Chapter Four: The Role of New Media in Inclusive Early Literacy Programs & Services

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Tablet technology has taken hold in mainstream early childhood, and while debates about screen-time persist (Christakis, 2014; Guernsey, 2012), the notion that children both with and without disabilities are acquiring knowledge via digital modes has been reported in recent research (Danby et al., 2013; Jowett, Moore, & Anderson, 2012; Levy, 2008; Winters & Vratulis, 2012). A number of studies suggest that tablet technology shows promise as a universally accessible tool for language and literacy learning (Neumann & Neumann, 2014). Tablet technology, repurposed as augmentative and alternative communication (AAC) devices, have more recently been able to give nonverbal people their "voices" (Bradshaw, 2013; McNaughton & Light, 2013; Neider, 2013). Librarians should consider the potential of tablet technology to provide children with viable means for both adult-child and peer-to-peer communication in inclusive settings, such as library storytime programs (Feinberg, Jordan, Deerr, Langa, & Banks, 2014).

Since tablet technology is so new to the assistive technology field, the role of mainstream devices and their range of uses in inclusive early childhood learning require a great deal more study if we are to better understand the affordances of technology within diverse children's homes and early literacy settings, including those of the public library. There is not yet sufficient research evidence to drawn on, therefore this chapter aims to provide readers with an orientation towards the consideration of tablet technology, and the apps that run on them, as potential tools for inclusion in our work with children who have disabilities, as well as their families.

Pre-iPad Studies about Assistive Technology (AT) and Early Literacy

Assistive technology has been used in special education spheres for decades. A significant body of research in both education and speech sciences reflects the importance of assistive technology in the lives of people with disabilities. However, in the field of assistive technology studies, there are very few that consider the role of AT in supporting early literacy development. For example, Burne, Knafelc, Melonis, and Heyn (2011) reveal a scarcity of empirical research that demonstrates the benefit

of AT to promote emergent literacy in young children with disabilities. They conclude that, even though there is evidence of the benefits of early literacy support in early childhood, and evidence of the benefits of AT in intervention for children with disabilities, there has not been enough research linking these two areas together. More studies that investigate specific approaches in the use of assistive technology to help develop early literacy in children with disabilities may help to build a rationale for the effective integration of AT (which would now include tablet technology) into inclusive early childhood literacy settings. The authors summarize this review of assistive technology and early literacy research from the past two decades by acknowledging that evidence is emerging that various kinds of AT, mainly computer-based programs, are effective in supporting early literacy in young children, particularly those with disabilities. Importantly, they also point out that some technology is used as assistive technology, and some assistive technology is just technology in mainstream inclusive settings. They state that this cross-over practice points to "greater homogeneity between children with disabilities and children without disabilities" (p. 212) which supports the development of more inclusive classrooms and other literacy learning sites. The iPad and other tablet devices is an example of a mainstream device that can serve multiple purposes across contexts.

A study by Jeffs, Behrmann, and Bannan-Ritland (2006) explores the "interactions and attitudes of parents and children…to build literacy skills" (p. 37). This study's participants were children with significant disabilities who were also struggling readers. They and their parents were introduced to a range of computer-based assistive technologies designed to both engage and bolster reading skills. All the children involved in the study showed some improvement in their literacy skills in both reading and writing after they and their parents were introduced to literacy-building computer-based programs. Features such as voice recognition and highlighted text functions were noted to be valuable in keeping the children focused on the literacy-building activities. These and other pre-2010 studies about children and technology suggest that children with disabilities were already benefiting from the affordances of computer technologies to support their literacy development (Hetzroni & Schanin, 2002). Librarians can build on this body of research by integrating tablet technology (among other digital tools that may be appropriate) into their children's services, collections, and programs to ensure that children who need the features offered by technological tools have them at their disposal in the library.

Librarians, Assistive Technology, and Children with Disabilities

A study by Ennis-Cole and Smith (2011) considers the role of the school librarian in the provision of assistive technology for students with autism. The authors found that:

> The success of AT is dependent on careful selection and use, operational knowledge, family support, and integration of the device into the curriculum. These are all areas where school librarians can take a leadership role ensuring access, equity,

> distribution, appropriate training, evaluation, and support to both school professionals and families. (p.91)

The authors articulate a strong rationale for the continued development of the school librarian's expertise in and knowledge of various types of assistive technology that can further the educational experiences of children with autism as well as other disabilities. Corollaries can be found between the role of the school librarian and that of the public library children's librarian. Both kinds of librarians encounter diverse children with communication, literacy, and other learning needs that can be met by the judicious selection and provision of a range of assistive technology tools.

Recently, three books from the field of librarianship touch on the role of technology in the lives of young people with disabilities (Farmer, 2013; Feinberg et al., 2014; Klipper, 2014). All of these titles deal with the topic of technology as well as tablet technology's unique potential for supporting communication and literacy development for children with a range of disabilities. This work emerging from the field of children's librarianship demonstrates that librarians can take up this vital role in the convergence of so-called assistive technology and new media to advance inclusion aims across settings. However, as we move forward with the development of collections, programs, and services that utilize new media, we must still acknowledge the almost complete lack of empirical research about young children with disabilities and new media in library settings.

iPads and Children with Disabilities

Research about young children with disabilities and iPads (and similar tablet devices) is in extremely short supply. This segment summarizes some of what has been published on this important topic (mainly emerging from the early childhood special education field) and provides food for thought about the appropriateness of incorporating new media into inclusive early literacy resources, collections, services, and programs within the public library sphere.

By presenting a vignette of early childhood classrooms that include children with disabilities, More and Travers (2013) present a universal design for learning (UDL) framework for app selection that considers how accessible apps are across a range of developmental domains (motor, cognitive, language and social). Their framework guides teachers (and others) to ask a range of questions about each app's affordances and features concerning how well they can support the development of a child with disabilities. This framework could be adapted for and used by librarians who wish to recommend apps to parents of children with disabilities. Because they align with UDL principles, apps selected using this framework will be developmentally appropriate and customizable for children within a range of development, including both typical and atypical children. This framework would be a good starting place for librarians and others who wish to ensure that the apps they select for their library's tablets and storytimes are as inclusive as possible.

Aronin and Floyd (2013) share examples of how iPads can be used within inclusive preschool settings to promote STEM learning. They discuss the importance of small-group interactions with the iPad and stress that some children will require repeated opportunities to develop the motor skills needed to interact with the apps they recommend. However, since the selected apps are "play-based," they believe children's motivation to engage will be high. The examples given include a math app, a tangram app, a weather app, two building apps, and a robot construction app. They also believe that, for children with fine motor difficulties, iPad apps often provide the motivation to continue with the activities therein even if they are difficult for them. This app play serves a dual purpose: players gain STEM knowledge as well as fine motor skill practice. Since librarians are also interested in supporting STEM in early childhood, this article provides a clear rationale for including such apps in library iPad collections and programs for young children.

Jowett et al. (2012) studied the efficacy of an iPad-based video modeling package to teach numeracy to a child with autism spectrum disorder (ASD). Clear gains in five-year-old Jack's ability to identify, write and comprehend numerals were evident after the short intervention program concluded. Interestingly, the researchers chose to exploit Jack's interest in the iPad app game Angry Birds™. His ASD notwithstanding, this five-year old boy's preferred popular media was very effectively harnessed to help him acquire numeracy skills. Tied together with what other researchers have implored regarding the importance of allowing popular media into educational settings (Dyson, 2003; Marsh, 2005; Wohlwend), young Jack's passion for Angry Birds makes him perhaps more like his non-ASD peers than was previously assumed.

McClanahan, Williams, Kennedy, and Tate (2012) report on the use of an iPad in a facilitated reading improvement strategy for a fifth-grade boy named Josh who is labeled with attention deficit hyperactivity disorder (ADHD). Pre-and post-testing demonstrated that Josh had gained a year's reading growth within the six-week intervention. Although the authors make no claims as to the generalizability of this iPad-based strategy for all struggling readers who have ADHD, they surmise that the higher levels of sensory stimulation may have allowed Josh to engage in the literacy learning tasks in ways that were different from his typical classroom environment.

In a recent Technology Voices column of the newsletter of the Family Center on Technology and Disability (2012), iPads are discussed in terms of their perceived therapeutic benefit. The authors state that "devices intended for a mass market are almost always cheaper and more accessible to users" (p. 1). They go on to explain that the app market provides children with disabilities ways to strengthen their "communication, executive planning, learning, daily living and social functions" (p. 1). With this range of applicability accessible from one relatively cheap device, it is little wonder that parents of children with disabilities are turning to tablets for help to support their children's learning in the early years. The article then describes iLearn, a program offered by the Lakeside Center for Autism, that grew

out of parents' requests for help with their children's new iPads. The program is essentially a parent-child workshop for parents and their children (with autism). Echoing the concerns of many librarians, the program facilitators emphasize the importance of interaction: parents, siblings, peers, teachers, and others are all involved in the iPad-based learning offered to the target children. While the iPad has been observed to be motivating for children, this piece cautions that "the iPad is a tool, not a silver bullet" (p. 3). Children and their families and other caregivers must be both taught and supported in order for the iPad's maximum benefits to be realized. The focus remains on the child and what he or she is learning, not the device itself.

Finally, Dixon (2011) states that "…the iPad is simply cool. It has the potential to be a powerfully inclusive tool." Like many other researchers, Dixon emphasizes the importance of continued research to ensure the continued development of evidence-based tools for both speech and communication (and, this author would argue, literacy development) within the tablet arena.

Arya's First App: An iPad Case Study

Arya[1] is four and has a global developmental disability that impacts her motor, language, and cognitive development. She has recently been introduced to the iPad, and currently she plays some games with her sisters that involve her "scratching" at the screen to create and move objects of different shapes and colors. However, both her mother and her speech-language therapist believe this device has the potential to allow Arya to begin to learn how to communicate with others by using assistive speech apps that speak her words for her through the device. The speech therapist recently showed Arya's mother how to download a simple, free iPad app called Sounding Board™ that can be programmed with words (recorded by anyone), pictures ,and sound files that will "speak" the word when the screen is touched. Arya's mother and therapist discussed the fact that the short term goal is for Arya to begin to understand that when she presses a picture on the screen, she hears a word that goes with that picture. Basically, she will have to learn to press something on the screen to indicate her choice.

Once the app was downloaded and some sound files added by the speech therapist, Arya was able to try out the *Sounding Board* app while her mother sang "Old MacDonald" to her and held the device right in front of her. Arya responded by smiling and moving her arms and legs, and while she needed physical support on her arm to succeed in pressing on the animal shown on the screen, she stayed engrossed throughout the song activity. After this activity, her speech therapist suggested that, when used as an assistive technology tool with an appropriate app, the iPad may eventually provide Arya with a way to speak. However, she also noted to Arya's mother that the iPad can double as a mainstream device upon which Arya can have fun and learn alongside other children her own age. This view echoes the sentiment from the recent review by Burne, Knafel, Melonis

[1] name has been changed

and Heyn (2011) regarding the convergence of assistive technology with mainstream technology, which are sometimes separate, sometimes one and the same.

Conclusion

Developments in assistive technology, including augmentative and assistive communication (AAC) and mainstream technology in early childhood, can support children with disabilities to further both their communication and early literacy development in new ways (Burne et al., 2011). As iPads (and other mainstream digital gadgets) are seen as everyday items, it is important to consider their place in inclusive settings where diverse groups of children learn literacy alongside one another using all the tools at hand. A nonverbal child (like Arya) who talks with her or his iPad may demonstrate literacy skills to the verbal children who are still learning that print or other symbol systems carry meaning. Although not reflected in the available empirical research to date, qualitative research and experience encourage the view that inclusive digital early literacy is not just for early childhood classrooms. Libraries should also harness the inclusive early literacy learning opportunities made available by mainstream technology such as the iPad. By building on what we already know about how children learn, and drawing on emerging evidence from early childhood education literature such as those referred to in this chapter, children's librarians can begin to use tablet technology to enhance the accessibility and inclusiveness of their current early literacy offerings in public libraries.

References

Aronin, S., & Floyd, K.K. (2013). Using an iPad in inclusive preschool classrooms to introduce STEM concepts. *TEACHING Exceptional Children, 45*(4), 34-39.

Bradshaw, J. (2013). The use of augmentative and alternative communication apps for the iPad, iPod and iPhone: an overview of recent developments. *Tizard Learning Disability Review, 18*(1), 31-37. doi: 10.1108/13595471311295996

Burne, B., Knafelc, V., Melonis, M., & Heyn, P. C. (2011). The use and application of assistive technology to promote literacy in early childhood: a systematic review. *Disability and Rehabilitation. Assistive Technology, 6*(3), 207-213. doi: 10.3109/17483107.2010.522684

Christakis, D.A. (2014). Interactive media use at younger than the age of 2 years: Time to rethink the american academy of pediatrics guideline? *JAMA Pediatrics*. doi: 10.1001/jamapediatrics. 2013.5081

Danby, S., Davidson, C., Theobald, M., Scriven, B., Cobb-Moore, C., Houen, S., . . . Thorpe, K. (2013). Talk in activity during young children's use of digital technologies at home. *Australian Journal of Communication, 40*(2), 83-99.

Dixon, D. (2011). The future of apps in the classroom: for children or teens walking into schools this year, as well as for adults, the

iPad is simply cool. it has the potential to be a powerfully inclusive tool. *ASHA Leader, 16*(12), 30.

Dyson, A. H. (2003). "Welcome to the Jam": Popular culture, school literacy, and the making of childhoods. *Harvard Educational Review, 73*(3), 328-361.

Ennis-Cole, D., & Smith, D. (2011). Assistive technology and autism: Expanding the technology leadership role of the school librarian. *School Libraries Worldwide, 17*(2), 86.

Family Center on Technology and Disability. (2012). Autism and the iPad: Finding the therapy in consumer tech. *Technology Voices*(130), 1-13.

Farmer, L.S.J. (2013). *Library services for youth with autism spectrum disorders*. Chicago: ALA Editions, an imprint of the American Library Association.

Feinberg, S., Jordan, B.A., Deerr, K., Langa, M.A., & Banks, C.S. (2014). *Including families of children with special needs: A how-to-do-it manual for librarians* (Revised ed.). Chicago: Neal Schuman.

Guernsey, L. (2012). *Screen time: How electronic media—from baby videos to educational software—affects your young child*. New York: Basic Books.

Hetzroni, O.E., & Schanin, M. (2002). Emergent literacy in children with severe disabilities using interactive multimedia stories. *Journal of Developmental and Physical Disabilities, 14*(2), 173-190. doi: 10.1023/A:1015271531459

Jeffs, T., Behrmann, M., & Bannan-Ritland, B. (2006). Assistive Technology and Literacy Learning: Reflections of Parents and Children. *Journal of Special Education Technology, 21*(1), 37-44.

Jowett, E.L., Moore, D.W., & Anderson, A. (2012). Using an iPad-based video modeling package to teach numeracy skills to a child with an autism spectrum disorder. *Developmental neurorehabilitation, 15*(4), 304-309. doi: 10.3109/17518423.2012.682168

Klipper, B. (2014). *Programming for children and teens with autism spectrum disorder* Chicago American Library Assocation.

Levy, R. (2008). 'Third spaces' are interesting places: Applying 'third space theory' to nursery-aged children's constructions of themselves as readers. *Journal of Early Childhood Literacy, 8*(1), 43-66. doi: 10.1177/1468798407087161

Marsh, J. (2005). *Popular culture, new media and digital literacy in early childhood*. London ; New York: RoutledgeFalmer.

McClanahan, B., Williams, K., Kennedy, E., & Tate, S. (2012). A breakthrough for Josh: How use of an iPad facilitated reading improvement. *TechTrends, 56*(Generic), 20-28. doi: 10.1007/s11528-012-0572-6

McNaughton, D., & Light, J. (2013). The iPad and mobile technology

revolution: benefits and challenges for individuals who require augmentative and alternative communication. *Augmentative and alternative communication 29*(2), 107.

More, C.M., & Travers, J.C. (2013). What's app with that? Selecting educational apps for young children with disabilities. *Young Exceptional Children, 16*(2), 15-32. doi: 10.1177/1096250612464763

Neider, D. (2013). Uncommon Sense. from http:// neiderfamily.blogspot.ca

Neumann, M.M., & Neumann, D.L. (2014). Touch screen tablets and emergent literacy. *Early Childhood Education Journal, 42*(4), 231-239. doi: 10.1007/ s10643-013-0608-3

Winters, K.-L., & Vratulis, V. (2012). Authored assemblages in a digital world: Illustrations of a child's online social, critical, and semiotic meaning-making. *Journal of Early Childhood Literacy*, 1-26. doi: 10.1177/1468798412438752

Wohlwend, K. E. *Literacy playshop: New literacies, popular media, and play in the early childhood classroom*.