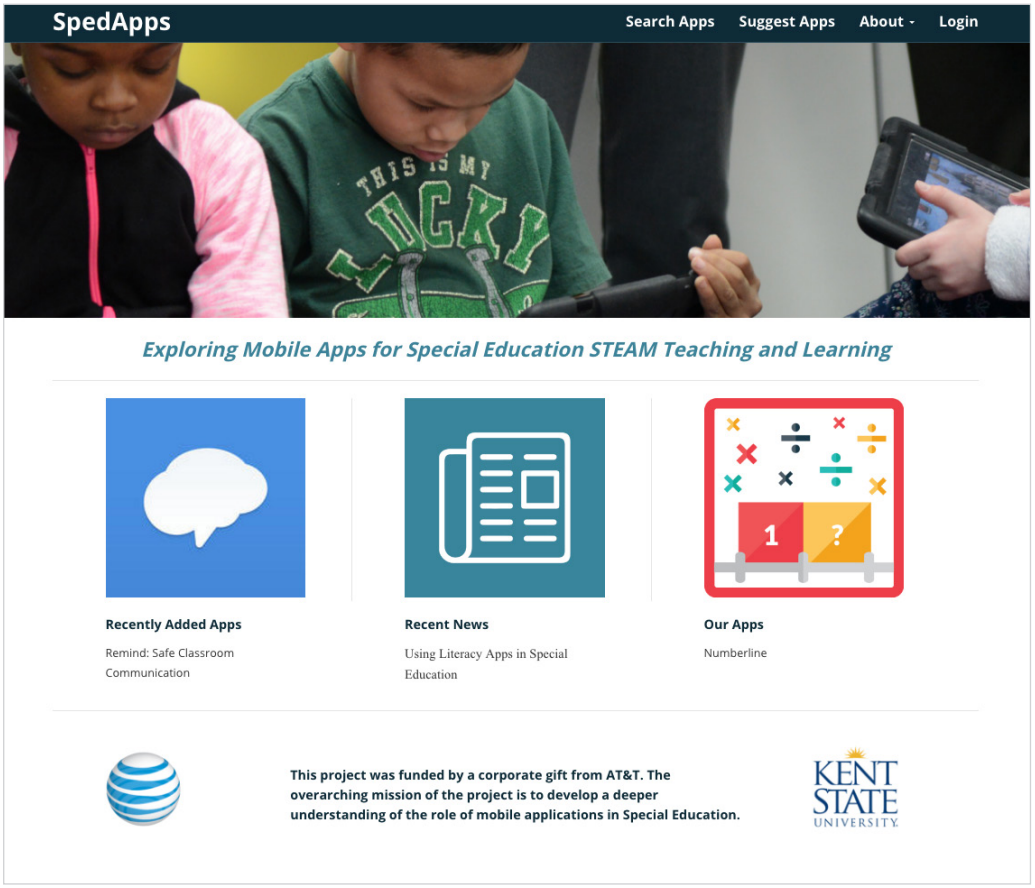


Figure 4 A screenshot of the *SpedApps* website available at: http://spedapps.kent.edu.

Figure 5 Screenshot example of an app in the *SpedApps* database.

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Appendix A : Special Education & Technology Survey[3]

Welcome to "Exploring Mobile Apps for Special Education STEAM Teaching and Learning," a web-based survey that examines how teachers, parents, administrators and other educators use mobile technology in special education. Before taking part in this study, please read the consent form below and click on the "I Agree" button at the bottom of the page if you understand the statements and freely consent to participate in the study.

(Consent Form)

If you are 18 years of age or older, understand the statements above, and freely consent to participate in the study, click on the "I Agree" button to begin the experiment.

- o I agree
- o I do not agree

1a Gender
- o Male
- o Female
- o Other

1b Year of Birth (please list 4 digits only; e.g. 1995)
Text box

1c Home ZIP code
Text box

1d Role
- o General Education Teacher
- o Special Education Teacher
- o Teacher Educator
- o Administrator (non-Therapeutic Support)
- o Parent/Caregiver
- o Therapeutic Professional (e.g. Itervention Specialist, School Psychologist, OT, PT, SLP, EI, etc.)
- o IT Professional
- o Other—*text box*

1e Ethnic Background
- o White/Caucasian
- o African-American
- o Hispanic/Latino/Latina
- o Asian/Pacific Islander
- o Native American
- o Other—*text box*

1f The highest degree that I have earned is:
- o Associate's Degree
- o Bachelor's Degree (B.A.; B.S.)
- o Master's Degree (M.A.; M.Ed.)
- o Educational Specialist Degree (Ed.S.)
- o Doctoral Degree (Ed.D.; Ph.D.; Psy.D.)
- o Other—*text box*

2a Please describe your primary work setting:
Text box

2b-i My primary work placement is within:
- o Preschool (ages 3–5 years)
- o Elementary School
- o Middle School
- o High School
- o Home-Based Services
- o Alternative Program or School
- o Therapeutic/Residential Treatment Facility
- o Juvenile Corrections
- o Administration Office
- o University
- o Vocational Training Program or School
- o Other—*text box*

2b-ii My primary work as an educator is conducted within:
- o General Education Classroom(s)
- o Special Education Classroom(s)
- o Resource Classroom(s)
- o Self-Contained Classroom(s)
- o Home Setting(s)
- o Other—*text box*

2c-i Total number of years in the profession (including this year):
- o 0–3
- o 4–6
- o 7–10
- o 10–15
- o 16–20
- o 20–25
- o 26+

[3]Some questions were only available to certain roles (e.g. teacher).

2c-ii Total number of years worked in your current position (including this year):

- o 0–3
- o 4–6
- o 7–10
- o 10–15
- o 16–20
- o 20–25
- o 26+

2c-iii Zip code of your work building

Text box

2d Which of these do you needs do you currently spend time working with (please check all that apply)?

- o Autism
- o Deaf-blindness
- o Deafness
- o Developmental delay
- o Emotional Disturbance
- o Hearing Impairment
- o Intellectual Disability
- o Multiple Disabilities
- o Orthopedic Impairment
- o Other Health Impaired
- o Specific Learning Disability
- o Speech or Language Impairment
- o Traumatic Brain Injury
- o Visual Impairment (including blindness)
- o N/A

2-e Certification type

- o Alternative Teacher/Administrator Preparation
- o Traditional Teacher/Administrator Preparation
- o N/A

2f My primary certification type

- o Administrator
- o Associate
- o Early Childhood (PK-3)
- o Middle Childhood (Grades 4-9)
- o Adolescence/Young Adult (Grades 7-12)
- o Multi-Age (PK-12)
- o Specialist (e.g., Behavior Analyst/Specialist; Intervention Specialist)
- o Career Tech
- o Professional Pupil Services
- o N/A

2g What ages and grade levels do you currently work with (please select all that apply)?

- o Ages Birth to 3 years old
- o Preschool
- o Kindergarten
- o 1st
- o 2nd
- o 3rd
- o 4th
- o 5th
- o 6th
- o 7th
- o 8th
- o 9th
- o 10th
- o 11th
- o 12th
- o Postsecondary

3a-i-par

Please rate how strongly you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Digital technologies are incredibly important in my personal life.	○	○	○	○	○
Digital technologies are fundamental for student learning.	○	○	○	○	○
Teachers or therapeutic professionals need to use digital technologies to improve their teaching.	○	○	○	○	○
Teachers and therapeutic professionals need to use digital technologies for IFSP/IEP planning/implementation/progress monitoring.	○	○	○	○	○
Students or children with special needs are best supported when digital technologies are used as a part of their teaching or learning environments.	○	○	○	○	○
Students or children with special needs are best supported when digital technologies are used as a part of their home environments.	○	○	○	○	○
There are numerous technologies available for students with special needs at my child's school or center.	○	○	○	○	○
My child's teachers are highly prepared to use technology to support my child's needs.	○	○	○	○	○
The professionals are able to support me to use technology at home.	○	○	○	○	○
I feel prepared to use technology to support my child at home.	○	○	○	○	○

3a-i-adm

Please rate how strongly you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Digital technologies are important in my personal life.	○	○	○	○	○
Digital technologies are fundamental for student learning.	○	○	○	○	○
Teachers or therapeutic professionals need to use digital technologies to improve their teaching.	○	○	○	○	○
Teachers and therapeutic professionals need to use digital technologies for IFSP/IEP planning/implementation/progress monitoring.	○	○	○	○	○
Students or children with special needs are best supported when digital technologies are used as a part of their teaching or learning environments.	○	○	○	○	○
Students or children with special needs are best supported when digital technologies are used as a part of their home environments.	○	○	○	○	○
My teachers strongly support the use of technology in teaching and learning.	○	○	○	○	○
My therapeutic professionals strongly support the use of technology in teaching and learning.	○	○	○	○	○
My district or center provides multiple opportunities to learn more about technology for supporting special education.	○	○	○	○	○
My teachers capitalize on professional development opportunities to learn about the use of new technologies for teaching and learning.	○	○	○	○	○
My therapeutic professionals capitalize on professional development opportunities to learn about the use of new technologies for teaching and learning.	○	○	○	○	○
I am fully prepared to use technologies to support teachers and therapeutic professionals of students with special needs.	○	○	○	○	○

3a-ii Regarding technology consumption and use, which of the following categories best describes you?

- o **INNOVATOR** - i.e., someone who adopts and experiments new and potentially groundbreaking technologies before their success or failure.
- o **EARLY ADOPTER** - i.e., someone who is open to use and promote new technologies but in a more cautious way in comparison with innovators.
- o **MASS FOLLOWER** - i.e., someone who adopts new technologies after shared legitimization and approval.
- o **LATE ADOPTER** - i.e., someone who adopts new technologies after average consumers and mass diffusion.
- o **SKEPTIC** - i.e., someone who refuses to utilize technologies.

3b

With which frequency (hours per week) do you use the following technologies for personal use (non-work related), administrative use (e.g., work email or creating lesson plans) or for instructional use (e.g., content delivery; working with students/children)?

	PERSONAL USE					ADMINISTRATIVE USE					INSTRUCTIONAL USE				
	0	1–5	6–10	11–20	21+	0	1–5	6–10	11–20	21+	0	1–5	6–10	11–20	21+
PC Desktop Laptop	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apple Desktop or Laptop	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Unix-based Desktop or Laptop	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Chromebook	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
iPhone	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
iPad	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Android Smartphone	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Android Tablet	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Microsoft Tablet	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Audio-player (e.g. Mp3 player)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
E-book reader (e.g. Kindle)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Smart-watch	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3D printer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Home gaming consoles (e.g. Wii)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Home gaming consoles (e.g. PSP)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SmartBoard or other Interactive Whiteboard	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Digital camera/video recorder	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TV/DVD Player	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Light table/overhead projector and screen	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Specific assistive technology devices (for special needs)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Facebook Account	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Twitter Account	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Other Social Media Account	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Your Own Website	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Q30 Have you been formally trained to use technology for instructional purposes?

o Yes
o No

Q31 Would you like to receive more training in the use of new technologies for instructional purposes?

o Yes
o No

4a Concerning mobile technologies, which of the following statements best describes you?

o I have never used mobile devices and apps to support a learner with special needs and I do not want to try.
o I have never used mobile devices and apps to support a learner with special needs but I am interested in learning how.
o I rarely use mobile devices and apps to support a learner with special needs.
o I sometimes use mobile devices and apps to support a learner with special needs.
o I frequently use mobile devices and apps to support a learner with special needs.

4b

Please rate how strongly you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
If I wanted to implement mobile devices and apps for working with students with special needs, I would have access to the technology to do so.					
I consider mobile technology (e.g. smartphones) and related apps an important tool for my personal enjoyment/growth					
I consider mobile technology (e.g. smartphones) and related apps an important tool in helping all students					
I consider mobile technology (e.g. smartphones) and related apps an important tool in helping students with special needs					
I consider myself to be prepared to use mobile devices and apps in teaching students with special needs					
I believe students with special needs already use mobile devices and apps in their lives					
I believe students with special needs already use mobile devices and apps in their learning					
I believe students with special needs are ready to use mobile devices and apps					
I believe most apps are accessible to all students					
I believe most apps are accessible to students with special needs					
I believe most educational apps are accessible to students with special needs					
I believe mobile devices and apps can be used with a universal approach to teaching and learning					
I believe mobile devices and apps can be used with a supplemental approach to teaching and learning					
I believe mobile devices and apps can be used with an intensive/targeted approach to teaching and learning					
I believe there are a sufficient number of apps to help with student differentiation.					
I believe there are a sufficient number of apps to help with customization of student learning					
I believe there are a sufficient number of apps to help students across the entire range of special needs					

4c

With which frequency (hours per week) do you use the following technologies for personal use (non-work related), administrative use (e.g., work email or creating lesson plans) or for instructional use (e.g., content delivery; working with students/children)?

	PERSONAL USE					ADMINISTRATIVE USE					INSTRUCTIONAL USE				
	0	1–5	6–10	11–20	21+	0	1–5	6–10	11–20	21+	0	1–5	6–10	11–20	21+
Apps for Organization	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Classroom Management	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Email	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Web Browsing	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Social Media (e.g. Facebook, Twitter)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Physical and Motor Skill	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Social and Emotional Development	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Mathematics	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Science	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Social Studies	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Communication, Language and Literacy	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Approaches Towards Learning	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Teaming and Collaboration	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for IFSP/IEP planning or implementation	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Apps for Gaming and Gamification	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Other Apps	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Q32 Are you trained to use apps?

o Yes
o No

Q33 Would you like to use apps more often?

o Yes
o No

4d-i Can you list the top three apps you use for your personal use (games or otherwise; please write N/A if you do not use apps or do not have a smartphone or other mobile device)?

Text box

4d-ii Can you list the top three apps you use for your administrative use (please write N/A if you do not use apps or do not have a smartphone or other mobile device)?
Text box

4d-iv Can you list the top three apps you use when you work with students/child (games or otherwise; please write N/A if you do not use apps or do not have a smartphone or other mobile device)?
Text box

4d-iii How do you find apps to use for working with students/children with special needs?
- o I don't use apps
- o Specialized websites
- o Generalist websites
- o Web research
- o Friends
- o Colleagues
- o Institutional sources (government, state department, etc.)
- o Social networks
- o Other

Appendix B : General education teachers' use of technology (n=143)

PERSONAL USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	19.58%	41.26%	15.38%	8.39%	15.38%
Apple Desktop or Laptop	62.94%	16.78%	9.79%	4.90%	5.59%
Unix-based Desktop or Laptop	95.80%	2.10%	1.40%	0.70%	0.00%
Chromebook	86.71%	8.39%	3.50%	0.70%	0.70%
iPhone	37.06%	10.49%	16.08%	11.89%	24.48%
iPad	49.65%	23.08%	15.38%	5.59%	6.29%
Android Smartphone	74.83%	4.90%	5.59%	4.90%	9.79%
Android Tablet	90.91%	6.99%	0.00%	0.00%	2.10%
Microsoft Tablet	92.31%	4.20%	2.10%	1.40%	0.00%
Audio-player (e.g. Mp3 player)	79.02%	12.59%	4.90%	2.10%	1.40%
E-book reader (e.g. Kindle)	69.93%	14.69%	9.79%	2.80%	2.80%
Smart-watch	95.10%	0.70%	0.70%	0.70%	2.80%
3D printer	96.50%	3.50%	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	81.82%	15.38%	2.10%	0.70%	0.00%
Handheld gaming systems (e.g., PSP)	95.80%	3.50%	0.70%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	93.71%	4.20%	1.40%	0.00%	0.70%
Digital camera/video recorder	53.85%	36.36%	7.69%	2.10%	0.00%
TV/DVD Player	14.69%	25.87%	29.37%	11.19%	18.88%
Light table/overhead projector and screen	92.31%	4.90%	2.10%	0.70%	0.00%
Specific assistive technology devices (for special needs)	95.80%	2.80%	1.40%	0.00%	0.00%
Facebook Account	27.97%	32.87%	18.88%	6.99%	13.29%
Twitter Account	67.83%	24.48%	4.20%	0.70%	2.80%
Other Social Media Account	62.24%	22.38%	10.49%	0.70%	4.20%
Your Own Website	87.41%	9.09%	2.10%	0.00%	1.40%

ADMINISTRATIVE USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	32.17%	20.98%	18.88%	18.88%	9.09%
Apple Desktop or Laptop	75.52%	10.49%	6.29%	3.50%	4.20%
Unix-based Desktop or Laptop	95.10%	1.40%	1.40%	0.70%	1.40%
Chromebook	88.11%	8.39%	2.80%	0.00%	0.70%
iPhone	71.33%	20.98%	3.50%	2.10%	2.10%
iPad	73.43%	20.28%	4.20%	0.70%	1.40%
Android Smartphone	88.81%	9.79%	1.40%	0.00%	0.00%
Android Tablet	98.60%	0.00%	0.00%	0.70%	0.70%
Microsoft Tablet	95.80%	1.40%	1.40%	0.70%	0.70%
Audio-player (e.g. Mp3 player)	97.90%	1.40%	0.70%	0.00%	0.00%
E-book reader (e.g. Kindle)	97.90%	2.10%	0.00%	0.00%	0.00%
Smart-watch	97.90%	2.10%	0.00%	0.00%	0.00%
3D printer	98.60%	1.40%	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	98.60%	1.40%	0.00%	0.00%	0.00%
Handheld gaming systems (e.g., PSP)	99.30%	0.70%	0.00%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	79.02%	13.99%	2.10%	3.50%	1.40%
Digital camera/video recorder	83.92%	14.69%	1.40%	0.00%	0.00%
TV/DVD Player	90.21%	8.39%	1.40%	0.00%	0.00%
Light table/overhead projector and screen	87.41%	6.29%	4.20%	0.70%	1.40%
Specific assistive technology devices (for special needs)	96.50%	0.70%	1.40%	0.70%	0.70%
Facebook Account	93.71%	4.90%	0.70%	0.00%	0.70%
Twitter Account	92.31%	4.90%	1.40%	0.70%	0.70%
Other Social Media Account	91.61%	4.90%	2.10%	0.70%	0.70%
Your Own Website	77.62%	13.29%	6.29%	0.70%	2.10%

INSTRUCTIONAL USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	15.38%	33.57%	20.98%	13.99%	16.08%
Apple Desktop or Laptop	73.43%	11.19%	5.59%	5.59%	4.20%
Unix-based Desktop or Laptop	93.01%	3.50%	1.40%	1.40%	0.70%
Chromebook	51.05%	27.27%	12.59%	4.90%	4.20%
iPhone	76.22%	18.18%	2.80%	1.40%	1.40%
iPad	66.43%	24.48%	6.99%	0.70%	1.40%
Android Smartphone	90.21%	6.99%	2.80%	0.00%	0.00%
Android Tablet	97.20%	2.10%	0.00%	0.00%	0.70%
Microsoft Tablet	94.41%	3.50%	0.70%	1.40%	0.00%
Audio-player (e.g. Mp3 player)	90.91%	7.69%	1.40%	0.00%	0.00%
E-book reader (e.g. Kindle)	92.31%	6.29%	0.70%	0.70%	0.00%
Smart-watch	97.20%	2.80%	0.00%	0.00%	0.00%
3D printer	95.10%	4.90%	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	97.90%	2.10%	0.00%	0.00%	0.00%
Handheld gaming systems (e.g., PSP)	97.20%	2.10%	0.70%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	32.87%	27.27%	11.89%	11.19%	16.78%
Digital camera/video recorder	76.22%	20.98%	2.80%	0.00%	0.00%
TV/DVD Player	59.44%	35.66%	4.20%	0.00%	0.70%
Light table/overhead projector and screen	55.94%	15.38%	13.29%	4.90%	10.49%
Specific assistive technology devices (for special needs)	87.41%	9.09%	1.40%	0.70%	1.40%
Facebook Account	93.71%	3.50%	2.10%	0.70%	0.00%
Twitter Account	92.31%	4.90%	2.10%	0.00%	0.70%
Other Social Media Account	87.41%	7.69%	4.20%	0.00%	0.70%
Your Own Website	71.33%	17.48%	7.69%	0.70%	2.80%

Appendix C : Special education teachers' use of technology (n=123)

PERSONAL USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	34.15%	36.59%	12.20%	12.20%	4.88%
Apple Desktop or Laptop	60.16%	14.63%	8.13%	8.13%	8.94%
Unix-based Desktop or Laptop	96.75%	3.25%	0.00%	0.00%	0.00%
Chromebook	84.55%	12.20%	0.81%	1.63%	0.81%
iPhone	28.46%	10.57%	17.07%	15.45%	28.46%
iPad	34.96%	28.46%	21.95%	7.32%	7.32%
Android Smartphone	73.17%	8.13%	3.25%	5.69%	9.76%
Android Tablet	93.50%	1.63%	1.63%	1.63%	1.63%
Microsoft Tablet	95.93%	1.63%	1.63%	0.81%	0.00%
Audio-player (e.g. Mp3 player)	78.86%	11.38%	6.50%	0.81%	2.44%
E-book reader (e.g. Kindle)	77.24%	11.38%	8.13%	1.63%	1.63%
Smart-watch	98.37%	0.00%	0.81%	0.00%	0.81%
3D printer	98.37%	1.63%	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	82.93%	12.20%	2.44%	0.81%	1.63%
Handheld gaming systems (e.g., PSP)	97.56%	1.63%	0.81%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	92.68%	4.07%	0.81%	1.63%	0.81%
Digital camera/video recorder	62.60%	29.27%	7.32%	0.00%	0.81%
TV/DVD Player	13.82%	28.46%	26.02%	19.51%	12.20%
Light table/overhead projector and screen	95.93%	2.44%	0.81%	0.00%	0.81%
Specific assistive technology devices (for special needs)	95.12%	2.44%	2.44%	0.00%	0.00%
Facebook Account	20.33%	29.27%	26.83%	12.20%	11.38%
Twitter Account	75.61%	13.01%	7.32%	2.44%	1.63%
Other Social Media Account	59.35%	23.58%	10.57%	3.25%	3.25%
Your Own Website	97.56%	1.63%	0.81%	0.00%	0.00%

ADMINISTRATIVE USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	26.83%	18.70%	26.83%	16.26%	11.38%
Apple Desktop or Laptop	82.93%	7.32%	4.88%	3.25%	1.63%
Unix-based Desktop or Laptop	97.56%	0.81%	0.81%	0.00%	0.81%
Chromebook	80.49%	18.70%	0.81%	0.00%	0.00%
iPhone	70.73%	23.58%	3.25%	1.63%	0.81%
iPad	71.54%	19.51%	5.69%	0.00%	3.25%
Android Smartphone	88.62%	8.94%	1.63%	0.81%	0.00%
Android Tablet	96.75%	2.44%	0.81%	0.00%	0.00%
Microsoft Tablet	96.75%	1.63%	0.81%	0.81%	0.00%
Audio-player (e.g. Mp3 player)	95.12%	4.88%	0.00%	0.00%	0.00%
E-book reader (e.g. Kindle)	96.75%	1.63%	1.63%	0.00%	0.00%
Smart-watch	98.37%	1.63%	0.00%	0.00%	0.00%
3D printer	97.56%	1.63%	0.81%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	99.19%	0.81%	0.00%	0.00%	0.00%
Handheld gaming systems (e.g., PSP)	98.37%	1.63%	0.00%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	73.98%	17.89%	4.07%	2.44%	1.63%
Digital camera/video recorder	94.31%	4.88%	0.81%	0.00%	0.00%
TV/DVD Player	87.80%	8.94%	0.81%	1.63%	0.81%
Light table/overhead projector and screen	91.87%	6.50%	0.81%	0.00%	0.81%
Specific assistive technology devices (for special needs)	93.50%	3.25%	2.44%	0.81%	0.00%
Facebook Account	95.93%	3.25%	0.81%	0.00%	0.00%
Twitter Account	95.93%	3.25%	0.81%	0.00%	0.00%
Other Social Media Account	95.93%	4.07%	0.00%	0.00%	0.00%
Your Own Website	95.12%	4.07%	0.00%	0.00%	0.81%

INSTRUCTIONAL USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	17.07%	39.84%	22.76%	9.76%	10.57%
Apple Desktop or Laptop	83.74%	8.13%	4.07%	1.63%	2.44%
Unix-based Desktop or Laptop	95.12%	4.07%	0.81%	0.00%	0.00%
Chromebook	55.28%	29.27%	10.57%	2.44%	2.44%
iPhone	73.17%	18.70%	5.69%	0.81%	1.63%
iPad	41.46%	33.33%	17.07%	2.44%	5.69%
Android Smartphone	91.87%	6.50%	1.63%	0.00%	0.00%
Android Tablet	97.56%	2.44%	0.00%	0.00%	0.00%
Microsoft Tablet	97.56%	2.44%	0.00%	0.00%	0.00%
Audio-player (e.g. Mp3 player)	84.55%	12.20%	2.44%	0.00%	0.81%
E-book reader (e.g. Kindle)	87.80%	8.13%	2.44%	0.00%	1.63%
Smart-watch	98.37%	1.63%	0.00%	0.00%	0.00%
3D printer	97.56%	2.44%	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	98.37%	1.63%	0.00%	0.00%	0.00%
Handheld gaming systems (e.g., PSP)	97.56%	2.44%	0.00%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	40.65%	21.14%	18.70%	8.94%	10.57%
Digital camera/video recorder	82.11%	16.26%	1.63%	0.00%	0.00%
TV/DVD Player	68.29%	25.20%	4.07%	1.63%	0.81%
Light table/overhead projector and screen	68.29%	17.89%	4.88%	4.88%	4.07%
Specific assistive technology devices (for special needs)	68.29%	16.26%	10.57%	3.25%	1.63%
Facebook Account	93.50%	5.69%	0.81%	0.00%	0.00%
Twitter Account	95.93%	4.07%	0.00%	0.00%	0.00%
Other Social Media Account	93.50%	6.50%	0.00%	0.00%	0.00%
Your Own Website	92.68%	4.88%	1.63%	0.00%	0.81%

Appendix D : Statistical analysis of general vs. special education teachers' technology use

	General Ed	Special Ed	*t*-Statistic	Unadjusted *p*-value	Simes Adjusted *p*-value
PC Desktop/Laptop	*M* = 2.81 *SD* = 1.32	*M* = 2.57 *SD* = 1.20	1.59	0.113	0.281
Apple Desktop/Laptop	*M* = 1.54 *SD* = 1.08	*M* = 1.31 *SD* = .83	1.95	0.052	0.208
Unix-based Desktop/Laptop	*M* = 1.41 *SD* = .57	*M* = 1.06 *SD* = .27	1.49	0.136	0.297
Chromebook	*M* = 1.81 *SD* = 1.08	*M* = 1.67 *SD* = .94	1.07	0.287	0.492
iPhone	*M* = 1.32 *SD* = .72	*M* = 1.39 *SD* = .78	-0.78	0.438	0.510
iPad	***M* = 1.44** ***SD* = .76**	***M* = 1.98** ***SD* = 1.10**	**-4.74*****	**0.000**	**0.000**
Android Smartphone	*M* = 1.13 *SD* = .41	*M* = 1.10 *SD* = .35	0.76	0.446	0.510
Android Tablet	*M* = 1.05 *SD* = .36	*M* = 1.02 *SD* = .16	0.83	0.410	0.510
Microsoft Tablet	*M* = 1.09 *SD* = .42	*M* = 1.02 *SD* = .16	1.57	0.117	0.281
Audio player	*M* = 1.15 *SD* = .52	*M* = 1.20 *SD* = .56	-0.86	0.389	0.510
Ebook reader	*M* = 1.09 *SD* = .37	*M* = 1.20 *SD* = .64	-1.65	0.101	0.281
Smart watch	*M* = 1.03 *SD* = .16	*M* = 1.02 *SD* = .13	0.58	0.561	0.612
3D Printer	*M* = 1.05 *SD* = .21	*M* = 1.02 *SD* = .16	0.97	0.331	0.510
Homegaming console	*M* = 1.02 *SD* = .14	*M* = 1.02 *SD* = .13	0.23	0.819	0.819
Handheld gaming system	*M* = 1.03 *SD* = .21	*M* = 1.02 *SD* = .16	0.39	0.699	0.729
Smartboard or other interactive Whiteboad	*M* = 2.49 *SD* = 1.48	*M* = 2.28 *SD* = 1.36	1.25	0.212	0.397
Digital Camera/video recorder	*M* = 1.27 *SD* = .50	*M* = 1.20 *SD* = .44	1.24	0.215	0.397
TV/DVD Player	*M* = 1.48 *SD* = .67	*M* = 1.41 *SD* = .72	0.77	0.441	0.510
Light table / overhead projector and screen	***M* = 2.01** ***SD* = 1.38**	***M* = 1.59** ***SD* = 1.06**	**2.83***	**0.005**	**0.03**
Specific assistive technology device (for special needs)	***M* = 1.21** ***SD* = .66**	***M* = 1.54** ***SD* = .93**	**-3.43****	**0.001**	**0.008**
Facebook Account	*M* = 1.11 *SD* = .47	*M* = 1.07 *SD* = .29	0.83	0.410	0.510
Twitter Account	*M* = 1.11 *SD* = .47	*M* = 1.04 *SD* = .20	1.60	0.111	0.281
Other Social Media Account	*M* = 1.18 *SD* = .56	*M* = 1.07 *SD* = .25	2.13	0.035	0.168
Your own website	***M* = 1.45** ***SD* = .88**	***M* = 1.11** ***SD* = .48**	**3.84*****	**0.000**	**0.000**

[a] *p < .10, *p < .05, **p < .01, ***p < .001*

Appendix E : General education teachers' use of apps (n=135)

PERSONAL USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	45.31%	35.16%	13.28%	3.91%	2.34%
Apps for Classroom Management	77.34%	15.63%	3.91%	2.34%	0.78%
Apps for Email	21.09%	41.41%	19.53%	7.81%	10.16%
Apps for Web Browsing	24.22%	36.72%	21.09%	6.25%	11.72%
Apps for Social Media (e.g. Facebook, Twitter)	27.34%	35.94%	21.88%	6.25%	8.59%
Apps for Physical and Motor Skill Development	85.16%	10.16%	2.34%	1.56%	0.78%
Apps for Social and Emotional Development	84.38%	11.72%	3.13%	0.00%	0.78%
Apps for Mathematics	78.13%	18.75%	2.34%	0.00%	0.78%
Apps for Science	80.47%	14.06%	5.47%	0.00%	0.00%
Apps for Social Studies	87.50%	11.72%	0.78%	0.00%	0.00%
Apps for Communication, Language and Literacy	75.00%	20.31%	1.56%	0.00%	3.13%
Apps for Approaches Towards Learning	77.34%	20.31%	1.56%	0.00%	0.78%
Apps for Teaming and Collaboration	75.78%	20.31%	2.34%	0.00%	1.56%
Apps for IFSP/IEP planning or implementation	90.63%	7.81%	1.56%	0.00%	0.00%
Apps for Gaming and Gamification	64.06%	25.78%	8.59%	0.78%	0.78%
Other Apps	53.13%	28.13%	13.28%	3.13%	2.34%

ADMINISTRATIVE USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	65.63%	26.56%	3.13%	2.34%	2.34%
Apps for Classroom Management	67.19%	23.44%	4.69%	0.78%	3.91%
Apps for Email	50.00%	26.56%	12.50%	5.47%	5.47%
Apps for Web Browsing	56.25%	27.34%	9.38%	3.13%	3.91%
Apps for Social Media (e.g. Facebook, Twitter)	84.38%	8.59%	3.91%	1.56%	1.56%
Apps for Physical and Motor Skill Development	90.63%	7.81%	0.78%	0.78%	0.00%
Apps for Social and Emotional Development	90.63%	7.03%	0.78%	1.56%	0.00%
Apps for Mathematics	84.38%	13.28%	1.56%	0.78%	0.00%
Apps for Science	87.50%	10.94%	1.56%	0.00%	0.00%
Apps for Social Studies	90.63%	8.59%	0.78%	0.00%	0.00%
Apps for Communication, Language and Literacy	80.47%	17.19%	0.78%	0.78%	0.78%
Apps for Approaches Towards Learning	81.25%	15.63%	1.56%	0.78%	0.78%
Apps for Teaming and Collaboration	79.69%	15.63%	3.13%	0.78%	0.78%
Apps for IFSP/IEP planning or implementation	92.97%	6.25%	0.78%	0.00%	0.00%
Apps for Gaming and Gamification	92.19%	7.03%	0.78%	0.00%	0.00%
Other Apps	82.03%	14.06%	2.34%	0.00%	1.56%

INSTRUCTIONAL USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	63.28%	25.00%	5.47%	3.13%	3.13%
Apps for Classroom Management	61.72%	21.88%	9.38%	1.56%	5.47%
Apps for Email	56.25%	28.13%	8.59%	2.34%	4.69%
Apps for Web Browsing	51.56%	29.69%	10.94%	3.13%	4.69%
Apps for Social Media (e.g. Facebook, Twitter)	78.91%	14.84%	3.91%	2.34%	0.00%
Apps for Physical and Motor Skill Development	85.16%	10.16%	3.91%	0.78%	0.00%
Apps for Social and Emotional Development	85.16%	11.72%	2.34%	0.78%	0.00%
Apps for Mathematics	63.28%	28.91%	5.47%	0.78%	1.56%
Apps for Science	72.66%	20.31%	6.25%	0.00%	0.78%
Apps for Social Studies	78.13%	16.41%	5.47%	0.00%	0.00%
Apps for Communication, Language and Literacy	67.19%	24.22%	7.81%	0.00%	0.78%
Apps for Approaches Towards Learning	70.31%	21.88%	6.25%	0.00%	1.56%
Apps for Teaming and Collaboration	77.34%	11.72%	8.59%	0.00%	2.34%
Apps for IFSP/IEP planning or implementation	85.16%	12.50%	2.34%	0.00%	0.00%
Apps for Gaming and Gamification	80.47%	16.41%	3.13%	0.00%	0.00%
Other Apps	73.44%	21.88%	3.91%	0.00%	0.78%

Appendix F : Special education teachers' use of apps (n=108)

PERSONAL USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	48.15%	37.96%	6.48%	2.78%	4.63%
Apps for Classroom Management	84.26%	12.04%	3.70%	0.00%	0.00%
Apps for Email	21.30%	43.52%	16.67%	6.48%	12.04%
Apps for Web Browsing	20.37%	37.04%	20.37%	8.33%	13.89%
Apps for Social Media (e.g. Facebook, Twitter)	22.22%	37.96%	20.37%	9.26%	10.19%
Apps for Physical and Motor Skill Development	87.96%	7.41%	2.78%	0.00%	1.85%
Apps for Social and Emotional Development	90.74%	4.63%	0.93%	0.00%	3.70%
Apps for Mathematics	76.85%	17.59%	3.70%	0.00%	1.85%
Apps for Science	87.04%	11.11%	1.85%	0.00%	0.00%
Apps for Social Studies	88.89%	9.26%	1.85%	0.00%	0.00%
Apps for Communication, Language and Literacy	81.48%	13.89%	3.70%	0.00%	0.93%
Apps for Approaches Towards Learning	81.48%	13.89%	3.70%	0.93%	0.00%
Apps for Teaming and Collaboration	86.11%	10.19%	1.85%	0.00%	1.85%
Apps for IFSP/IEP planning or implementation	81.48%	15.74%	2.78%	0.00%	0.00%
Apps for Gaming and Gamification	70.37%	19.44%	4.63%	1.85%	3.70%
Other Apps	58.33%	25.00%	11.11%	0.93%	4.63%

ADMINISTRATIVE USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	71.30%	18.52%	5.56%	2.78%	1.85%
Apps for Classroom Management	79.63%	12.96%	4.63%	2.78%	0.00%
Apps for Email	49.07%	25.00%	15.74%	2.78%	7.41%
Apps for Web Browsing	59.26%	21.30%	12.96%	3.70%	2.78%
Apps for Social Media (e.g. Facebook, Twitter)	91.67%	6.48%	0.93%	0.93%	0.00%
Apps for Physical and Motor Skill Development	97.22%	1.85%	0.93%	0.00%	0.00%
Apps for Social and Emotional Development	95.37%	2.78%	1.85%	0.00%	0.00%
Apps for Mathematics	79.63%	15.74%	3.70%	0.00%	0.93%
Apps for Science	89.81%	8.33%	1.85%	0.00%	0.00%
Apps for Social Studies	91.67%	6.48%	1.85%	0.00%	0.00%
Apps for Communication, Language and Literacy	80.56%	13.89%	3.70%	0.93%	0.93%
Apps for Approaches Towards Learning	83.33%	12.04%	2.78%	1.85%	0.00%
Apps for Teaming and Collaboration	86.11%	8.33%	3.70%	0.93%	0.93%
Apps for IFSP/IEP planning or implementation	79.63%	12.96%	2.78%	3.70%	0.93%
Apps for Gaming and Gamification	91.67%	4.63%	3.70%	0.00%	0.00%
Other Apps	79.63%	15.74%	3.70%	0.00%	0.93%

INSTRUCTIONAL USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	73.15%	19.44%	5.56%	0.93%	0.93%
Apps for Classroom Management	66.67%	24.07%	6.48%	1.85%	0.93%
Apps for Email	70.37%	18.52%	7.41%	0.00%	3.70%
Apps for Web Browsing	56.48%	25.93%	12.04%	2.78%	2.78%
Apps for Social Media (e.g. Facebook, Twitter)	90.74%	6.48%	2.78%	0.00%	0.00%
Apps for Physical and Motor Skill Development	82.41%	12.04%	3.70%	0.93%	0.93%
Apps for Social and Emotional Development	81.48%	11.11%	6.48%	0.93%	0.00%
Apps for Mathematics	51.85%	31.48%	12.96%	1.85%	1.85%
Apps for Science	74.07%	19.44%	4.63%	0.93%	0.93%
Apps for Social Studies	75.93%	17.59%	4.63%	0.93%	0.93%
Apps for Communication, Language and Literacy	50.93%	33.33%	10.19%	1.85%	3.70%
Apps for Approaches Towards Learning	66.67%	20.37%	8.33%	4.63%	0.00%
Apps for Teaming and Collaboration	79.63%	13.89%	4.63%	1.85%	0.00%
Apps for IFSP/IEP planning or implementation	76.85%	15.74%	5.56%	1.85%	0.00%
Apps for Gaming and Gamification	75.93%	16.67%	4.63%	1.85%	0.93%
Other Apps	70.37%	21.30%	6.48%	0.93%	0.93%

Appendix G : Statistical analysis of general vs. special education teachers' app use

	General Ed	Special Ed	*t*-Statistic	Unadjusted *p*-value	Simes Adjusted *p*-value
Apps for Organization	*M* = 1.55 *SD* = .94	*M* = 1.37 *SD* = .72	1.62	0.107	0.214
Apps for Classroom Management	*M* = 1.71 *SD* = 1.14	*M* = 1.46 *SD* = .78	1.93	0.055	0.176
Apps for Email	*M* = 1.70 *SD* = 1.03	*M* = 1.48 *SD* = .92	1.75	0.081	0.190
Apps for Web Browsing	*M* = 1.78 *SD* = 1.06	*M* = 1.69 *SD* = .98	0.63	0.529	0.564
Apps for Social Media (e.g. Facebook and Twitter)	***M* = 1.18** ***SD* = .49**	***M* = 1.27** ***SD* = .62**	**2.72[a]**	**0.024**	**0.096**
Apps for Physical and Motor Skill	*M* = 1.18 *SD* = .49	*M* = 1.27 *SD* = .62	-0.78	0.439	0.502
Apps for Social and Emotional Development	*M* = 1.26 *SD* = .55	*M* = 1.33 *SD* = .70	-1.28	0.203	0.352
Apps for Mathematics	***M* = 1.46** ***SD* = .76**	***M* = 1.70** ***SD* = .90**	**-2.30[a]**	**0.023**	**0.096**
Apps for Science	*M* = 1.34 *SD* = .66	*M* = 1.35 *SD* = .70	-0.13	0.899	0.899
Apps for Social Studies	*M* = 1.26 *SD* = .55	*M* = 1.33 *SD* = .70	-0.93	0.354	0.473
Apps for Communication, Language and Literacy	***M* = 1.41** ***SD* = .69**	***M* = 1.74** ***SD* = .98**	**-3.10***	**0.002**	**0.032**
Apps for Approaches Towards Learning	*M* = 1.39 *SD* = .73	*M* = 1.51 *SD* = .84	-1.23	0.220	0.352
Apps for Teaming and Collaboration	*M* = 1.36 *SD* = .82	*M* = 1.29 *SD* = .64	0.79	0.430	0.502
Apps for IFSP/IEP planning or implementation	***M* = 1.16** ***SD* = .43**	***M* = 1.32** ***SD* = .67**	**-2.28[a]**	**0.023**	**0.096**
Apps for Gaming and Gamification	*M* = 1.21 *SD* = .48	*M* = 1.35 *SD* = .74	-1.74	0.083	0.190
Other Apps	*M* = 1.33 *SD* = .63	*M* = 1.41 *SD* = .74	-0.93	0.355	0.473

[a] *p < .10, *p < .05, **p < .01, ***p < .001*

Appendix H : Therapeutic Professionals' use of technology (n=35)

PERSONAL USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	25.71%	48.57%	11.43%	8.57%	5.71%
Apple Desktop or Laptop	68.57%	20.00%	5.71%	2.86%	2.86%
Unix-based Desktop or Laptop	97.14%	2.86%	0.00%	0.00%	0.00%
Chromebook	97.14%	0.00%	2.86%	0.00%	0.00%
iPhone	28.57%	17.14%	28.57%	17.14%	8.57%
iPad	51.43%	34.29%	14.29%	0.00%	0.00%
Android Smartphone	74.29%	2.86%	8.57%	8.57%	5.71%
Android Tablet	94.29%	5.71%	0.00%	0.00%	0.00%
Microsoft Tablet	91.43%	5.71%	0.00%	0.00%	2.86%
Audio-player (e.g. Mp3 player)	71.43%	20.00%	5.71%	2.86%	0.00%
E-book reader (e.g. Kindle)	65.71%	20.00%	11.43%	2.86%	0.00%
Smart-watch	97.14%	2.86%	0.00%	0.00%	0.00%
3D printer	100.00%	0.00%	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	88.57%	11.43%	0.00%	0.00%	0.00%
Handheld gaming systems (e.g., PSP)	100.00%	0.00%	0.00%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	100.00%	0.00%	0.00%	0.00%	0.00%
Digital camera/video recorder	31.43%	65.71%	0.00%	0.00%	2.86%
TV/DVD Player	8.57%	34.29%	34.29%	14.29%	8.57%
Light table/overhead projector and screen	94.29%	5.71%	0.00%	0.00%	0.00%
Specific assistive technology devices (for special needs)	94.29%	5.71%	0.00%	0.00%	0.00%
Facebook Account	17.14%	62.86%	11.43%	2.86%	5.71%
Twitter Account	74.29%	20.00%	2.86%	0.00%	2.86%
Other Social Media Account	77.14%	22.86%	0.00%	0.00%	0.00%
Your Own Website	97.14%	2.86%	0.00%	0.00%	0.00%

ADMINISTRATIVE USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	11.43%	22.86%	20.00%	22.86%	22.86%
Apple Desktop or Laptop	85.71%	14.29%	0.00%	0.00%	0.00%
Unix-based Desktop or Laptop	97.14%	0.00%	0.00%	0.00%	2.86%
Chromebook	88.57%	11.43%	0.00%	0.00%	0.00%
iPhone	62.86%	34.29%	0.00%	2.86%	0.00%
iPad	65.71%	22.86%	11.43%	0.00%	0.00%
Android Smartphone	80.00%	20.00%	0.00%	0.00%	0.00%
Android Tablet	100.00%	0.00%	0.00%	0.00%	0.00%
Microsoft Tablet	94.29%	0.00%	5.71%	0.00%	0.00%
Audio-player (e.g. Mp3 player)	94.29%	5.71%	0.00%	0.00%	0.00%
E-book reader (e.g. Kindle)	94.29%	5.71%	0.00%	0.00%	0.00%
Smart-watch	100.00%	0.00%	0.00%	0.00%	0.00%
3D printer	100.00%	0.00%	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	100.00%	0.00%	0.00%	0.00%	0.00%
Handheld gaming systems (e.g., PSP)	100.00%	0.00%	0.00%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	88.57%	11.43%	0.00%	0.00%	0.00%
Digital camera/video recorder	91.43%	8.57%	0.00%	0.00%	0.00%
TV/DVD Player	97.14%	0.00%	2.86%	0.00%	0.00%
Light table/overhead projector and screen	91.43%	2.86%	5.71%	0.00%	0.00%
Specific assistive tech devices (for special needs)	77.14%	22.86%	0.00%	0.00%	0.00%
Facebook Account	91.43%	5.71%	2.86%	0.00%	0.00%
Twitter Account	100.00%	0.00%	0.00%	0.00%	0.00%
Other Social Media Account	88.57%	8.57%	2.86%	0.00%	0.00%
Your Own Website	94.29%	2.86%	2.86%	0.00%	0.00%

INSTRUCTIONAL USE OF TECHNOLOGY (HRS/WEEK)	0	1–5	6–10	11–20	21+
PC Desktop or Laptop	25.71%	60.00%	5.71%	8.57%	0.00%
Apple Desktop or Laptop	94.29%	5.71%	0.00%	0.00%	0.00%
Unix-based Desktop or Laptop	97.14%	0.00%	2.86%	0.00%	0.00%
Chromebook	82.86%	17.14%	0.00%	0.00%	0.00%
iPhone	74.29%	22.86%	2.86%	0.00%	0.00%
iPad	37.14%	48.57%	14.29%	0.00%	0.00%
Android Smartphone	91.43%	8.57%	0.00%	0.00%	0.00%
Android Tablet	94.29%	5.71%	0.00%	0.00%	0.00%
Microsoft Tablet	100.00%	0.00%	0.00%	0.00%	0.00%
Audio-player (e.g. Mp3 player)	88.57%	11.43%	0.00%	0.00%	0.00%
E-book reader (e.g. Kindle)	94.29%	5.71%	0.00%	0.00%	0.00%
Smart-watch	100.00%	0.00%	0.00%	0.00%	0.00%
3D printer	100.00%	0.00%	0.00%	0.00%	0.00%
Home gaming consoles (e.g., Wii)	100.00%	0.00%	0.00%	0.00%	0.00%
Handheld gaming systems (e.g., PSP)	100.00%	0.00%	0.00%	0.00%	0.00%
SmartBoard or other Interactive Whiteboard	82.86%	11.43%	5.71%	0.00%	0.00%
Digital camera/video recorder	80.00%	20.00%	0.00%	0.00%	0.00%
TV/DVD Player	91.43%	5.71%	2.86%	0.00%	0.00%
Light table/overhead projector and screen	82.86%	17.14%	0.00%	0.00%	0.00%
Specific assistive technology devices (for special needs)	57.14%	34.29%	5.71%	0.00%	2.86%
Facebook Account	94.29%	5.71%	0.00%	0.00%	0.00%
Twitter Account	91.43%	8.57%	0.00%	0.00%	0.00%
Other Social Media Account	91.43%	8.57%	0.00%	0.00%	0.00%
Your Own Website	100.00%	0.00%	0.00%	0.00%	0.00%

Appendix I : Therapeutic Professionals' use of apps (n=32)

PERSONAL USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	40.63%	59.38%	0.00%	0.00%	0.00%
Apps for Classroom Management	96.88%	3.13%	0.00%	0.00%	0.00%
Apps for Email	12.50%	56.25%	21.88%	6.25%	3.13%
Apps for Web Browsing	12.50%	50.00%	31.25%	3.13%	3.13%
Apps for Social Media (e.g. Facebook, Twitter)	18.75%	62.50%	9.38%	6.25%	3.13%
Apps for Physical and Motor Skill Development	93.75%	3.13%	3.13%	0.00%	0.00%
Apps for Social and Emotional Development	96.88%	3.13%	0.00%	0.00%	0.00%
Apps for Mathematics	90.63%	9.38%	0.00%	0.00%	0.00%
Apps for Science	100.00%	0.00%	0.00%	0.00%	0.00%
Apps for Social Studies	100.00%	0.00%	0.00%	0.00%	0.00%
Apps for Communication, Language and Literacy	81.25%	18.75%	0.00%	0.00%	0.00%
Apps for Approaches Towards Learning	93.75%	6.25%	0.00%	0.00%	0.00%
Apps for Teaming and Collaboration	90.63%	9.38%	0.00%	0.00%	0.00%
Apps for IFSP/IEP planning or implementation	93.75%	6.25%	0.00%	0.00%	0.00%
Apps for Gaming and Gamification	84.38%	12.50%	3.13%	0.00%	0.00%
Other Apps	65.63%	31.25%	3.13%	0.00%	0.00%

ADMINISTRATIVE USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	65.63%	28.13%	3.13%	0.00%	3.13%
Apps for Classroom Management	90.63%	9.38%	0.00%	0.00%	0.00%
Apps for Email	25.00%	43.75%	21.88%	6.25%	3.13%
Apps for Web Browsing	37.50%	50.00%	9.38%	0.00%	3.13%
Apps for Social Media (e.g. Facebook, Twitter)	90.63%	9.38%	0.00%	0.00%	0.00%
Apps for Physical and Motor Skill Development	96.88%	3.13%	0.00%	0.00%	0.00%
Apps for Social and Emotional Development	87.50%	12.50%	0.00%	0.00%	0.00%
Apps for Mathematics	93.75%	6.25%	0.00%	0.00%	0.00%
Apps for Science	100.00%	0.00%	0.00%	0.00%	0.00%
Apps for Social Studies	100.00%	0.00%	0.00%	0.00%	0.00%
Apps for Communication, Language and Literacy	78.13%	15.63%	6.25%	0.00%	0.00%
Apps for Approaches Towards Learning	75.00%	21.88%	3.13%	0.00%	0.00%
Apps for Teaming and Collaboration	75.00%	25.00%	0.00%	0.00%	0.00%
Apps for IFSP/IEP planning or implementation	71.88%	15.63%	9.38%	3.13%	0.00%
Apps for Gaming and Gamification	96.88%	3.13%	0.00%	0.00%	0.00%
Other Apps	75.00%	21.88%	0.00%	0.00%	3.13%

INSTRUCTIONAL USE OF APPS (HRS/WEEK)	0	1–5	6–10	11–20	21+
Apps for Organization	71.88%	28.13%	0.00%	0.00%	0.00%
Apps for Classroom Management	81.25%	18.75%	0.00%	0.00%	0.00%
Apps for Email	75.00%	25.00%	0.00%	0.00%	0.00%
Apps for Web Browsing	59.38%	37.50%	3.13%	0.00%	0.00%
Apps for Social Media (e.g. Facebook, Twitter)	87.50%	12.50%	0.00%	0.00%	0.00%
Apps for Physical and Motor Skill Development	78.13%	18.75%	3.13%	0.00%	0.00%
Apps for Social and Emotional Development	56.25%	40.63%	3.13%	0.00%	0.00%
Apps for Mathematics	87.50%	12.50%	0.00%	0.00%	0.00%
Apps for Science	100.00%	0.00%	0.00%	0.00%	0.00%
Apps for Social Studies	96.88%	3.13%	0.00%	0.00%	0.00%
Apps for Communication, Language and Literacy	53.13%	34.38%	12.50%	0.00%	0.00%
Apps for Approaches Towards Learning	78.13%	18.75%	3.13%	0.00%	0.00%
Apps for Teaming and Collaboration	84.38%	15.63%	0.00%	0.00%	0.00%
Apps for IFSP/IEP planning or implementation	78.13%	18.75%	3.13%	0.00%	0.00%
Apps for Gaming and Gamification	81.25%	18.75%	0.00%	0.00%	0.00%
Other Apps	75.00%	25.00%	0.00%	0.00%	0.00%

Appendix J : Administrators' perspectives on mobile devise and apps (n=27)

#	Question about Mobile devices and applications (1=Strongly Disagree; 5=Strongly Agree)	Administrators
1	If I wanted to implement mobile devices and apps for working with students with special needs, I would have access to the technology to do so.	3.96
2	I consider mobile technology (e.g. smartphones) and related apps an important tool for my personal enjoyment/growth	4.26
3	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping all students	4.15
4	I consider mobile technology (e.g. smartphones) and related apps an important tool in helping students with special needs	4.11
5	I consider myself to be prepared to use mobile devices and apps in teaching students with special needs	3.52
6	I believe students with special needs already use mobile devices and apps in their lives	3.89
7	I believe students with special needs already use mobile devices and apps in their learning	3.48
8	I believe students with special needs are ready to use mobile devices and apps	3.78
9	I believe most apps are accessible to all students	3.59
10	I believe most apps are accessible to students with special needs	3.31
11	I believe most educational apps are accessible to students with special needs	3.37
12	I believe mobile devices and apps can be used with a universal approach to teaching and learning	3.81
13	I believe mobile devices and apps can be used with a supplemental approach to teaching and learning	4.19
14	I believe mobile devices and apps can be used with an intensive/targeted approach to teaching and learning	4.19
15	I believe there are a sufficient number of apps to help with student differentiation	3.63
16	I believe there are a sufficient number of apps to help with customization of student learning	3.52
17	I believe there are a sufficient number of apps to help students across the entire range of special needs	3.44

Appendix K : Top apps reported for personal use

NAME	NUMBER
2048	2
1010!	2
4 Pics 1 Word	2
AbcYa	1
Adobe Acrobat	1
Amazon	4
AOL	1
Apple Maps	1
Audible	1
Audio books	1
Banking	16
BBC News	1
Belly	1
Bleacher Report	3
Book Wizard	1
Bubble Witch Saga 2	1
Buble	1
Buy Me A Pie	1
Calculator	4
Calendar	24
Candy Crush	8
Car Minder	1
Chrome	13
Clash of Clans	1
Class Dojo	1
Coach's Eye	1

NAME	NUMBER
Colorfy	1
Cozi	1
Criminal Case	2
Day in History Tweeter	1
Dedge	1
Dropbox	2
Dubsmash	1
Duolingo	4
eBay	2
Electronic books	1
Email	56
Etsy	1
Evernote	1
Facebook	177
Farm Heroes	1
Firefox	1
First 5	2
Fitness	28
Flash Seats	1
Flashlight	1
Flipboard	1
Flipster	1
FreeCell	1
Frozen Free Fall	1
Fruit Ninja	1
Game/Changer	1

NAME	NUMBER
Games	8
Gas Buddy	3
Genius Scan	1
Gmail	35
GoNoodle	1
Google	12
Google Apps for Education	1
Google Classroom	1
Google Docs	5
Google Drive	4
Google Hangout	1
Google Keep	1
Google Maps	13
Google Messenger	1
Google Play Music	1
Google Sheets	2
Google Slides	1
GPS	3
GroupMe	2
Groupon	1
HeadsUp!	1
Health	9
Herald Star	1
Hotmail	1
Hulu	1
iBooks	2
iFunny	1

NAME	NUMBER
IMDB	1
iMessage	2
Instagram	50
Insurance	1
Internet	1
iTunes	2
Journey	1
Keeper	1
Key Ring	1
Khan Academy	1
Kindle	8
Klondike Solitaire	1
Kobo Books	1
Kuta software	1
Laudate	1
Life 360	1
Lumosity	1
Memo	1
Messaging	10
Microsoft Office	1
Midnight Castle	1
Mint	1
MobyMax	1
Music	2
My Verizon	1
NASA	1
Netflix	5

NAME	NUMBER
News	19
Night Sky	1
Nook	1
Notebook	1
Notes	3
One Drive	1
Organization	1
Outlook	3
OverDrive	3
Pandora	11
Paps	1
PBS	1
Pearson Chronological Age Calculator	1
Periodic Table	1
Pet Rescue Saga	1
Photogene	1
Photos	5
Pinterest	56
Podcast Republic	1
Podcasts	1
Puzzle	1
QR Scanner	1
Raz-Kids	1
Realtor	1
Renweb	1
Roku	1
Rut Reporters	1

NAME	NUMBER
Ruzzle	1
Safari	21
School App	1
Schoology	1
Scrabble	1
Scrabble Blast	1
Shazam	1
Shopping	3
SiriusXM	1
Skype	1
SkyView Free	1
Snapchat	19
Social media	2
Soduku	1
Solitaire	2
Songza	1
Sports	15
Spotify	3
Stitcher	1
Subway Surfers	1
Target Cartwheel	5
Texting	9
Textra	1
That Quiz	1
The Simpsons: Tapped Out	1
Timehop	1
Toyblast	1

NAME	NUMBER
Travel	2
TripAdvisor	1
Trivia Crack	3
Tumblr	1
Twitter	35
USAA	1
Voxer	1
Weather	34
Web browser	8
WeChat	3
Weibo	1
WhatsApp	3
Whisper	1
White Noise	1
Wodify	1
Word Bubbles	1
Word Crack	1
Words with Friends	7
WordSlinger	1
Xfinity	1
Yahoo	4
Yahtzee	1
You Need a Budget	1
Youdao	1
YouTube	14
Yummy Gummy	1
Zillow	1

Appendix L : Top apps reported for administrative use

NAME	NUMBER
Adobe	1
Aesop	1
Banking	1
bCourses	1
Bing	1
BitsBoard	1
Blackboard	4
Blog	1
Bloglovin'	1
BookScanner	1
Braille Driller	1
Buckeye Local	1
Calculator	4
Calendar	28
Camera	1
Canvas	7
CareHere!	1
Chrome	14
ClassDojo	8
Classroom Walk-Through	2
Common Core Standards	6
Dayforce Scheduling	1
Dictionary	1
Dropbox	6
Drund	1

NAME	NUMBER
Edmodo	1
EducatorsHandbook	1
Email	48
Evernote	4
Explore Learning	1
Facebook	5
Fact or Fiction	1
FileMaker Go	1
Firefox	2
First Edition	1
FirstClass	1
GameChanger	1
Genius Scan	3
GeoGebra	1
Gmail	49
Google	10
Google Apps for Education	6
Google Classroom	6
Google Docs	17
Google Drive	22
Google Earth	1
Google Forms	1
Google Keep	3
Google Maps	1
Google Sheets	2

NAME	NUMBER
Google Slides	4
GradeCam	1
Groovy Grader	1
Groupon	1
HoverCam	1
Infinite Campus	2
Instagram	1
Internet Explorer	1
iPad Notes	1
i-Ready	1
iTunes App Store	1
Kahoot!	2
Kindle	1
KSU Mobile	1
Level It	1
Lumosity	1
MapQuest	1
mERP	1
Messaging	3
Microsoft Office	8
Milestone	1
MobyMax	2
Music	1
Nearpod	1
Notability	1
Notes	3
Noteworthy	1

NAME	NUMBER
Ohio Department of Education	1
OneDrive	1
OTES on the Go	1
Outlook	7
OWA	1
Pages	1
Pearson's Chronological Age Calculator	1
Phonics Studio	1
Photos	1
Pinterest	13
Planbook	5
Play Dice Lite	1
PowerSchool	1
PowerTeacher	1
ProgressBook	4
Proloquo2Go	1
Remind	12
Renaissance Learning	1
Safari	10
Scan	1
Schoology	3
School-Wide Information System (SWIS)	1
Seven Little Words	1
SFA Member Center	1
Siri	1
Socrative	2
Stopwatch	1

NAME	NUMBER
Study Island	1
Swivl for iPhone and iPad	1
Teachers Pay Teachers	1
Texting	4
Timer	1
Todoist	1
Twitter	9
U.S. Smithsonian	1
Via's Smarter Shared Rides	1
Voxer	2
Web browser	2
Weebly	1
Wells Fargo	2
Words with Friends	1
Yahoo	1
YouTube	3

Appendix M : Top apps reported for instructional use

NAME	NUMBER
1010!	1
4Kid Share	1
ABC Learning	1
ABC Ninja	1
ABCmouse	3
ABCya	6
Achieve3000	1
Angry Birds	2
Arbordale books	1
Articulation Station	1
Audible	1
Autism iHelp	1
bCourses	1
BehaviorSnap	1
Bike Race	1
BitsBoard	2
Blackboard	2
Blogger	1
Bluster!	1
BrainPOP	8
Bugs and Bubbles	1
Calculator	4
Calendar	1
CamScanner	1
Canvas	3

NAME	NUMBER
Capti	1
Choiceworks	1
Chrome	4
Chromebook	1
ClassDojo	16
Classroom Walk-Through	1
Clipart	1
Co:Writer	1
Coloring	1
Common Core Standards	1
Computer	1
ConversationBuilder	1
Corkculous	1
Counting Money	1
Daisy the Dinosaur	1
Dexteria	2
Dictionary	5
Digital History	1
Discovery Channel	1
Disney	2
Doodle Buddy	1
Doodle Find	1
Dragon Dictation	1
DropBox	1
Dropbox	2

NAME	NUMBER
Drund	1
Earobics	1
Ebenezer School for the Visually Impaired Visual Perceptual Training	1
Edmodo	5
Elmo?s Preschool	1
Email	5
EMD PTE	1
Empower3000	1
Endless Alphabet	1
Epic!	2
Eye Can Learn	1
Facebook	1
Fact or Fiction	1
Fast Facts Math	3
Firefox	1
First in Math	1
Fluid	1
Fluid Monkey	1
Front Row	1
Fun with Directions	2
Futaba	1
GeoQuiz	1
Gizmo	1
Glogster	1
Gmail	6
GoNoodle	1
Google	10

NAME	NUMBER
Google Apps for Education	3
Google Classroom	13
Google Docs/Drive	16
Google Earth	1
Google Forms	2
Google Sheets	1
Google Slides	2
Google Translate	1
GrammarFlip	1
Hearbuilder	1
HelpKidzLearn	1
Hideout	1
Highlights Hidden Pictures	1
How to Write an Essay	1
IGDI Online Data System	1
iLearn	2
iMovie	2
Infinite Campus	2
iTrace	1
IXL	5
join.me	1
Kahoot!	13
Kakooma	1
Khan Academy	7
Kidblog	1
Kids A-Z	1
Kindle	3

NAME	NUMBER
Language Acquisition through Motor Planning (LAMP)	1
Learning Ally	2
Learning Farm	1
Learning Lab	1
Lego Juniors	1
Letter School	2
Lexia Reading Core5	2
Little Writer	1
Livescribe	1
MacroLab	1
Marlee Signs	1
Math	2
Math Bingo	1
Math Busters	1
Math Fact Cafe	1
Math Playground	1
Mathway	1
MeeGenius	1
Memo	1
Memory Matches	1
Merriam-Webster	1
Microsoft Office	2
Microsoft OneNote	1
Minecraft	1
MobyMax	9
Moodle	1
My Math	1

NAME	NUMBER
My Talking Tom	2
MyClassRules	1
myHomework	1
Name That State	1
NASA	1
Netflix	2
Nook	1
Notability	2
Notepad	1
Notes	1
Noteworthy	1
Nozoku Rush	1
Numbrix	1
OneDrive	1
Outlook	1
OverDrive	2
Pandora	1
Perfect Piano	1
PhET	1
Phonics Island	1
Phonics Studio	2
Photomath	1
Pic Collage	1
Pinterest	6
Play Dice Lite	1
Plickers	3
Pocket Artic	1

NAME	NUMBER
Poll Everywhere	1
Popplet	2
PowerSchool	1
Prodigy Math Game	1
Proloquo2Go	4
QR Reader	2
Quiver	1
Quizizz	1
Quizlet	10
Raz-Kids	7
Read&Write	1
Reading A-Z	1
Remind	9
Restaurant Tip Generator	1
Running Records	1
Safari	6
Scan	1
Schoology	2
Scrabble Blast	1
Sentence Builder	3
ShowMe	1
Sight Words	1
Sight Words Ninja	1
SimpleMind	1
Smart Board	1
Smart Trace	1
SmartMusic	1

NAME	NUMBER
Smithsonian Tween Tribune	1
Socrative	2
Solitaire	1
Spelling City	6
Splash Math	4
ST Math	1
Starfall	7
STARS	1
Stop Motion Studio	1
Storybook	1
StoryJumper	1
StoryKit	1
Storyline Online	1
Study Island	3
Study Jams	1
Sumdog	2
SuperDuper Apps	1
Sushi Monster	1
SwitchIt	1
TeacherTube	1
TED	1
Temple Run	1
Text-to-Speech	1
That Quiz	1
The Foos	1
The History Channel	1
Time for Kids	1

NAME	NUMBER
Timer	3
Tiny Tap	1
Toontastic	1
Twitter	4
U.S. Smithsonian	1
Units Plus Converter	1
VizZle	4
VoiceThread	1
Weather	1
Wechsler Individual Achievement Test	1
Wechsler Intelligence Scale for Children	1
Wechsler Preschool and Primary Scale of Intelligence	1
WhatsApp	1
Word Bingo	1
Word Drop Deluxe	1
Word Slinger	1
Wordplay	1
WordPress	1
Xtra math	1
XtraMath	3
Yahoo	1
YouTube	11
Zoodles	1