Principles of App Selection and Training After Brain Injury

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Abstract

The growing popularity of using mainstream smart devices as assistive technology for cognition (ATC) is having a significant impact in the daily lives of individuals living with brain injury. With more than 60 percent of the mobile market using smart devices, it is becoming more common for individuals to have their own smart devices. However, the devices are often underutilized and are not being used in a way conducive to benefiting individuals postinjury. Although brain injury professionals play a significant role in the selection and training of devices and apps, the sheer number of apps and the time required to select and train others to use them present major obstacles to the broad adoption of these devices in the therapeutic environment. The purpose of this article is to provide a framework for selecting and training the use of apps that helps clients with cognitive impairments function more optimally in their day-to-day lives. We present 4 questions to help identify training and instructional needs of clients. In addition, we discuss training templates and learning tools that can be used by therapists to facilitate app training within clinical sessions as well as by clients and/or caregivers outside the clinical environment.

Importance of Mainstream ATC Smart Devices

The importance and popularity of using mainstream smart devices (e.g., smartphones, tablets, cell phones) as assistive technology for cognition (ATC) has evolved over the last 8–10 years (Wild, 2013). ATC includes a range of tools used to provide support for individuals with compromised cognitive ability (Cole, 1999; Gillespie, Best, & O'Neill, 2012; LoPresti, Bodine, & Lewis, 2008; LoPresti, Mihailidis, & Kirsch, 2004; Sohlberg & Turkstra, 2011). Although ATC resources range from low-tech options (e.g., paper calendars, timers) to specialized high-tech systems, the popularity, implied normalcy, and sheer volume of quality mobile applications (apps) associated with the use of mainstream smart devices is quickly changing how these devices are used and integrated into the rehabilitation community. As Sohlberg and Turksra (2011) suggest, the use of ATC devices to assist individuals with brain injuries to compensate for cognitive challenges is one of the most notable advances in recent years. The significance of the use of ATC is underscored by the integration of ATC as a Practice Standard for individuals with mild memory impairments according to the American Congress of Rehabilitation Medicine (Cicerone et al., 2011; Haskins, 2012).

The most recent smartphone market reports indicate that, as of November 2013, more than 152 million people in the United States own smartphones, which is more than 63 percent of the mobile market (ComScore, 2014). This number represents nearly half the population of the United States. In addition, one-third of Americans own tablets (PewInternet, 2013). As a result, it is not uncommon for patients/clients to enter therapy with their own smartphones and/or tablets. Those with their own devices may have used them prior to their injury or the device may have been purchased after injury with the hope of dealing with cognitive impairments (e.g., memory). Although patients/clients may have used and/or be using a smart device after injury, it is often the case that they do not use the device in a way that is conducive to benefiting them postinjury. Research supports the use of ATC devices/apps to compensate for common cognitive

challenges, including those related to memory, attention, organization, planning, and time management (Gillespie et al., 2012; LoPresti et al., 2004; Sohlberg & Turkstra, 2011). For instance, mainstream smart devices offer many features that can significantly benefit those with brain injury, such as portability, the ability to set multiple audible and tactile reminders to help with memory issues, and built-in accessibility features (de Joode, van Heugten, Verhey, & van Boxtel, 2010; LoPresti et al., 2008).

Although the ubiquity of smart devices has significant implications for those with brain injury, the number of apps available, the time required to select apps that will have the most significant impact, and the necessity to learn and then train patients/clients to use the app(s) present major obstacles to the broad adoption of mainstream smart devices for those with brain injury. The purpose of this article is to provide a framework for selecting and training the use of apps that help clients with cognitive impairments function more optimally in their daily contexts.

The Process of App Selection

With hundreds of thousands of apps available, how does a clinician decide on the most appropriate app for a patient/client? Often the recommendation of an app is based on whether or not the clinician personally uses the app and/or how comfortable she or he is with the app. In addition, apps may be recommended based on a list of apps and brief descriptions shared among clinicians. While these informal information sources can be fruitful, they are not sufficient to identify the optimal match for a client's profile. The app selection process requires the clinician to engage in systematic information gathering that considers the environment, client and app features. Wild (2013) posed three questions for clinicians to consider when beginning the process of app selection:

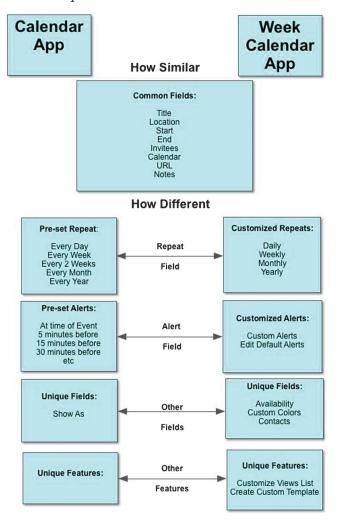
- Question 1: What is the compensatory purpose for the app?—This question helps focus attention on specific issues the potential user has that the app might address.
- Question 2: What features should we be looking for in such an app?—This question brings attention to the features included in an app and whether those features are beneficial and/or necessary to help individuals with brain injuries.
- Question 3: What other cognitive skills will this app help to work on or develop?— Once an app has been selected for the identified compensatory purpose, metacognition and generalization can be emphasized through the training process.

In addition to these three questions, clinicians might also want to explore how various apps compare to each other by asking a fourth question:

• Question 4: How does one app compare to another, including features or fields the apps share as well as specific differences?

Figure 1 illustrates this comparison by showing the similarities and differences associated with two calendar apps.

Figure 1. Calendar/Week Cal Comparison



Note that an emphasis is placed on the category in which the differences appear (e.g., Repeat Field or Alert Field) as well as the specific differences. In addition to these questions being useful for clinicians in their app selection process, the answers to these questions can be shared with the patient/client and/or caregivers to assist them in understanding the purpose of the specific app recommendation. It is postulated that a better understanding of the purpose of the app recommendation on the part of the patient/client/caregiver will result in enhanced motivation and increased compliance in using the app outside of therapy. The clinician could also use the questions to evaluate apps that a patient/client might already be using on his/her device, but which may not be providing a maximum benefit to the user.

Certainly the expertise of the clinician and his/her knowledge of the patient/client will lead to some of the answers for the questions posited above; however, where can a clinician gather the necessary app-specific information? This step can be quite time-consuming and challenging. The various smart device operating systems have their own "app stores" where apps are purchased and downloaded (e.g., App Store, Google Play, etc.). Unfortunately, the information a clinician needs to evaluate an app for a client is not always available within the stores. In many cases, the stores do have abbreviated feature lists and screen shots; however, this alone may not

be sufficient to make a well-informed decision. Some additional ways to gather the important information necessary to make an informed recommendation include:

- app review web sites
- YouTube videos
- online app webinars.

Most app reviews and online videos are created for the general population. As a result, they don't always emphasize those categories and/or functions most relevant to the rehabilitation of cognitive issues. Again, this is where the questions posed above and the expertise of the clinician play a significant role. One other factor that is important in the selection of apps is the "staying power" of the app. The latest apps may not be the best option; in fact, sometimes new apps may not last long in the marketplace and as a result can negatively impact the user. Some factors associated with "staying power" include:

- length of time in marketplace
- frequency of updates
- new and improved functionality with updates
- consistent user interface across updates.

Regardless of the app selection process, the significance of the training and the ability of the trainer to troubleshoot client issues are paramount in the overall adoption and success of the app for the end user.

Principles of App Training

Successful app adoption that has a positive impact on daily functioning requires engaging in an individualized selection process that includes a review of app options as described above. The selection process guided by the four recommended app selection questions posed will also be important for identifying training and instructional needs for the app user. The need for training is largely dependent upon the cognitive profile and background knowledge of the users (Sohlberg & Turkstra, 2011). For example, individuals familiar with apps and mobile devices or those with mild cognitive impairments may be able to independently load and begin using an app, whereas other individuals will require training and ongoing support from clinicians or experienced family members/caregivers. In addition to learning the basic procedures for using an app, individuals will need to understand how the app will help them achieve goals that are meaningful to them and know how to implement the app so they receive the maximum benefit (e.g., time, place, and context for app use).

Training individuals with significant impairments in memory and new learning requires implementation of specific instructional techniques (e.g., error minimization, use of a task analysis) that allows learning of new procedures when episodic learning is impaired (Sohlberg & Turkstra, 2011). Training is not a linear process and usage variables regarding implementation within the real world context need to be monitored in order to adjust training and achieve and maintain independent use. Hence, app selection, training, and monitoring need to be integrated and need to be accessible for clinicians and family members/caregivers supporting individuals who are not already familiar with apps and/or who have impaired learning.

Training and monitoring will be individualized, as some individuals may require a comprehensive program of systematic instruction, while others may require only minimal prompting to practice app use until they are fluent and then receive faded prompting until they are effectively using the target app in their daily life. A helpful training framework is the PIE framework that encourages the clinician or provider to engage in three phases: Planning, Implementation and Evaluation. Careful *planning* has an enormous bearing on successful

selection and training of devices and apps. For health providers, many critical clinical decisions are made *outside* of the therapy session or direct interaction with the person with cognitive impairments. Initial planning decisions must consider the user of the technology and functional needs, the environment, and the actual app(s) and host device. We have provided the four app selection questions to guide the planning process.

Implementation refers to training and instructional methods that maximize the efficiency and durability of learning and are based on cognitive learning theory. As noted, individuals with more severe learning impairments will benefit from a task analysis breaking down the steps of the app, systematic instruction reviewing each step with minimization of error, and distributed practice. Resources to facilitate the training during the implementation phase are described in the next section.

The implementation phase for those with less severe impairments could include structured brainstorming and discussions related to the various ways in which clients might use apps in a very practical way in their daily life based on the information gathered during the planning phase. For example, most individuals would indicate they know how to use the native Camera app. Although this may be true, they may not be using it in an effective way to help with cognitive issues they experience post injury. Some examples that might not always come to mind include taking pictures of:

- where one parks a car in a large lot or which store a person goes into when entering a mall to prevent frustration and deal with memory issues,
- specialized light bulbs so the correct bulb is purchased potentially saving time and frustration,
- a pill box with all the required medications so they can see that all the medications are in the box when it is refilled weekly,
- the wiring setup for an entertainment system so it can always be replicated

Evaluation of individuals' use of the app(s) within and outside of training sessions is critical for both measuring outcome and making decisions about future training and support. Data gathered on the learning process *during training of app use* and on the impact of the training *outside of direct support* will drive the training decisions. The three PIE phases—Plan, Implement, and Evaluate—provide the scaffolding for effective training of apps and devices and have been validated in the rehabilitation research (Powell et al., 2012).

Materials to Facilitate App Training

There are a number of training templates and learning tools that can facilitate app training. As clinicians use them with their participants, they will build their repertoire of templates and create an economy of effort. An important feature of these resources is that they can be used by clinicians as well as caregivers. Although clinicians typically do the bulk of the app training, it is essential that caregivers have accessible, easy-to-use tools, because they will ultimately be the ones involved when app-related issues occur outside of the clinical setting.

Clinicians can produce and/or use existing templates (e.g., http://id4theweb.com/resources) to help clients better understand the purpose of the apps selected. Quickstep reference guides can be used to help clients recall specific step-by-step procedures discussed during training in the clinical setting. In addition, there are apps available that can be used to record step-by-step procedures via still images and captions or live-motion video. Although creating or finding these materials takes time initially, they should save significant time overall.

Quickstep Reference Guides

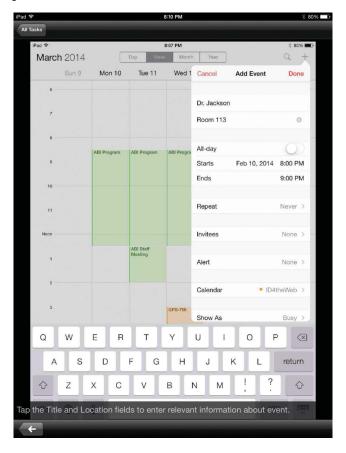
Quickstep reference guides can be used to provide the client and/or caregiver with specific step-by-step instructions to perform various app functions. The reference guide would include the same steps identified in the clinician's Progress Monitoring Form, but be printed in a format the client and/or caregivers could benefit from when away from the therapeutic environment. The following information could be included in the quickstep reference guides to help the client and caregivers understand the overall purpose and use of the identified app:

- App name
- Purpose of app
- Ways in which the app can be used in daily life
- Description of specific app function(s) (e.g., create a new Calendar event)
- Step-by-step instructions to complete described app function(s).

CanPlan App

The CanPlan app is designed to sequence still images with labels in order to clearly lay out step-by-step instructions on how to perform tasks. This app can be used for things such as illustrating the sequence of steps involved in making coffee or doing laundry. It can also import captures of app screens in order to show the sequence of steps involved in performing app-related functions. Figure 2 shows an example of how the CanPlan app could be used as a practical resource for training apps.

Figure 2. CanPlan Example



Note the screen capture appears within CanPlan and the specific instruction/label for that screen appears at the bottom. In this case, the instruction reads: "Tap the Title and Location fields to enter relevant information about the event." The CanPlan app can accommodate multiple tasks and multiple labeled steps for each task. The app can be used by the client and/or caregiver outside of the clinical environment to help recall specific steps learned while in the training session.

Educreation App

The Educreation app is a white-board app designed to record video and audio of screen movements that occur within the app. Screen captures of apps being trained can be imported into Educreation. The app can then be used to record screen movements such as drawing on and/or highlighting certain sections of the screen capture or adding text to the screen capture. In addition to recording screen movements, the app also records sound, which might include a narration of what is being done on the screen or descriptions of the steps that need to be performed. The videos can be saved and made available via a website or shared with the client as a video file.

Summary

The process of app selection and training in app usage are both essential to the effective use of assistive technology for cognition by those with brain injury. The specific expertise of clinicians is necessary to evaluate the appropriateness of apps on a client-by-client basis. The

training procedures identified by Sohlberg & Turkstra (2011) lead the clinician through a comprehensive needs assessment and training protocol. In addition to the time spent by clinicians training clients during a session, this article emphasizes the importance of creating/ using training materials to share with the client and/or caregivers in order to facilitate learning and recall outside the clinical session. These practical training materials can be used by the client to assist with recall or by the caregivers to help clients when challenges occur outside of therapy. It is essential that clinicians provide materials to help clients during therapy sessions as well as training materials that can be used to support clients and their caregivers when they are engaged in their daily routines.

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