

Is There an App For That? Developing an Evaluation Rubric for Apps for Use with Adults
with Special Needs

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Abstract

Background: Societal need for technological support constantly evolves. Many mobile applications (apps) are now easily accessible, especially for the special needs population. Little literature exists discussing the usefulness, value, and evaluation of applications in this population. Apps have the potential to enhance the independent lives of adults with Down syndrome. One example is iDress which provides the user with the temperature and the clothing selection that is appropriate for that temperature.

Purpose: The purpose was to identify apps that could enhance the lives of adults with Down syndrome.

Methodology: Apps were chosen based on ease of use and applicability to the population. A tool was developed previously based on Harry Walker's evaluation rubric. The tool provides evaluations in application, feedback, adjustability, ease of use, cost and benefit. Each app was scored 1-4 and an average of each area calculated. Qualitative data were gathered from participants (adults with special needs and family members). Participants selected from a convenience sample, were required to be English speaking and capable of touch technology.

Results/Conclusions: Through analysis of qualitative and quantitative data, conclusions were drawn that touch technology and the apps that use it, can be beneficial in the lives of adults with Down syndrome. Apps that were rated low were due to participants' inability to communicate and understand directions or physical inability to use touch technology. Adults that were able to participate in the study rated most apps useful and applicable to their daily lives, specifically iDress. Findings indicate that adjustments, based on participants verbal and education capabilities, are needed for apps to be fully effective in the target population.

Introduction

The world has entered a technology revolution with the invention of iPod and iPad technology. Technology is becoming highly accessible to all and has greatly affected how society exists. This large impact is only starting to become relevant in the special needs population and its need is proving necessary in the development and daily lives of this population in order to keep pace with our rapidly adapting society. The ease of using iPad technology is being used to enhance learning in all populations, especially young adults and children. Advancements seen in the apps created are able to improve the quality of life in people with disabilities by supporting them with communication, dressing, counting money, medication reminders, maintaining diet, and many other daily needs. Through this technology, people with disabilities are able to function in the world around them and become an active member of society. This technology affects not only the people with disabilities, but also their teachers, caregivers, and families. Parents are given tools to be able to intervene earlier to enhance their child's learning and increase their overall level of wellbeing. Through the internet, families are able to connect and communicate across the world to share stories and ideas to augment their loved one's learning. The hope is that soon a central repository will be developed where adults with disabilities and their families can find and evaluate apps useful for their unique circumstances.

Apps are useful for all children and adults. Educational apps for adults with disabilities may need to interact and provide feedback in different ways that target this population's needs in order to be beneficial. Apps in the special needs population focus on obtaining and adapting daily living skills such as counting money and communication so they are capable of participating in everyday activities. Apps developed for basic daily

living skills are not as abundant as traditional educational apps, but, are beginning to increase with demand.

Apps are published daily as technology increases and publication becomes easier. The research team's focus was on identifying apps and validating a tool to assist adults with special needs and their families to determine which apps are applicable to their daily lives. Some of these apps are free, whereas others can be hundreds of dollars. Apps were considered carefully to best support adults while being financially aware of the daily costs they already have.

The tool used in this pilot study was adapted to gain insight about the strengths and weaknesses of each app. The goal is to ultimately create a central repository where apps can consistently be added and evaluated to provide a way for adults with disabilities and their families to search for new ways to enhance their lives. The hope is that all adults with disabilities can reach their fullest capabilities, live independently, and be an active member of society (Buckler & Peterson, 2012).

Literature Review

Technology has gone through tremendous change within the past decade, creating an increased relevance for adults with special needs. Much of the research available has been focused on children with special needs, not adults. In our literature search, no research, other than a previous pilot study (Buckler and Peterson 2012), was found that evaluated the use of iPad apps on the lives of adults with disabilities. Buckler and Peterson (2012) used an evaluation tool and had ten adults with Down syndrome evaluate six apps. This pilot study used the same evaluation tool to evaluate additional apps for adults with

Down syndrome and their caregivers. The researchers evaluated and expanded on the articles from the previous literature review by Buckler and Peterson (2012).

To establish useful apps for the adults with special needs, an evaluation tool must be developed. According to Walker's article (2011) *Evaluating the Effectiveness of Apps for Mobile Devices*, apps can be examined for quality through usefulness, curriculum connections, ability to export/import, potential for collaboration, aesthetics, and stability. He also noted that the price of the app may not be linked to the quality of the app. Through the use and evaluation of more apps, a common language can be created to allow a greater understanding of appropriate apps for each individual. Walker (2011) created a rubric for teachers to evaluate apps usefulness based on six characteristics of an app that he concluded were important from his research. These characteristics included a) curriculum connections, b) authenticity, c) feedback, d) differentiation, e) user friendliness, and f) motivation. Walker's rubric is shown in Appendix A. His rubric was adapted for the previous pilot study and used again for this study. His permission was obtained and is shown in Appendix B. After an evaluation tool is developed, a central repository could be created in order to form a location where all apps beneficial to adults with Down syndrome could be accessed.

Technology has become more readily available and the price has continued to decrease. The main hope through the use of apps is to increase the independence of adults with disabilities. Apps can be used for a variety of purposes to enhance the lives of this population through aiding communication, time management, education, allowing alerts and reminders, monitoring safety, and guiding the individual and their families. Palmer, Wehmeyer, Davies, and Stock (2012), conducted a national survey of 1617 family members

of persons with disabilities. Their survey indicated that many family members with cognitive or physical impairment did not use assistive technology, but could benefit from it. Many also stated that complexity was not a barrier to their use of technology. Barriers identified leading to underuse are that devices commonly break, need set up, and are expensive.

Smart technology encompasses a large realm of different possibilities to aid in the independence of individuals in their home setting, ranging from controlling appliances to monitoring the individual's safety (Storey, 2010). Examples of smart technology include: computers, tablets, and smart phones which can be utilized, in addition to specific devices and monitors. Depending on the adult's individual requirements, different apps and technology can be made available to assist them in their unique needs. For example, web cams can track the adult in their household or a GPS tracker in their smart phone can alert their family when the adult has left their home. Alerts can remind the individual when it is time to complete an activity or take a medication. They can also alarm the family when a medication was not dispensed or alert the pharmacy when a new prescription needs to be refilled. Other technology is also available such as automatic vacuums and lighting to keep the individual safe as well as oriented.

For many adults with disabilities, remembering schedules and medication administration can be difficult. Through smart technology, schedules can be made for adults that can be shared and edited by their families as well. Alerts can be sent to the family member when the adult has an activity that requires assistance from someone else. Picture cues are a great aid in daily reminders that assist adults with disabilities that have a lower reading ability, helping to increase their independence.

Communication can be very complicated for adults with disabilities, adding to their reliance on others to complete activities and also causing social isolation. Smart technology allows a technological medium for augmentative and alternative communication (AAC). Through more mediums available, AAC software is becoming more extensive and available. Research with AAC has begun to show that adults with disabilities can have a range of vocabulary they are unable to verbally express. Through help from technology and a medium to express themselves, adults with disabilities are able to communicate with the world around them. This creates a large impact on the ability for this population to be active and independent in society. "Use of an SGD (speech generating device) can enhance the quality of life for persons with intellectual disabilities and severe expressive language disorders by providing a way to interact with familiar and unfamiliar communication partners" (Cheslock, Barton-Husley, Ronski, & Sevcik, 2008, p. 385). SGD may enhance their "...intellectual credibility as perceived and assessed by others" (Cheslock, Barton-Husley, Ronski, & Sevcik, 2008, p. 385).

Continuous education is necessary for all individuals. New skills and knowledge can be acquired with technology through computer-based instruction (CBI) and computer-based video instruction (CBVI) as stated by Ayres and Cihak (2010). Skills such as money management and proper hygiene can be acquired through these learning modules and applied to the individual's real life. Learning these life skills aids in allowing the individual to participate in their own lives and in society.

USA Today (2011) has alleged that iPads are successful within this population because they are lightweight, mobile, and can be personalized to the needs of the user. The use of touch screens can also be beneficial for adults that struggle with fine motor skills.

The iPad engages the user through the use of colors, sounds, and interactions. This draws in adults with disabilities attention. Through the use of iPads within this population, adults with disabilities can be connected to society as technology continues to develop.

“Although we do not need to predict the future, it is possible to offer some general guidelines for helping to guide development of smart technology supports for individuals with intellectual and developmental disabilities” (Storey, 2010, p.467). The goal is to establish apps on devices, such as tablets, that can establish independence and increase quality of life for adults with Down syndrome. Through adaptation of the tool used in the previous pilot study, apps can be evaluated and added to a central repository where adults with Down syndrome can discover new ways to develop their skills and reach their fullest potential.

Methodology

This study was submitted to and approved by the Institutional Review Board for Human Subjects at a midwestern university. The participants included adults with Down syndrome with varying degrees of disabilities, and their families, selected through purposive and convenience sampling. They were asked to participate in the study and completed the consent forms. The adults and families were required to speak English and be capable of using touch screen technology. The researchers provided the iPad and apps for evaluation. The research team was available to assist during evaluation if needed. Participants evaluated six different apps using the adapted evaluation tool created by researchers in the previous pilot study (Appendix C). They were provided the form and rubric to complete ratings for multiple domains on each app, and then asked to answer a selection of questions about the usefulness of iPad apps and the evaluation tool (Appendix

D). Apps evaluated included: Counting money, Proloquo2Go, iDress, and Telling Time, Now What, and Calorie Count. These apps focus on enhancing communication, education and activities of daily living. Evaluation of apps averaged around 15 minutes. Completion of the evaluation was anonymous with no personal information or identifying factors.

Evaluation scores were averaged and evaluated against hypothesized findings. Qualitative data were reviewed for themes. Data were compared to the previous pilot study and recommendations for the future were made.

Results

Results were gathered from a sample of ten pairs of adults with Down syndrome and their surrogates/caregivers. The end results are displayed in Appendix E.

The app that was considered most applicable and easy to use by the adults was iDress. Counting Money was rated as the least applicable and easy to use for adults with Down syndrome. All apps rated high on feedback and adjustability overall. Apps were considered cost effective except for Proloquo2Go which rated least cost effective. Most apps were rated as beneficial for adults with Down syndrome. Counting Money had a variety of ratings for the benefits domain.

Overall ten participants stated they thought some of the apps would be helpful to them or their adult, whereas only three said they would not be. Eleven said their adult could use at least one of the apps compared to two who stated they could not. Participants tended to like iDress the best. All but one subject who answered the qualitative questions said other adults with disabilities could benefit from the study apps. Most were unable to state other apps to investigate. Apps known to participants included location and sign language apps. Eight participants did not own an iPad or iPod, versus five participants who

did own an iPad or iPod. Only two stated that the tool used was not adequate in providing enough information to decide how to rate and evaluate the apps. No feedback was given for ways to improve the tool.

Discussion

Quantitative data were compiled related to the application, feedback, adjustability, ease of use, cost, and benefits of the apps for each adult with Down syndrome. All caregivers completed the evaluation tool. Few adults with Down syndrome were able to evaluate the results themselves. Those who were able were asked the questions as the researcher filled out the evaluation for them. Non verbal adults and adults with physical disabilities had difficulties using the apps, causing low scores from the surrogates/caregivers and no rating from the adults for many apps. Many of these caregivers/surrogates stated in the qualitative section that many of these apps may be more beneficial for other adults with less severe disabilities. Some apps may also have been ranked lower due to misunderstanding of the evaluation rubric. There was some missing data, especially for feedback, possibly due to misunderstanding of this domain. In one case, *Proloquo2Go* was not rated because the adult was verbal and *Now What* was not rated due to the adult already using a different scheduling program.

A qualitative analysis was also completed on the six short answer questions that evaluated the apps. Through these questions researchers were able to identify participants' opinions about apps usefulness in the adult with Down syndrome population. All participants except one said that their adult or other adults they know with Down syndrome could benefit from the use of these apps. Apps that were rated lower commonly were due to the adult's inability to communicate, complications from physical disability

and inability to use touch technology, or dementia. Only four participants were aware of other apps available that they recommended. This demonstrates the lack of use and awareness of touch technology for this population. Two suggestions for apps to be created are an app for learning sign language for non verbal adults and an app that shows pictures of favorite locations around town. This app could be used for the adult to pick a location they want to go to. There were two participants that stated they might acquire a few of the apps, such as iDress, Telling Time, and Now What, for their use at home.

Another problem identified was the number of families that owned touch technology. Many adults with disabilities must first learn the fine motor skills involved in touch technology before applications can be useful. Additionally, adults that are non-verbal tend to have a more difficult time understanding the educational apps. Apps with more pictures and less use of touch were identified as more realistic to implement in the daily lives of adults with Down syndrome.

Overall, most participants believe that the evaluation tool is useful and beneficial for assessment of the apps. Some low scoring results, specifically in the cost category, could be due to misunderstanding of the evaluation rubric. Many participants took under one minute to read the evaluation tool and rated each evaluation domain (application, feedback, adjustability, ease of use, cost, benefits) using a one to four scale, with four being the best. The scores ratings ranging from 1-4 also caused confusion in comparison to making the scores range from 1-5. Adjustments and clarification to the evaluation rubric could be made for future studies.

There were a few limitations identified within the study. First, the size of the sample was small and therefore generalization cannot be made. There were also a limited

number of adults that could use touch technology to evaluate the apps themselves.

Reasons for these complications included dementia, problems with communication, and physical disability. Exact usefulness in this population can be difficult to conclude due to the limited number of participants that could assess the apps themselves.

Conclusions

Through analysis of qualitative and quantitative data, conclusions can be drawn that touch technology can be beneficial in the lives of adults with Down syndrome. The evaluation tool can be effective in assessing each application; however adjustments to make it more user friendly should be made in the future. Apps that were rated low were due to participants' inability to use touch technology, inability to communicate, or physical disability. Many caregivers of these participants stated that apps could be applicable to other adults with a lower degree of disability. Most adults and caregivers who were able to use the apps rated them at higher levels and stated their potential usefulness in their daily lives. A larger sample size needs to be used for further research in order to obtain more data that can be generalized. The study can also be expanded to include all adults with disabilities. Lastly, touch technology and the use of apps need to be implemented into the education and daily use of adults with disabilities in order to fully understand their usefulness.

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<http://yourlife.usatoday.com/parenting-family/special-needs/story/2011-09-11/Adapting-to-the-iPad-called-educations-equalizer/50362426/1>

Appendix A Evaluation rubric for iPod apps (Walker, 2010)

Evaluation Rubric for iPod Apps

Domain	1	2	3	4
Curriculum Connection	Skill(s) reinforced in the app are not clearly connected to the targeted skill or concept	Skill(s) reinforced are prerequisite or foundation skills for the targeted skill or concept	Skill(s) reinforced are related to the targeted skill or concept	Skill(s) reinforced are strongly connected to the targeted skill or concept
Authenticity	Skills are practiced in a rote or isolated fashion (e.g., flashcards)	Skills are practiced in a contrived game/simulation format	Some aspects of the app are presented in an authentic learning environment	Targeted skills are practiced in an authentic format/problem-based learning environment
Feedback	Feedback is limited to correctness of student responses	Feedback is limited to correctness of student responses and may allow for student to try again	Feedback is specific and results in improved student performance (may include tutorial aids)	Feedback is specific and results in improved student performance; Data is available electronically to student and teacher
Differentiation	App offers no flexibility (settings cannot be altered)	App offers limited flexibility (e.g., few levels such as easy, medium, hard)	App offers more than one degree of flexibility to adjust settings to meet student needs	App offers complete flexibility to alter settings to meet student needs
User Friendliness	Students need constant teacher supervision in order to use the app	Students need to have the teacher review how to use the app on more than one occasion	Students need to have the teacher review how to use the app	Students can launch and navigate within the app independently
Student Motivation	Students avoid the use of the app or complain when the app is assigned by the teacher	Students view the app as “more schoolwork” and may be off-task when directed by the teacher to use the app	Students will use the app as directed by the teacher	Students are highly motivated to use the app and select it as their first choice from a selection of related choices of apps

<http://learninginhand.com/storage/blog/AppRubric.pdf>

Created by Harry Walker – Johns Hopkins University

10/18/2010

Please contact for permission to use hwalker@bcps.org

**Appendix B Email correspondence with Harry Walker for permission to adapt rubric
(Buckler & Peterson, 2012)**

From: Moya Peterson [mailto:MPETERSO@kumc.edu]

Sent: Thursday, February 09, 2012 5:38 PM

To: Walker, Harry C.

Subject: your evaluation for iPod apps

Sir- I am an assistant professor at the University of Kansas School of Nursing and School of Medicine. I have established an Adults with Down Syndrome Specialty Clinic. A student and myself are attempting to find and evaluate apps on the iPad and iPod touches that my patients would benefit from as well as be able to inform parents and other providers of apps that are established that could assist them in their activities of daily living. We have used your evaluation tool as a pattern but have changed it somewhat to fit our particular needs. I have attached this tool to this email. I just wanted to make sure that we had your permission to do this. We were thrilled to find your tool, as there is very little in the literature about this. We thought it valuable and it provided the only suggestion to develop the tool that we wanted.

Please feel free to email me any questions you may have. Thank you for consideration of this matter. We will be anxious to hear back from you.

Moya Peterson, PhD, APRN

From: Harry Walker

Sent: 2/10/2012 10:15:22 AM

To: Moya Peterson

Hi Moya,

I'm glad you found the rubric to be useful. You have permission to use the rubric as described in your email. I will likely be in touch sometime in the coming month to ask for formalized feedback as part of my dissertation research at Johns Hopkins. I hope you will be able to participate. Best of luck in your efforts to get mobile devices in the hands of your patients.

You might also want to check out our blog - <http://iteachthererforeipod.blogspot.com> It has resources, articles, etc., related to IPods, Mobile 1 to 1 and BYOT. Feel free to share with like minded folks. There is also a link to an article I wrote for the Journal of Special Education Technology about the rubric. The background material may help in your work.

Regards,

Harry Walker

Appendix C Quantitative Evaluation Rubric

Please use the provided rubric to rate each iPad application:

Domain/APP	Counting Money	Proloquo2Go	iDress	Telling Time	Now What	Calorie Count
Application						
Feedback						
Adjustability						
Ease of Use						
Cost						
Benefits						

Evaluation of Applications

Domain	1	2	3	4
Application	Skills in the app are not applicable to individual's needs	Skills in the app are somewhat applicable to individual's needs	Skills in the app are adequately applicable to individual's needs	Skills in the app are very applicable to individual's needs
Feedback	No feedback is provided in the app	Feedback is only given regarding correctness of response	Feedback gives correctness of response and allows individual to try again	Feedback given is constructive and contributes to improvement of the task
Adjustability	App settings are not adjustable to individual's needs*	App settings are somewhat adjustable to meet individual's needs	App settings are adequately adjustable to meet individual's needs	App is very adjustable to meet individual's needs
Ease of Use	Individual needs maximum (step-by-step) instruction to use app	Individual needs moderate amount of instruction to use app	Individual needs minimal amount of instruction to use app	Individual needs no instruction to use app
Cost	Cost of app largely outweighs benefit of use	Cost of app somewhat outweighs benefit of use	Cost of app is equal to benefit of use	Benefit of use largely outweighs cost of app
Benefits	App provides no benefit to individual's daily life	App provides minimal benefit to individual's daily life	App provides some benefit to individual's daily life	App provides large benefits to individual's daily life

11/13/11

*Examples of needs include: larger fonts, volume control, larger graphics, difficulty levels, etc

Appendix D Qualitative Evaluation Rubric

Please answer the following questions:

Every participant will be asked to score each app on the following tool.

Every participant will be asked to answer the following questions:

1. Do you think any of these apps would be helpful to you or your adult?
2. Do you think that you or your adult could use any of these apps?
3. Do you think other adults that you know would benefit from these apps? How?
4. Are you aware of any other apps we should investigate?
5. Do you or someone in your family own an iPad or iPod? If no, have you thought about the purchase of one or such technology that is similar?
6. Do you think that this tool adequately evaluates the app and gives you the information you would need to make a decision on the app's use for you or your adult?

Appendix E Results

Domain/App	Counting Money	Proloquo2go	iDress	Telling Time	Now What	Calorie Count
Application	2.3	2.5	3.5	2.7	2.5	2.7
Feedback	3.1	3.6	3.9	3.4	3.2	3.5
Adjustability	2.3	3.0	3.1	3.0	3.0	3.3
Ease of Use	2.4	2.8	3.5	3.1	2.6	2.6
Cost	3.5	2.2	3.8	3.5	3.5	3.7
Benefits	2.7	3.2	3.5	3.2	3.0	3.3

*Costs: Counting Money \$0.99, Proloquo2Go \$189.99, iDress \$1.99, Telling Time \$0.99, Now What \$0.00, Calorie Count \$0.00

1. Do you think any of these apps would be helpful to you or your adult?

Yes: IIIIIIIII

Specific comments: iDress/telling time, especially idress, no computer access at home

No: II, I-Not at this stage in life with dementia

2. Do you think that you or your adult could use any of these apps?

Yes: IIIIIIIIIII

Specific comments: iDress, considering purchasing, no computer access at home

No: II

3. Do you think other adults that you know would benefit from these apps? How?

Yes: IIIIIIIIIIIII

Specific comments: proloquo2go, all seem quite beneficial to adults with Down syndrome, every aspect, calorie count could help everyone

No: I

4. Are you aware of any other apps we should investigate?

Yes: IIII

Specific Comments: different location apps, sign language

No: IIIIIIII

5. Do you or someone in your family own an iPad or iPod? If no, have you thought about the purchase of one or such technology that is similar?

Yes: IIIII

Specific comments: caregiver has i-pod

No: IIIIIIII

Specific comments: have considered it but have not made a purchase yet, may purchase one

6. Do you think that this tool adequately evaluates the app and gives you the information you would need to make a decision on the app's use for you or your adult?

Yes: IIIIIIII

Specific comments: owns a touch

No: II

Specific comments: difficult to understand