

Using Mobile Technology with Individuals with Aphasia: Native iPad Features and Everyday Apps

Gretchen Szabo, M.A., CCC-SLP¹ and Janice Dittelman, M.S., CCC-SLP¹

ABSTRACT

The use of mobile technology, including smartphones and tablet devices, is a growing trend among adults nationwide, and its potential use in aphasia rehabilitation has generated widespread interest. Despite this trend, adults living with disability are less likely than other adults to go online. Complicating things further, most adults living with aphasia come from a generation where computers and technology were not an integral part of their lives. Additionally, training adults with aphasia requires a different approach than training those in the same age bracket without a disability. This article describes the mobile technology program at the Adler Aphasia Center in Maywood, New Jersey. The goal of this program is to improve access to mobile technology for people with aphasia. The use of mobile devices is the focus of the article. Mobile technology concepts and skills needed to establish a strong foundation for successful iPad (Apple Inc., Cupertino, CA) use are suggested. We discuss how apps may be used to support aphasia therapy with a focus on apps that are native to the iPad and on other apps that were not specifically developed for aphasia rehabilitation. Challenges in implementing a mobile technology program for people with aphasia and individual member success stories are included.

KEYWORDS: Aphasia, technology, apps, mobile device, life participation, iPad

Learning Objectives: As a result of this activity, readers will be able to: (1) list skills and concepts that support use of mobile technology by individuals with aphasia; (2) discuss ways that apps that are not developed for the purpose of aphasia rehabilitation can be used to support treatment goals; (3) describe

¹Adler Aphasia Center, Maywood, New Jersey.

Address for correspondence: Janice Dittelman, M.S., CCC-SLP, Adler Aphasia Center, 60 West Hunter Avenue, Maywood, NJ 07607
(e-mail: jdittelman@adleraphasiacenter.org).

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potential challenges to mobile technology use by people with aphasia and integrate solutions to those challenges; and (4) list factors that may contribute to successful mobile technology use by a person with aphasia.

The Adler Aphasia Center is celebrating its 11th anniversary this year. The center is based on the Life Participation Approach to Aphasia.¹ Our goals include enhancing the communication skills of our members, individuals with aphasia (IWAs), providing opportunities for social and peer support, and building confidence and self-esteem to help our members lead productive lives. We offer a wide range of group programming, as well as opportunities for individual therapy. The center conducts aphasia education, caregiver support and community outreach programs, and research concerning the value of our programs, in addition to more basic clinical research. Technology is considered a priority, and commercially available software programs targeting language and cognition have long been available to our members in our computer laboratory (e.g., Parrot (Parrot Software, West Bloomfield, MI) [www.parrotsoftware.com/home/default.htm], Bungalow (Bungalow Software, Inc., Blacksburg, VA) [www.bungalowsoftware.com], Sentence Shaper (Psycholinguistic Technologies, Inc., Jenkintown, PA) [www.sentenceshaper.com], and Brain Fitness (Posit Science Corporation, San Francisco, CA)).

Over the past several years, the growth of mobile technology, specifically Apple products (Apple Inc., Cupertino, CA), has exploded. Apple's introduction of the iPad rejuvenated member and staff interest in technology and began to highlight how the use of evolving mobile technology could play a valuable role within our center and enhance our existing program. Introducing our members to mobile technology and training them in its use has become a major programming focus at the center.*

* Throughout this article, devices will refer to mobile technology devices such as the iPad, iPod Touch, and iPhone. Although our mobile technology program currently uses only Apple devices, we do not intend to limit the reader's use to these platforms. It is likely that many of the features we discuss are available on other mobile platforms. However, features and apps on Apple mobile devices, specifically the iPad, will be the focus of this article.

A Google (www.google.com) search of "apps and aphasia" delivers over 230,000 results. The results include a range of resources from blogs to nonprofit organizations to app developers and continuing education courses. Questions related to using mobile devices and apps with IWAs are common on American Speech-Language-Hearing Association's Division 2 listserv, and recent journal articles suggest guidelines for selecting and using apps for aphasia rehabilitation.^{2,3} It seems that apps are a hot topic in aphasia rehabilitation and one that is likely to remain at the forefront as technologies continue to rapidly develop.

With this article, we hope to add to the ongoing discussion by sharing some ways we are using mobile technology with our members. Rather than focus on apps developed specifically for aphasia therapy, we will describe our mobile technology program and highlight how features and apps that are native to Apple's mobile devices, as well as apps that have widespread popularity, can benefit IWAs and individuals with cognitive-linguistic disorders. Native apps are preloaded on Apple's mobile devices. Unlike other apps, they do not need to be downloaded separately. Refer to Table 1 for a full list of apps, features, and Web sites mentioned in the article. Following our discussion of mobile device features and apps, we will discuss some challenges with mobile technology use by IWAs, as well as share a series of case studies highlighting successes.

EVOLUTION OF A CENTER-BASED MOBILE TECHNOLOGY PROGRAM

The Adler Aphasia Center's mobile technology program evolved from our individual therapy activities, specifically script training.^{4,5} Compliance with home practice and carryover of trained scripts was a frequent challenge. Mobile technology offered members an enhanced way to practice and use their scripts outside of the treatment room. Through a partnership with LINGraphica (www.aphasia.com), we began

Table 1 Apps, Features, and Web Sites Mentioned in the Article*

Native Apps (Apple)	Nonnative Apps	
Calendar	• Angry Birds (Rovio Entertainment)	• Pinterest (Pinterest, Inc.)
Camera	• Awesome Memory (Tangible Games)	• Proloquo2Go (AssistiveWare)
iBooks	• Diner Dash (Play First, Inc.)	• ooVoo (ooVoo LLC)
FaceTime	• Dragon Dictation (Nuance)	• Skype (Skype Communication)
Mail	• Facebook (Facebook, Inc.)	• Smalltalk Aphasia (Lingraphica)
Maps	• Language TherAppy (Tactus)	• Story Creator (Alligator Apps)
Messages	• Paper Toss (Backflip Studios)	• Talking Tom (Out Fit 7 Ltd.)
Notes	• Pandora (Pandora Media, Inc.)	• TalkPath (Lingraphica)
Photo	• Photo Editor (Aviary)	• VASTtx—Key Words (SpeakinMotion)
Reminders	• Photo Editor -(Axiem)	• <i>USA Today</i> (USA TODAY)
Safari	• Pic Stitch (Big Blue Clip, LLC)	• Where's My Water (Disney)
	• Pictello (AssistiveWare)	• YouTube (Google, Inc.)
iPad Features	Web Sites	
Reader (in Safari)	Aphasia Recovery Connection: www.aphasiarecoveryconnection.org	
Speak Selection	LinkedIn: www.linkedin.com	
Siri	Facebook: www.facebook.com	
	n2y: www.n2y.com	
	New York Times' The Learning Network: learning.blogs.nytimes.com	
	Tapgram: www.tapgram.com	
	Twitter: www.twitter.com	
	<i>USA Today</i> : www.usatoday.com	
	YouTube: www.youtube.com	
	Voice of America: Learning English— http://learningenglish.voanews.com	

*See text for location of app manufacturers.

using their AllTalk speech-generating device in conjunction with their SmallTalk Aphasia app (Lingraphica, Princeton, NJ). This allowed us to sync personalized scripts with a member's mobile device. Similarly, personal storybook apps like Pictello (AssistiveWare, Amsterdam, Netherlands) and Story Creator (Alligator Apps, Singapore) were additional options for creating digital scripts with embedded supports including pictures, video, text, and recordable sound. With access to scripts on their mobile device, members could practice at home with the assistance of a range of cues and could refer to scripted lines on their device to support conversations throughout their activities of daily living (ADLs).

Although members' home practice improved, carryover and generalization of their scripts remained inconsistent. Members were comfortable with the script content, but they were unsure how to use mobile devices during conversations. We decided to go beyond the

individual therapy level by forming our first group in which mobile technology played a key role. The group consisted of members who were already using a device in individual treatment. It was structured as a conversation group where they would have the opportunity to use their devices to share information from their scripts during more natural exchanges. Although this group was helpful in facilitating carryover of scripts into the members' ADLs and strengthening comfort with accessing the scripts to support natural conversation, we knew that there was so much more our members could do with their devices, either to assist them with their communication needs or support them in everyday activities.

Recent reports from the Pew Research Center's Internet & American Life Project reveal the growing trend of adults, including older adults (age 65+), using mobile devices and the Internet. A June 2013 report states that 56% of American adults are smartphone owners,⁶ and another reports 34% of American

adults own a tablet device.⁷ Although older adults make up a smaller share of all adults using smartphones, at 18%, ownership among this group is up 5% from 2012.⁶ Similarly, tablet ownership by older adults grew from 10% in 2012 to 18% in 2013.⁷ In addition, 53% of older adults now report using the Internet or e-mail,⁸ with 86% of these users using e-mail⁸ and 43% using social networking sites⁹ (e.g., Facebook, (Facebook, Inc., Menlo Park, CA) [www.facebook.com], LinkedIn, (LinkedIn, Mountain View, CA) [www.linkedin.com]). These numbers demonstrate that mobile technology and Internet use are on the rise among our members' age-mate peers, but our members were not keeping pace. When surveyed, 77% of our members expressed interest in using mobile technology, but only a handful were actually doing it. This was not surprising given that, despite the rise in mobile device and Internet use among adults overall, adults living with disability were significantly less likely than adults without a disability to go online.¹⁰

To decrease the divide between our members' mobile technology interest and use, we formed our current mobile technology program. Initially, most of the apps we were using with our members were specifically focused on improving aphasic language (e.g., Language TherAppy (Tactus Therapy Solutions Ltd., Vancouver, BC); TalkPath Suite) (Lingraphica, Princeton, NJ); VASTtx—Key Words (SpeakinMotion, LLC, Alameda, CA). Although our members see these apps as having a valued role in rehabilitation, they also want to be able to use iPads in the same ways their peers without aphasia use them. Accordingly, the goal of our program is to improve our members' access to mobile technology by training them on the basic use of an iPad and introducing them to a variety of features or apps that may be useful for them. The program includes group and individual components.

In our technology groups, members come together to learn the basic functions of the iPad and begin to explore broadly popular apps. Individual attention is provided during technology laboratory hours and also incorporated into our individual speech-language therapy. The technology laboratory provides one-on-one support based on the member's functional needs, abilities, and interests. It offers additional support to those

who struggle in the group setting and is an opportunity for members who own their own devices or who embrace the technology to further expand their skills and customize their devices. As mentioned previously, our mobile technology program has its roots in our individual therapy program where we continue to use devices to support our treatment goals and to facilitate carryover and maintenance of skills.

BUILDING A FOUNDATION FOR MOBILE TECHNOLOGY USE

As noted earlier, despite increasing use among American adults, our members' exposure to mobile technology remained limited or absent. Keeping that in mind, we start at the most basic level when introducing IWAs to mobile technology. We believe the skills, features, and concepts that follow are the foundation needed for IWAs to have successful command of the device. IWAs who do not have this complete foundation may be able to access specific features or certain apps on the device but, in our experience, are unlikely to have the flexibility to take advantage of all that it offers. This foundation provides a strong stepping-stone to continue to build mobile technology skills to explore various apps and Web sites.

Basic Device Functions

Before exploring any features or apps on the device, we directly train our members on the basic functions of the iPad. This includes: (1) turning it on and off, (2) putting it to sleep and waking it up, and (3) locating and controlling the volume and home buttons. From there, we teach them how to use the touch screen interface. This includes showing them how to: tap, swipe, tap and hold, and enlarge/reduce the screen. Once our members are more comfortable using these basic functions, we begin to introduce apps, the Internet, and various features of the iPad.

What Is an App?

Despite the professional and media buzz surrounding apps, many of our members have never heard the term, and most of those who have heard of an app are still unsure of what it really means. Understanding the idea of an app

must be established. As we begin introducing popular apps, we discuss and demonstrate “What is an app?” and “How do you locate and open an app on the iPad?”

Popular game apps are introduced first. Along with providing a context to understand the app concept, they also support the development of device navigation skills. Apps such as Angry Birds (Rovio Entertainment Ltd., Espoo, Finland), Paper Toss (Backflip Studios, Boulder, CO), and Talking Tom (Out Fit 7 Ltd. Limassol, Cyprus) offer an engaging way to introduce and practice the movements needed to navigate the touch screen device and provide a framework to introduce the terms used for the movements (i.e., swipe, tap). To successfully launch your bird in Angry Birds or throw your paper in Paper Toss, you need to use a swiping motion just as you would to move between screens on the iPad. In Talking Tom, tapping and swiping result in different reactions when interacting with Tom the cat. Tom also repeats everything he hears and can be a humorous and engaging way for IWAs to use spoken language. While having fun, members strengthen their ability to navigate the device and better understand what an app is.

Mobile Internet (Safari)

Using Safari, the default Internet app for the iPad, we introduce accessing the Internet on the device. Although many of our members have a working understanding of the Internet, it is a new idea for others. Safari’s search bar provides a stable search tool to begin exploring various news, sports, food, and entertainment sites. Through demonstration and repeated exposure, members begin to understand the process of searching the Internet, reviewing the results list, selecting a Web site to view, and using navigation buttons (e.g., back arrow).

The next step in mobile Internet access involves understanding additional features like bookmarking and tabbing. These skills are introduced after basic device and mobile Internet skills are mastered. As with the more basic mobile Internet skills, bookmarking and tabbing require direct demonstration and opportunities to practice. Bookmarking is particularly useful for our members, providing easy access to sites they frequent by

reducing language and cognitive loads. Although tabbing does allow the user to switch between multiple Web sites and our members see its usefulness, they often have difficulty with this and most continue to require some support with this feature.

When introducing and reviewing the Safari app, we use our members’ interests to demonstrate how they can use the iPad to access meaningful information. Following their lead, we search everything from stock prices to *I Love Lucy*. One note of caution: multiple steps and the high language load of many Web sites make mobile Internet access an ongoing challenge for our members. This, along with other challenges to mobile technology use, will be further discussed below.

Speak Selection

Beginning with iOS 5, Apple offered an accessibility feature called Speak Selection. This feature allows the device to read selected text aloud. The Speak Selection feature is app dependent, meaning it is not compatible with all apps. However, it is available on many of the apps native to the iPad (e.g., Mail, Safari, iBooks, Notes, and Messages (Apple Inc., Cupertino, CA)), allowing e-mails, Web pages, books, and notes to be read aloud to the user. The speaking rate can be adjusted and there is the option to highlight each word as it is read aloud. Multiple dialects and several languages are also available.

The process of selecting the text to be read requires fine motor coordination and practice. Enlarging the text display and the use of a stylus are both strategies that facilitate the text selection process. Within our groups, Speak Selection is usually introduced using news Web sites such as *USA Today* (www.usatoday.com). After executing a Google search, locating the Web site in the results list, and opening and bookmarking the *USA Today* Web page, members spend a significant amount of time practicing using the Speak Selection feature with various articles of interest. Because reading is a challenge for many IWAs, Speak Selection is a feature that is widely popular among our members. To turn on Speak Selection on an iOS device, go to: Settings, General, Accessibility, Speak Selection.

Safari's Reader

The Reader feature is offered for certain Web sites using the Safari app or desktop browser. Web sites that support this feature will display the word *Reader* within a box on the URL bar. When the Reader button is selected, a separate window will open displaying only written content from the Web site. Links, unrelated photos, and advertisements are removed. Using Safari's Reader feature along with Speak Selection is helpful for an IWA as the uncluttered display makes it easier to select and highlight specific content that can be read aloud.

App versus Web Site

IWAs need to understand how they are accessing information to accurately apply the skills they are learning. This requires distinguishing between an app and a Web site. The importance of this distinction becomes apparent when using the Speak Selection feature, which we noted is only supported on some apps but is widely available on Web sites. For example, *USA Today* (Garnett Publications, McLean, VA) can be accessed on an iPad by both the app and mobile Web site. At this time, Speak Selection is not available on the *USA Today* app. This means members wishing to use Speak Selection for *USA Today* articles need to access *USA Today* through the Web site.

The difference between an app and Web site is also a consideration when something is available only on the Internet. Our members use Tapgram (www.tapgram.com), a social networking site like Facebook but created for IWAs. Tapgram is currently only accessible through the Internet. It is not currently available as an app. For our members to know where to access specific content they find useful, it is important to continue to help them to distinguish how they are gaining access to different programs: either through the Internet/Web site or an app.

CLINICAL USES OF NATIVE AND POPULAR APPS

A 2009 Apple commercial coined the phrase "There's an app for that" as it proposed a variety of dilemmas that could be addressed with an app on the iPhone. Although the slogan should

not be taken literally, there is no shortage of available apps for consideration. Currently there are over 20 apps native to the iPad. As noted earlier, native apps are those that are built-in to the device, such as Photos and Reminders. The App Store is also a native app and is the porthole to the more than 900,000 apps available for download. Examples of popular apps that can be downloaded include Pandora (Pandora Media, Inc., Oakland, CA), YouTube (www.youtube.com; Google, Inc., Mountain View, CA), and Talking Tom. Although we initially used many native and popular apps to provide a meaningful context to build and reinforce the basic skills discussed in the previous section, an added benefit is that some have potential uses for the common rehabilitative needs of our members. In this section, we highlight several of these apps and briefly describe ways they may benefit IWAs or individuals with cognitive-linguistic deficits.

Conversation Support (Photos, Camera, Maps)

There is a wide range of augmentative and alternative communication (AAC) interventions used to facilitate successful communication among IWAs and their communication partners.¹¹ The iPad can be used in similar ways to low-tech (e.g., pen and paper, communication book) and high-tech (e.g., Lingraphica) AAC devices.† Although there are mobile AAC apps (e.g., Proloquo2Go by AssistiveWare, Amsterdam, Netherlands) that offer more robust or traditional AAC features, the Photos and Camera apps [Apple (Apple Inc., Cupertino, CA)] that are native to the iPad are user friendly and powerful resources to build a digital picture library of personally relevant content. We use the Camera app to take pictures of people, places, items, and experiences that are important to our members. These photos are saved to the Photos app and placed

† Although we understand there is a role for a range of high-tech augmentative and alternative communication devices in the continuum of aphasia therapy, a discussion of other high-tech augmentative and alternative communication options and comparisons of the possible benefits or limits of each is beyond the scope of this article.

into digital albums that members can access with a few taps of the finger.

We now have members with their own devices who return from vacations with pictures in the Photos app ready to support and enhance their conversations about their trip. It should also be noted that you can add older photos in a variety of ways, such as taking a picture of the photograph or scanning and e-mailing it to the Mail app. Adding text to the pictures has been a useful way to incorporate written supports (e.g., including people's name and relation to the IWA). At this time, the built-in editing available in the Photos app does not allow you to add text to your pictures. However, many free photo-editing apps offer this feature. Photo Editor (Aviary, Inc., New York, NY), Photo Editor- (Axiem Systems), and Pic Stitch (Big Blue Clip, LLC) are just a few examples of such apps.

Another app native to the iPad is the Maps app (Apple Inc., Cupertino, CA). Hard copy maps are a common supportive communication aid. The Maps app serves as a compact atlas of the world that offers both standard and satellite views of locations. The Maps app is used in both our group and individual contexts. Members initially enjoy searching their own address as well as other members' addresses. Once comfortable with it, our members or their conversation partners use it in group discussions or one-on-one conversations to facilitate communication.

Cognitive-Communication Support (Calendar, Reminders, Notes, Gaming Apps)

Some of our members with cognitive communication deficits embrace native apps that offer functional ways to keep track of schedules or provide external memory aids. These include: (1) Calendar (Apple Inc., Cupertino, CA), where users can input important dates such as birthdays, meetings, appointments, and social events. (2) Reminders (Apple Inc., Cupertino, CA), which allows users to create to do lists where they can check off items as the task is completed. In addition to creating traditional to do lists to remember to pay bills or call a friend, our members also use it to make their shopping

lists. A unique feature of Reminders is that you can set location-based alerts that send text and audio notifications when you arrive or leave a specific location. This is a particularly useful memory aid. (3) Notes (Apple Inc., Cupertino, CA), which is useful for marking down important information that the user may need to refer to at a later time. We use the Notes app to input a member's current medications, biographical and contact information, or e-mail address. Some members who have difficulty recalling passwords also ask that they be added to Notes. Notes is not a secure app, so caution should be used if passwords are included.

Popular gaming apps are a useful and engaging resource to assist with a variety of executive functions. Thanks to Megan Sutton's suggestions on the Tactus Therapy Solutions blog,¹² we use apps like Where's My Water? (Walt Disney, Inc., Burbank, CA) to assist with problem solving and Awesome Memory (Tangible Games, Ekaterinburg, Russian Federation) to assist members with their memory. Even apps like Diner Dash (Play First, Inc., San Francisco, CA) address some of the higher-level executive function skills in a fun way. While using any of these apps, the focus always remains on how they help the IWA with his or her cognitive skills. For example, when members use the Awesome Memory app the goal is not to see how many matches they can make but to see what compensatory strategies or skills worked to help them complete the task successfully. The idea being that these compensatory strategies and skills can then be carried over and used in more functionally meaningful tasks.

Social Connection (Mail, FaceTime, Tapgram, YouTube)

In recent years, the management of aphasia has expanded beyond the impairment level to include the psychosocial effects of stroke and aphasia, including social isolation.¹³⁻¹⁵ Empowering our members to connect socially is a cornerstone of our center, and using the iPad to accomplish this is a major focus of our technology program. Mobile devices provide an alternative and powerful tool that helps IWAs connect and communicate with other people. There are two apps native to the iPad that can

facilitate social connection: Mail and FaceTime (Apple Inc., Cupertino, CA).

Although e-mail is available on many technology platforms and devices, supports built into the iPad or available via apps can facilitate the writing and reading challenges many IWAs encounter with e-mail communication. Our members who have difficulty writing or typing successfully use Siri (Apple Inc., Cupertino, CA), Apple's voice-activated assistant, and speech-to-text apps like Dragon Dictation (Nuance Communications, Inc., Burlington, MA) to compose messages without having to type. Alternatively, we use the Speak Selection feature so e-mail messages can be read aloud. Using a speech-to-text app or features such as Siri and Speak Selection in conjunction with the Mail app provides our members with the necessary support for successful e-mail communication.

FaceTime, Apple's video-calling app, allows our members to connect with family and friends with the benefit of visual cues that are not available during traditional phone calls. A limitation of FaceTime is that both parties need to own an Apple device to have a video chat. Nonnative video chat apps like Skype (Skype Communications SARL, Clausen, Luxembourg) and ooVoo (ooVoo LLC, New York, NY) are alternatives that can be used when both parties do not own an Apple product. Another benefit to ooVoo is that it allows video chatting with up to 12 people at a time. The Aphasia Recovery Connection, an online aphasia support group (www.aphasiarecoveryconnection.org), successfully uses ooVoo and other social media to connect IWAs and reduce feelings of isolation. The Aphasia Recovery Connection hosts weekly ooVoo meetings offering opportunities for IWAs to meet face-to-face regardless of geographical location or transportation concerns.

Social networking sites are becoming a more popular way for adults to keep in touch and exchange information.⁹ Like e-mail, many social networking platforms offer asynchronous communication, where participants are not exchanging information in real time. One benefit of asynchronous communication for IWAs is that it reduces the pressure of an immediate response. Information can be shared and received at a pace comfortable to the IWA. Although Facebook and Twitter ([\[ter.com\]\(http://ter.com\)\) are probably the two most popular social media networks at the moment, we will illustrate the potential of social networking sites using Tapgram and YouTube as examples.](http://www.twit-</p>
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As mentioned earlier, Tapgram is a modified version of Facebook created specifically for IWAs. Using symbols and basic phrases it is possible to post a message by simply tapping on what you want to say. Within our mobile technology program, we have created our own network of contacts. Members have their own profiles, and they connect with one another. Similar to Facebook's newsfeed, Tapgram offers a newspaper submenu where members can view postings from themselves and their friends. Our members feel Tapgram offers a user-friendly system to interact with and communicate with their friends.

YouTube, a video-sharing Web site that is also available as a downloadable app on mobile devices, is another widely popular social networking site that can be used by IWAs to access and share information. Our members enjoy watching clips to get information and for entertainment and inspiration. They enjoy videos posted by aphasia groups or organizations and videos that are in YouTube's "Popular" category. The videos provide a great way to promote spontaneous conversations and discussions among the members.

CHALLENGES

We believe in the power of mobile technology and the growing role that it can play in a range of aphasia rehabilitation. However, we would be remiss if we were not honest about the challenges we have faced when using mobile technology with our members. What follows are the main challenges we have dealt with as our mobile technology program has grown, as well as ways we have tried to work with or around them. Holland et al and McCall also offer additional suggestions to successfully facilitate the use of apps with IWAs.^{2,3}

Average Age of Population

The majority of our members are not technologically savvy. During their lives, many had

limited to no exposure to computers or general technology. Despite expressing interest in using an iPad, many of our members are very hesitant to work with them, fearing that they will damage the device or ultimately fail. We frequently stress to our members that technology is not perfect. When working with technology, you can *always* count on something going wrong. When this happens, it is not necessarily the user's fault but rather just the nature of technology. Many of our members find this to be comforting. Fortunately, besides throwing or dropping the iPad, it is difficult to damage it just from exploratory learning!

Willingness to Learn about Technology

When we first began the technology program, most of our members were intimidated by iPads. We started with a very small group of members. We found that one of the most important factors in determining whether a member would be successful was if he or she demonstrated a willingness to want to learn how to use it. As members throughout the center began to observe their friends using the iPads, it sparked more interest and curiosity, eventually resulting in waiting lists for the technology group and laboratories. For those of you who may not have access to an aphasia group, the Snyder Center for Aphasia Life Enhancement's YouTube channel offers several videos showing their members with aphasia using mobile technology.¹⁶

Support

Most of our members require some level of support to assist them in using an iPad. The level of support needed varies across the members' technology exposure, severity of aphasia, and fine motor capabilities. The level of support needed often diminishes as members become comfortable with a particular skill or app. We rely mostly on volunteers during our groups and laboratories to provide one-on-one support to our members. Family members and caregivers may also be a resource for those who have their own devices. However, volunteers, family members, or caregivers may not have experience with the devices and may also require training.

Heterogeneous Membership

We offer beginner and intermediate groups, so members in a group have similar mobile technology skills. However, groups are often heterogeneous in terms of the types and severity of aphasia. Additionally, some members have concomitant cognitive deficits that create further challenges when implementing the program at the group level. Applying supported communication strategies and increasing the number of volunteers available to support the members in a group setting helps mitigate some of these challenges.¹⁷

Apps, Web Sites, and Accessibility Features Rarely Created with IWAs in Mind

It is rare to identify an app or Web site with appropriate content that is also easy for our members to navigate. Many Web sites or apps require you to create an account and enter a username and password. This is a challenge for our members to independently and successfully perform. Additionally, some accessibility features available on the iPad, although good in theory, are not always easy to access for IWAs. As mentioned earlier, Speak Selection offers IWAs the opportunity to "read" an article by listening to it. However, the feature itself can be temperamental. Precision in how the IWA taps or touches the iPad screen is an issue. Highlighting more than one word can be a challenge because it requires use of fine motor skills, which may be compromised. Despite the challenges with Speak Selection, our members recognize its usefulness and generally have success with the feature following repeated practice.

When we started our technology groups we attempted to introduce our members to adapted Web sites such as Voice of America Learning English (<http://learningenglishvoanews.com>) and New York Times' The Learning Network Web site (learning.blogs.nytimes.com). Although some of these Web sites offer useful features such as recordings of articles, our members did not find them user friendly. In contrast to the Speak Selection feature, words cannot be highlighted as recordings play. Sometimes the full recordings are not offered for all articles, and it is often difficult for our

members to locate the speak icon due to its small size and inconsistent placement on the Web page. One Web site that our members enjoy is a subscription service called n2y (news-2-you; www.n2y.com). Each week a new article relevant to current events is posted along with worksheets (e.g., puzzles, multiple choice questions, etc.). The service offers different reading skill levels for each article from beginner to advanced, uses symbols and words, and allows content to be read aloud while words and symbols are highlighted.

Technical Support

As our technology program grew, so did the number of center-owned mobile devices. It became increasingly difficult to maintain all the devices due to time limitations and lack of technically trained staff. To address this issue we hired an outside IT consultant agency to help us manage and update our devices on a regular basis. Although the challenge of managing multiple devices is not present when working in a setting where clients own their own devices, technical maintenance is still needed and may require coordination with family members or caregivers to help manage tasks such as backing up the device, updating software, or accessing passwords.

Rapidly Changing Technology World

Another challenge when dealing with the mobile technology field is keeping up with the many changes that occur in the technology world. Whether it is new apps, an updated operating system, or a change in how an app looks or a feature is used, one important factor to facilitating successful mobile technology use with IWAs is to keep up with the times.

Limited Budget

Purchasing devices and software apps can become quite an expense. Working in a nonprofit organization limits the number of new resources that can be purchased during a set period of time. As we have highlighted in this article, Apple devices come with several built-in apps that can be used without an additional cost. In

addition, the apps listed in Table 1 are just a sampling of the numerous free or low-cost apps available.

Most Members Do Not Own Their Devices

Although some of our members own their own iPads or other mobile device, many do not. They rely upon using the center-owned devices. Most of the members who purchased their own device have been able to utilize what they have learned at the center and apply it to their ADLs. Those who do not have the opportunity to take a device home and use it every day are restricted in how much success they will have integrating the device into their lives.

MOBILE TECHNOLOGY SUCCESS STORIES

The majority of our members who participate in our mobile technology program report that it is a positive experience. When surveyed about their satisfaction with the program, the average member's response was 4, on a scale of 1 to 5 with 5 being very satisfied. Similarly, after participating in one of the mobile technology groups, members report a higher comfort level with the technology. Of those members who have a device at home, over 75% of them report using the device daily. They report a variety of ways they are using their devices, including to access information (e.g., news, weather, sports scores), to go onto the Internet, for entertainment (e.g., games, music, videos), to practice or facilitate communication (e.g., SmallTalk Aphasia (Lingraphica, Princeton, NJ) Pictello, Tactus Therapy apps), and for social networking (e.g., Tapgram, Facebook, Pinterest (Pinterest, Inc., San Francisco, CA) [www.pinterest.com]). To better illustrate the variety of ways some of our members have been using an iPad with success, we offer the following case studies.

Mildred is an 81-year-old woman diagnosed with Broca's aphasia and apraxia of speech (AOS). She is 7 years postonset. Due to her severe AOS, Mildred has limited verbal output. Her reading and writing skills are less impaired, allowing her to use those modalities as her primary means of communicating. She

owns an iPad and participated in our technology group for two semesters where she learned how to use the basic features of the iPad. She then joined our technology laboratory where she received customized, individual support based on her needs and interests. Telephone conversations are difficult due to her aphasia and AOS. Using her iPad she is now able to e-mail and Skype with her family, who live out of state, providing them with a functional way to keep in touch with one another. When Mildred first obtained her iPad, she required moderate to maximum assistance. She now requires less assistance and independently uses a range of apps and features.

Ben is a 55-year-old man diagnosed with Broca's Aphasia and AOS. He is 5 years post-onset. His verbal output is stronger than his reading and writing skills, but still somewhat limited. Ben participated in our scripting treatment program where he also learned to use various features of the iPad, including the Dragon Dictation app to compose e-mails and send them to his friends and family. Although Ben no longer participates in individual therapy, he continues to use his iPad in a variety of ways, particularly to e-mail friends and family. He also continues to participate in our technology group where he is learning to use more apps, Web sites, and features available on the iPad. When asked about the technology program his response is always, "This is great!" He loves learning about new apps, particularly those that have to do with cooking. At the end of each group session, he always asks, "What are we doing next week?"

Another member, Julia, is a 44-year-old woman diagnosed with mild anomic aphasia and concomitant cognitive-communication deficits. She is 9 years postonset and has participated in the technology group for several semesters. Julia has her own iPad mini and is able to send e-mail, surf the Internet, and utilize various apps to help her with her activities of daily living. She has been successful with learning how to use an iPad while requiring only minimal assistance. When she is asked about the technology program her response is always "Fantastic." Julia loves using the iPad for social networking. She currently uses Facebook but has also embraced using Tapgram. She loves the

idea of connecting with her friends at the center using an aphasia-friendly Web site.

Kyle is a 61-year-old man diagnosed with anomic aphasia and cognitive-communication deficits. He is 5 years poststroke. Kyle's cognitive communication impairments are more pronounced than the aphasia, so we began using the iPad to develop compensatory strategies. For example, remembering appointment times was a priority for him. Using the Calendar app, he was able to set alerts to help keep his appointments. We also introduced game apps, such as Where's My Water? and Awesome Memory to target problem solving and memory goals. To be successful with the games, we developed a variety of compensatory strategies for Kyle. We then discussed how he could use these same strategies to successfully complete his ADLs that were relevant for his life. Initially, Kyle did not own an iPad but had been borrowing one. After a few months using the device he saw how useful the iPad was in helping him to complete his ADLs, so he purchased his own.

As these case studies demonstrate, our members use mobile devices in varying ways and for different reasons. However, there are several common factors in these case studies that contribute to the success these members have had with mobile technology. These include: (1) the IWA's willingness to learn and use the technology; (2) regular access to a mobile device to develop mobile technology skills; (3) opportunities to apply skills in personally meaningful ways; and (4) support to establish skills, maintain the device, and troubleshoot problems.

CONCLUSION

In our experience, most members who start in the mobile technology program do not want to stop. They want more exposure to technology. Although current demand is greater than our ability to accommodate the needs and interests of our membership, technology is becoming a powerful tool for our members with aphasia. As discussed throughout this article, in addition to learning how to use an iPad in a similar manner to their peers without aphasia, our members experience firsthand how a common mobile device such as an iPad can serve as an important

AAC tool to assist them with their daily communication. Gone are the days of devices that are too large or impractical for an IWA to use. This new era of technology is allowing IWAs greater opportunities. The rapid development of powerful new apps, Web sites, and tools that are being created on a daily basis will continue to assist these individuals with their daily struggle of being able to communicate successfully. It is truly an exciting time for IWAs and speech-language pathologists!

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