Everyday Assistive Technology on the Go: Identifying Characteristic of Popular Apps for People with Disabilities

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Abstract:

This study examined 287 applications (apps) available in Apple's iTunes App Store that had been identified as popular apps for people with disabilities using the tiered checklisting method compiled from lists of apps recommended by developers, caregivers, service providers and people with disabilities as being useful for people with disabilities. These apps were examined to discover patters regarding content, platform, cost and popularity to help with the selection of apps for libraries' circulating mobile technology. This study found that popular apps tended to be more supportive than skill acquisitions based and apps popular for people with disabilities tended to be more expensive, especially if the app was marketed for people with autism spectrum disorders. Further research is needed to identify the causes of the cost disparity as well as identifying key characteristics of successful apps for people with disabilities.

Keywords:
Mobile Applications, inclusion, multimedia learning, supports. Libraries

Introduction

With the advent of the iPhone in July of 2007, the idea of what mobile computing is and could be was forever changed. Since that time, not only have the choices of smart phone technology expanded, but lightweight tablet computers which can access the internet using Wi-Fi or cellular networks have burst onto the market as well. Mobile devices are well on the way to becoming ubiquitous in our society. The Pew Institute reported that 83% of U.S. adults have cell phones, and 42% of those adults own smartphones.[1] Libraries are also increasingly adding mobile devices to their circulating collections. Developing a core collection of apps for those devices with all patrons in mind can be a daunting task. One group of patrons who may find the ability to borrow mobile devices especially fulfilling are people with disabilities. Mobile applications are being developed that give people with disabilities the tools to live independently and connect to the world around them, but how do you choose which apps will be most useful for your patrons? In July of 2012, 793 apps a day were added to the iTunes App store.[2] This can be very overwhelming for librarians who are choosing which apps to purchase for their circulating mobile devices. Finding and choosing apps to include so that people with disabilities can fully engage with devices adds another layer of complexity to the selection processes.

While apps are generally inexpensive compared to traditional software or assistive technology devices, there are rarely demos available for users to test out the software before buying; this

can make for a frustrating mobile experience as well as costly experimentation. Librarians are in a position to help guide user experiences and provide an opportunity for patrons to experiment with apps as well as the device to see if it will meet their needs. Developing a core collection of apps that can be used to help people with disabilities can be a valuable addition to libraries' iPad programming. Word of mouth is one way for users to get more information about how specific apps work for people with disabilities; however it is often hard for people with disabilities to connect with others who have the same needs as they do. Luckily, social media has made it significantly easier for interested parties to connect with each other. For this study, a selection of 287 applications were identified as apps for people with disabilities by compiling a list of apps recommended through blogs and Facebook by parents, educators and service providers who work with people with disabilities. The apps were examined in an effort to ascertain what types of apps were being marketed for people with disabilities and autism specifically, how the apps were classified, how costly the apps were and to identify areas in which further development would be appreciated.

Literature Review

The first step to developing a core collection is to figure out how users outside of the library are utilizing the technology. Mobile devices are being used in the classroom, in the home and by professionals such as therapists as a routine part of the therapeutic process. For students with disabilities, one way that mobile technology can be utilized in the classroom is to help differentiate instruction.[3] In fact, in the 2010 National Education Technology Plan, it is recommended that mobile technology, when coupled with the principles of Universal Design for Learning, is one way to successfully reach students who have been marginalized, whether by language barriers, learning difference or economic differences, from having a fulfilling experience in the traditional classroom environment.[4] The National Center for Technology Innovation identified five key elements of state-of-the-art assistive technology: Convergence; Customizability and Universal Design for Learning; Evidence-Based; Portability to Promote Independence; and Interoperability.[5] Smart devices, like the iPod touch, iPhone and iPad can make it possible for schools and families to provide state of the art assistive technology at a comparatively low cost .[6] This not only has the potential to reverse the trends of underutilization of assistive technology due to cost barriers and lack of understanding the technology by general educators,[7] but also due to students reluctance to use devices which highlight their differences from their peers. Unlike traditional AT devices, these devices can help students with disabilities to connect with their peers as well as decrease feelings of being ostracized because of their disabilities .[8,9]

Mobile devices are not just being utilized as assistive technology for children with disabilities. They are also being used by people with developmental disabilities of all ages to improve levels of independence in a variety of ways, including providing access to age appropriate leisure activities,[10,11] helping to train for and maintain employment,[12, 13, 14] and helping to navigate and communicate with others in their local communities .[15, 16]

Therapists and service providers are exploring ways in which mobile devices like the iPhone and iPad can be utilized to provide "just-in-time" therapy as well as more accurate tracking of behaviors and incidences by making reporting tools accessible at any time or place .[17, 18] These

capabilities can result in a better understanding by patients and caregivers about triggers and patterns in their daily lives, thus allowing for more autonomy and targeted interventions. Mobile devices are being integrated into the lives of people with disabilities in a wide variety of ways. More research is becoming available on a daily basis and, while it is not clear yet what this will mean in the long run for people with disabilities, it is clear that there is great potential for mobile devices to dramatically change the daily lives of people with disabilities.

The dynamic qualities of app markets, coupled with the diversity of assistive technology needs make it difficult to compile a robust checklist of core apps. The creation and use of core resources lists has a long history in libraries for the development and evaluation of collections. For special collections, like an apps collection, it is often necessary for librarians to create specialized checklists tailored to specific library needs. Dennison introduced the idea of tiered checklisting[19] to help list creators identify popular resources. Tiered checklisting gives more weight to resources which are recommended by multiple sources. By utilizing tiered checklisting, list creators are able to more effectively compile lists that are unbiased and able to meet the unique needs of their patron base.

Methodology

For this study, applications were gathered from 5 different sources in August of 2011:

ITunes Special Education Subcategory: In October of 2010, Apple added a sub-category to the Education apps for apps developed for people with disabilities. This does not appear to be an active subcategory.

Apps for Children with Disabilities top 100 Apps: This list was developed by a very active Facebook community of the Apps for Children with Special Needs website. It is a compilation of the "the most popular among Special needs Parents and professionals"

Autism Epicenter: The Autism Epicenter is a website maintained parent, Shane Nurnberg, who also works in the disability field. The apps are reviewed on a five star scale and are not specific to autism.

Mobile Learning for Special Needs Wiki: This wiki was developed and is maintained by Luis Perez, a doctoral student in special education at the University of South Florida

Ohio Center for Autism and Low Incidence Apps Guide: This list of resources was developed by Heather Bridgman and Nick Weiland at the Ohio Center for Autism and Low Incidence

These five sources were chosen for the diversity of backgrounds of the list developers. With this selection, the final list is influenced by app developers, professionals in the field, educators, parents and people with disabilities. By ensuring that interested parties from a variety of perspectives had a role in compiling the source lists used to create the list of apps that were evaluated, it was hoped to limit the biases that each group inherently contributed to their recommendations.

The following data was collected about each app listed:

- Name of application
- Creator
- URL
- Description
- Category (defined by study author)
- Whether it was marketed as an app for people with autism
- Price
- Apple platform necessary
- Source list

While there are many mobile applications available on other mobile platforms, for the sake of accurate comparisons in price and platform it was decided to focus solely on apps developed for the iTunes app store. Each application was assigned one of 10 categories based on their primary function. The categories are:

Communication: Apps assigned to the communication category are designed to help people communicate with others either as an alternative communication device or in a therapeutic role including ASL acquisition.

Daily Living Skills: Apps assigned to the daily living skills category help users develop skills and routines for day to day activities.

Literacy: Literacy applications help users improve reading and writing skills including braille.

Motor skills: These apps help users improve their fine motor skills

Organization & Study: The apps categorized as organization & study apps support users with scheduling, note taking, visual thinking and other day to day tasks.

Reinforcement/Data: These apps help users and caregivers model, reward and reinforce behaviors as well as track and record behavior patterns

Sensory: Sensory applications help users enhance and understand their senses. This category also includes apps that are targeted for users with sensory processing disorders.

Social Competence: The social competence apps are apps that are specifically designed to help users develop social skills.

Specific Learning: These apps are designed to enhance users learning in a specific skill set. Each app assigned to the specific learning category was assigned one of nine subcategories to identify the focus of the app. The subcategories are: Art, Fundamentals, Geography, Math, Music, Pattern Recognition, Storytelling, Transition and Trivia.

Other: The apps in the other category are a collection of apps that did not clearly fall into one of the other categories. These apps were also assigned a subcategory. The subcategories were: Assessment, IEPs, Games, Reference and Classroom Management.

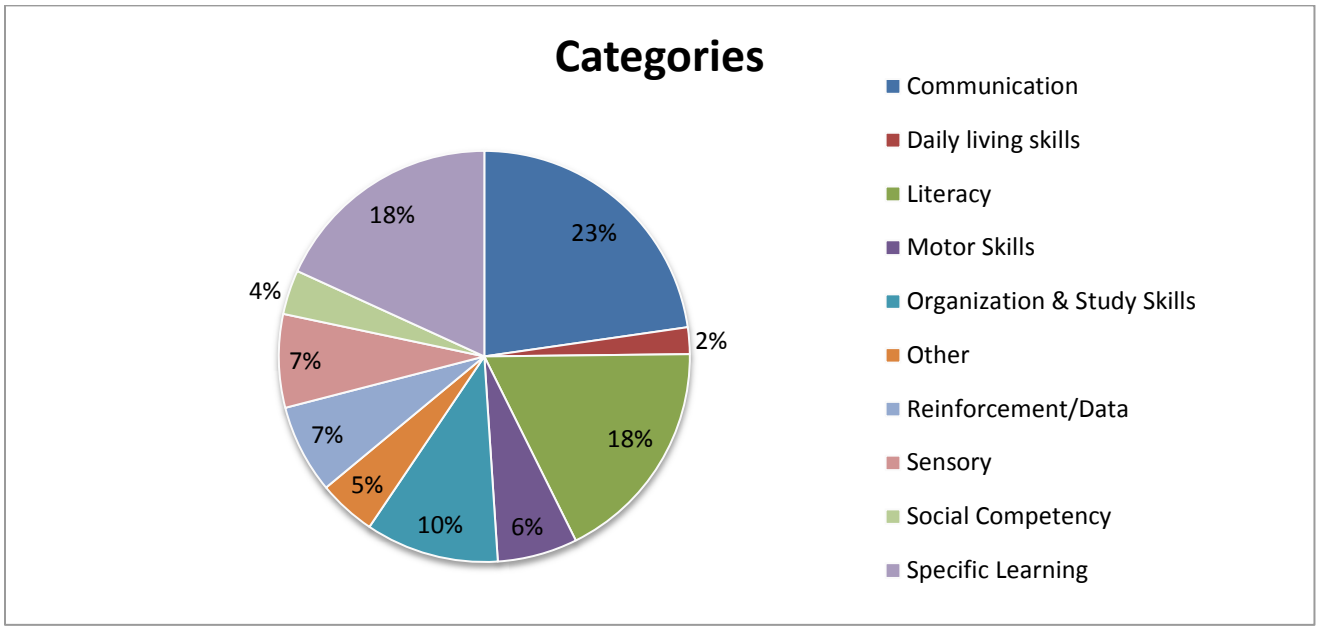
Apps were identified as being marketed as an app for people with autism or their caregivers and support providers only when autism was specifically mentioned in the app description provided by the app developer. It was not counted if autism was mentioned in a user review unless the review had been selected by the app developer to be included in the official description of the app.

A list of core apps determined by comparing the number of source lists on which a specific app appeared was also developed. This list is comprised of those apps which appeared on three or more of the source lists. This ensures that the app is popular with a diverse group of people who have different roles in the lives of people with disabilities.

Results

Of the 286 apps analyzed, 49, or 17% of the apps were only available on iPad, the rest of the applications would work on any up to date apple platform. Communication (23%), Specific Learning (18%) and Literacy (18%) were the most popular categories.

Figure 1: Categories of Apps

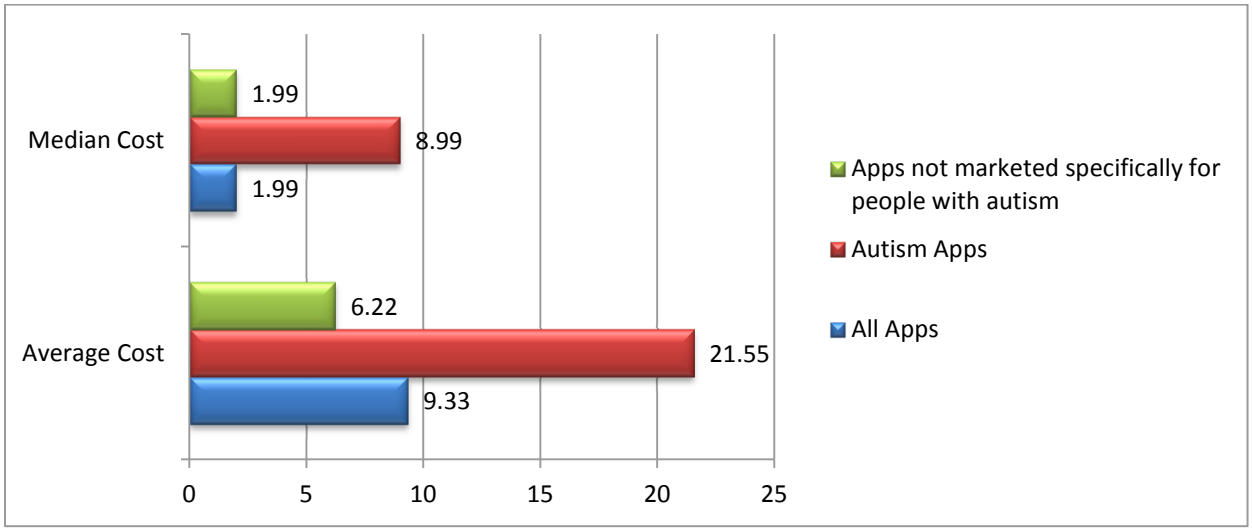


Within the specific learning category, apps that focused on math skills (31%) and fundamentals (25%) such as learning colors, shapes, the alphabet, etc. were the most frequent subcategories. Fifty eight, or 20% were marketed specifically for or to people with autism.

The average cost for apps listed that were marketed to the autism community was $21.55, while the average cost of apps that were listed, but not specifically marketed for the autism community, was $6.22.

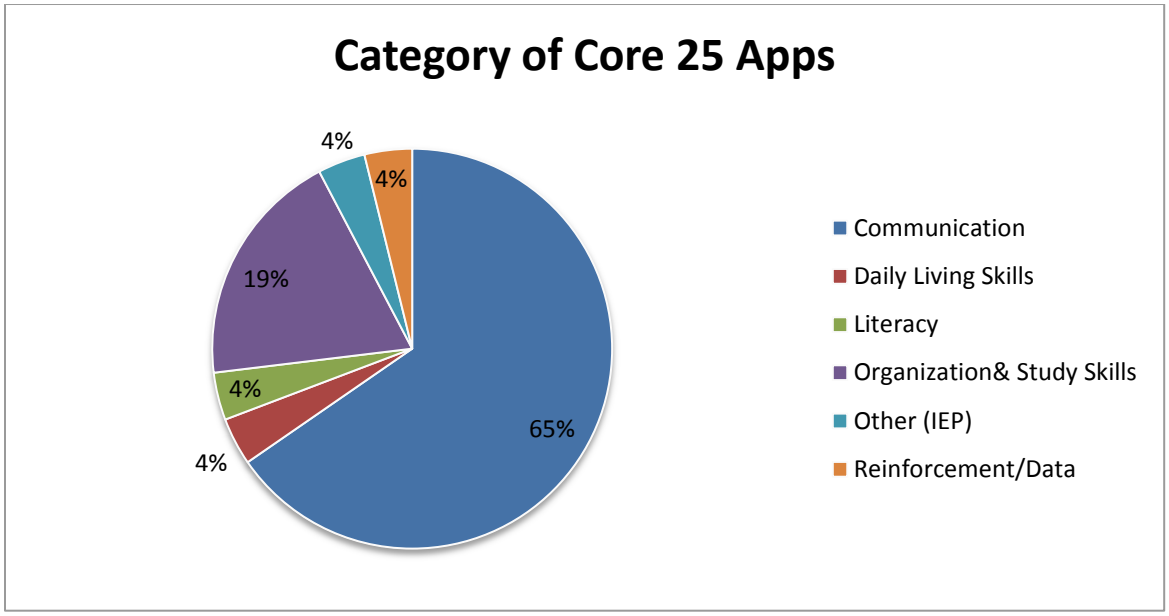
The median cost for all of the apps listed as well as the apps that were not specifically marketed to the autism community was $1.99, while the median cost of listed apps marketed to the autism community was $8.99.

Figure 2: Median and Average cost of Apps included in the study



From the five lists only one app, Proloquo2Go, appeared on all five lists. Five apps appeared on four of the lists, 19 apps appeared on three of the five lists, 43 apps appeared on two of the five lists and 218 apps appeared on only one of the lists. Of the 25 apps which appeared on three or more lists (see appendix A), 10 were marketed to the autism community. The majority of the apps listed on three or more lists were communication apps (17), followed by Organization & Study Skills apps (5).

Figure 3: Breakdown of Categories of the Core Apps



Discussion

It is not surprising that apps that help users communicate and interact with the world around them are the most popular apps with the professionals, parents and caregivers who contributed to the development of the lists of apps utilized for this project. iPads as well as the even smaller and more portable iPhones/iTouches are more affordable and more mobile than traditional communication devices.[20] The additional functionality of the devices may make them more appealing than some of the traditional devices which only serve one function. However, like any multitasking devices, it may not be a good fit for some users with disabilities because they are not designed specifically to be used by people with disabilities. The majority of the apps included in this study do not seem to be targeting users with severe cognitive or motor disabilities. Only two of the apps, Tap to Speak and RadSounds were specifically designed with switch users in mind.

The most frequently listed apps in this study, identified as those listed on three or more lists, tend to serve a supportive role rather than a skills acquisition role. In fact, none of the specific learning apps appeared on three or more lists. One reason for this could be that there are many more choices of apps that serve the same basic functions in the skills acquisition categories; versus the more specialized apps in the other categories. Communication supports are the most popular apps by far, followed by apps that help users stay organized and act as memory aids.

Very few of the apps that appear in this study are focused on the development of daily living skills and behavior support. It is not clear if this is due to a lack of apps on these topics, or that users find the apps that are available unhelpful. Further research is needed to help identify which types of apps are most useful for people with disabilities and their caregivers, and what characteristics of these apps make them more successful and appealing to this user group.

One of the most striking points to come out of this study is the overall greater cost of apps included in the lists for people with disabilities than the average cost of apps overall. The average price of the apps listed by these five sources is $9.33 compaired to an overall average cost of $2.30 for all apps listed in the iTunes app store as of August 2011[i]. In particular, the apps marketed for people with autism had a significantly higher average and median cost. The median cost of apps marketed for people with autism spectrum disorders was a startling $8.99 compared to the $1.99 media cost of apps listed, but not specifically marketed for people with autism. Further analysis of apps marketed for people with autism spectrum disorders is needed to identify the causes of the drastic price discrepancies. Some key areas that would help to develop a greater understanding would be to identify ways in which apps marketed to people with autism spectrum disorders are fundamentally different than other apps and how these differences may influence the cost of development; what the backgrounds are of developers of these apps and how that may influence pricing structures; and what the potenital audience size for these apps are and how that may effect price.

Conclusion

Mobile devices and applications are being utilized in innovative ways to help improve the lives of people with disabilities and create avenues for greater inclusion in school, work and community life. This project provides a glimpse into which apps people with disabilities, their caregivers and service providers are finding to be most helpful in achieving this goal. Apps are being utilized to help people with disabilities communicate as well as to help them access the information they need to live more independently. However, there is not as much consensus about which apps are best for specific learning tasks.

When selecting apps for circulating mobile devices for people with disabilities, libraries should focus primarily on apps which will help patrons: communicate, remember things and organize tasks. Including apps that will act as assistive technology tools on circulating mobile devices will not only make it easier for patrons with disabilities to fully enjoy these devices, it will also allow for patrons with limited resources to try popular assistive technology apps before investing in technology that may not fit their needs. Much research is needed to develop best practices and foster a greater understanding of the ways in which mobile devices can be integrated into the daily experience of people with disabilities. The nature of apps markets means that the specifics of this study are merely a snapshot in time of the app market; however, identifying the key characteristics of popular apps can help librarians evaluate new apps to gauge how well they will meet the needs of users with disabilities.

References

1. Smith, Aaron. "Smartphone adoption and use." July 11, 2011 http://www.pewinternet.org/~/media//Files/Reports/2011/PIP_Smartphones.pdf

2. 148Apps.biz "App Store Metrics." Accessed on August 16, 2012 from http://148apps.biz/app-store-metrics/

3. Auchincloss, Conrad, and Thomas McIntyre. "iPod 'teach': Increased access to technological learning supports through the use of the iPod Touch." *Journal of Special Education* 23, no. 2 (2008): 45-49.

4. U.S. Dept. of Education. "Transforming American Education Learning Powered by Technology: Executive Summary" (Nov., 2010). http://www.ed.gov/sites/default/files/netp2010-execsumm.pdf pg. 14.

5. Gray, Tracy., Heidi Silver Pacuilla, Cynthia Overton, & Alise Brann. "Unleashing the power of innovation for assistive technology." (January, 2010) http://www.nationaltechcenter.org/documents/unleashing_the_power_color.pdf Pg. 4.

6. Davidson, Miriam. "The iPad as AAC device? Yes and no, say users." *MDA/ALS Newsmagazine* (Nov. 10, 2010), http://alsn.mda.org/article/ipad-aac-device-yes-and-no-say-users

7. Gray, Tracy, Heidi Silver-Pacuilla, Alise Brann, Cynthia Overton, and Rebecca Reynolds, "Converging trends in educational and assistive technology." In *Breakthrough Teaching and Learning: How Educational and Assistive Technologies are Driving Innovation* eds. Tracy Gray and Heidi Silver-Pacuilla (Springer, 2011) 5-24 doi: 10.1007/978-1-4419-7768-7_2

8. Holmquist, Julie. "Apps 101: Exploring iPhone, iPod, iPad apps for children with disabilities." *Pacesetter* 34 vol. 2 (2011) http://www.pacer.org/newsletters/pacesetter/summer11.pdf

9. Rummel-Hudson, Robert. "A revolution at their fingertips." *Perspectives on Augmentative and Alternative Communication 20.* (2011). doi:10.1044/aac20.1.19

10. Kagohara, Debora M, " Three students with developmental disabilities learn to operate an iPod to access age-appropriate entertainment videos." *Journal of Behavioral Education 20* (2011): 33-43, doi: 10.1007/s10864-010-9115-4

11. Kagohara, Debora M., Jeff Sigafoos, Donna Achmadi, Larah van der Meer, Mark F. O'Reilly, and Guilio Lancioni, "Teaching students with developmental disabilities to operate an iPod Touch to listen to music." *Research in Developmental Disabilities 32* (2011): 2987-2992 doi: 10.1016/j.ridd.2011.04.010

12. Burke, Raymond, V., Melissa N. Andersen, Scott L. Bowen, Monica R. Howard, and Keith D. Allen, "Evaluation of two instruction methods to increase employment options for young adults

with autism spectrum disorders." *Research in Developmental Disabilities* (2010): 1223-1233. doi: 10.1016/j.ridd.2010.07.023

13. Van Laarhoven, Toni, Jesse W. Johnson, Traci Van Laarhoven-Meyers, Kristen L. Grider, Katie M. Grider, "The effectiveness of using a video iPod as a prompting device in employment settings." *Journal of Behavioral Education 18* (2009): 119-141. doi: 10.1007/s10864-009-9077-6

14. Kellems, Ryan O. "Using video modeling delivered through ipods to teach vocational tasks to young adults with autism spectrum disorders (ASD)" (Ph.D. diss., University of Kansas, 2010) http://kuscholarworks.ku.edu/dspace/handle/1808/8270

15. Kelley, Kelly Renee. "Effects of Picture Prompts Delivered by a Video iPod on Pedestrian Navigation." Ph.D. diss. The University of North Carolina at Charlotte, 2011. Proquest Pub. No. 3474320.

16. Achmadi, Donna Adorina, "Teaching a multi-step requesting sequence to two adolescents with autism using an iPod-based speech generating device." Master's thesis, Victoria University of Wellington, 2010. http://researcharchive.vuw.ac.nz/handle/10063/1526

17. de Sá, Marco, Luís Carriço, Joana Neca, Nádia Fernandes, Pedro Feiteira, Ricardo Pereira, Pedro Bernardo, João Faria and Isabel Sá, "Ubiquitous geo-referenced social skills therapy." In *Proceedings of the 12th ACM international conference adjunct papers on Ubiquitous computing* (2010): 399-400, doi:10.1145/1864431.1864456

18. Mathews, Mark, and Gavin Doherty, "In the mood: Engaging teenagers in psychotherapy using mobile phones." In *Proceedings of the 2011 annual conference on Human factors in computing systems* (2011): 2947-2956, doi:10.1145/1978942.1979379

19. Dennison, Russell F., "Quality Assessment of Collection Development Through Tiered Checklists: Can You Prove You Are a Good Collection Developer?" *Collection Building*, 19 (2000): 24–6. doi:10.1108/0160495001031086

20. Davidson, 2010.

Appendix: 25 apps listed on 3 or more lists

Proloquo2Go	http://itunes.apple.com/us/app/proloquo2go/id308368164?mt=8#
TapSpeak Sequence for iPad	http://itunes.apple.com/us/app/tapspeak-sequence-for-ipad/id379541810?mt=8#
Grace - Picture Exchange for Non-Verbal People	http://itunes.apple.com/us/app/grace-picture-exchange-for/id360574688?mt=8#
ArtikPix - Full	http://itunes.apple.com/us/app/artikpix-full/id356720379?mt=8#
First Then Visual Schedule	http://itunes.apple.com/us/app/first-then-visual-schedule/id355527801?mt=8#
Model Me Going Places 2	http://itunes.apple.com/us/app/modelmegoingplaces2/id375669988?mt=8#
Scene Speak	http://itunes.apple.com/us/app/scene-speak/id420492342?mt=8#
TapSpeak Button Plus for iPad	http://itunes.apple.com/us/app/tapspeak-button-for-ipad/id364806507?mt=8#
Typ-O HD - writing is for everybody	http://itunes.apple.com/us/app/typohdwritingisforeverybody/id372971659?mt=8#
Articulate it!	http://itunes.apple.com/us/app/articulate-it/id391296844?mt=8#
Assistive Chat	http://itunes.apple.com/app/assistive-chat/id379891874?mt=8#
Dragon Dictation	http://www.nuancemobilelife.com/apple/dictation.html
FirstWords: Deluxe	http://itunes.apple.com/us/app/firstwordsdeluxe/id337462979?mt=8#
Look2Learn - AAC	http://itunes.apple.com/us/app/look2learnaac/id319600029?mt=8#
OneVoice	http://itunes.apple.com/us/app/onevoice/id412448074?mt=8
Pictello	http://itunes.apple.com/us/app/pictello/id397858008?mt=8
Speak it! Text to Speech	http://itunes.apple.com/app/speakittexttospeech/id308629295?mt=8#
TapToTalk™	http://itunes.apple.com/us/app/taptotalk/id367083194?mt=8#
iDress for Weather	http://itunes.apple.com/us/app/idressforweather/id385227220?mt=8#
Sentence Builder	http://itunes.apple.com/us/app/sentencebuilder/id344378741?mt=8#
iPrompts	http://itunes.apple.com/us/app/iprompts-xl/id410386084?mt=8#
Picture Scheduler	http://itunes.apple.com/us/app/picturescheduler/id315050461?mt=8#
Visules	http://itunes.apple.com/us/app/visules/id322543961?mt=8#
Time Timer	http://itunes.apple.com/us/app/time-timer/id332520417
IEP Checklist	http://itunes.apple.com/us/app/iepchecklist/id348702423?mt=8#