

Using a Handheld Computer as a Cognitive-Behavioral Tool

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Apple's ipod touch and ipad, and the growing catalog of Android and Microsoft tablets, are remarkably versatile and agile tools that have taken the consumer world by storm. Within the disability community, it has become clear that these devices can be readily customized and adapted to address cognitive-behavioral challenges. Because they are so portable, they can be used as behavioral supports at home, at school, at work and in the community.

Because these devices can do so much, it can be challenging to figure out what to do first. The following guidelines are based on a decade of community-based PDA research in VCU's Assistive Technology for Cognition laboratory. They are not intended as strict rules, but as suggestions for ways to get the most from these products.

Remembering to Do Things

The very first Palm Pilot PDAs came with to do list apps and calendars with reminder alarms, giving them a distinct advantage over paper-based scheduling products. Setting an alarm for daily tasks can be a game-changer for people with memory or attention challenges, and current devices offer a wide range of tools for doing just that. Apple products include a *Calendar* that allows alarms to be tagged to everyday events; the iphone and ipod touch also offer a versatile *Clock* app that allows you to choose a customized reminder sound for each task (including one particularly insistent reminder that only turns off when you tap the screen). Android tablets include Google Calendar, and Microsoft tablets include a tablet version of *Outlook*, both of which incorporate reminder alarms. All of these products feature note-taking apps that allow for the creation of to do lists. There are at least 500 add-on apps available, offering variants on these onboard calendars. For Apple products, the online iTunes Store is where you will find them. For Android products, search the online Android Market.

Task-Sequencing & Wayfinding

People who have difficulty learning to complete multi-step tasks independently (morning grooming tasks, complex job skills, etc.) can use these devices as task coaches. Some people only need a step-by-step written task list, or a list that includes a picture prompt. *Errands*, *Visules* and *HomeRoutine* are inexpensive apps for creating such supportive task sequences. You can also create a *Powerpoint* sequence of pictures and captions for any task, click to create a movie version and download that for playback on your handheld device. For people who need audiovisual support, you can create a video showing the task being performed successfully, and have it available for playback when needed. Most current PDAs and tablets come with onboard video recording capabilities. Using these videocameras, it is easy to build videos showing turn-by-turn routes through a building or across a campus. For many people with cognitive challenges, these videos are easier to follow than the abstracted images on maps.

Social Stories and Behavioral Cues

As with task-sequencing, supports may include a written set of directions, a captioned picture sequence, or a videotape modeling appropriate behaviors. See the attached *Video Modeling using Handheld Computers* for more information about this approach.

Stress Management

Relaxation apps, art and music apps and many puzzle and game apps can help people relax in stressful situations. *SimplyBeing*, for instance, plays new age music and shows relaxing natural scenes, while *Tactical Breathing Trainer* and *Breathe2Relax* use simple video graphics to teach deep breathing relaxation methods. *Bloom* and *Seline HD* are entrancing music apps, *WURM* and *Meritum Paint* are relaxing finger painting apps, and there are thousands of puzzle and game apps that may appeal.

Academics, Healthy Living and Beyond

You may wish to use your portable computer as a homework tracker. *iHomework* and *iStudiez Pro* provide comprehensive support for classwork, planning and reminders. Dictionaries, algebra helpers, astronomy maps and frog dissection simulations are just a few of the thousands of academic apps now available. You may also use your handheld device as a health coach. *All Fitness*, for instance, provides video-guided workouts, *Sleep Cycle* purports to track your sleep habits, and *Lose it!* is one of many calorie counting weight loss apps on the market.

Clearly, it is possible to build a personalized suite of supportive apps on your smartphone, ipod touch, ipad or tablet. I wish you luck as you do so, and would like to hear about your experiences. Please contact me at logentry@vcu.edu.

Video Modeling using iPod Touch, iPad or other Tablets

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Of all the assistive technologies used to support people with cognitive-behavioral challenges, the most thoroughly researched is *video modeling*. More than 60 studies have been published in the past 20 years, showing that many people with cognitive difficulties can learn to perform complex tasks and manage social behaviors when a videotaped representation of the activity is used for guidance.

With the recent emergence of videocamera-equipped smartphones, ipod touches and computer tablets, opportunities to utilize video modeling strategies have grown. These devices typically offer simple one-touch video recording and playback, and some include editing software that allows for clip trimming, titles and soundtracks. *For the first time, we now have truly portable tools for creating, editing and using video as a behavioral aid.*

Opportunities to utilize video modeling include: (1) task-sequencing of complex everyday tasks (grooming, packing a backpack, etc.); (2) wayfinding guidance (though many portable devices now have GPS mapping, many people with cognitive-behavioral challenges find transferring what they see on a map to what they see in the real world difficult -- a video that shows exactly where they are, which doors to use, which turns to make, etc., can be more successful as a wayfinding guide); (3) videotaped social stories for managing difficult situations; (4) behavioral advice and guidance; and (5) general encouragement from a loved one.

Apple has recently made available on their App Store a simplified version of their *iMovie* film production software, which allows cut-and-paste and other editing tasks to be performed directly on an iPhone, iPod touch or iPad. Android devices will soon have a similar editing product. In many cases, however, if you follow the guidelines listed below, you will not have to edit the video at all.

Making Behavioral Guidance Videos

In building a personal library of video modeling supports on a person's handheld device, it is important to pay attention to basic production values:

- 1) **Brevity:** Videos should be short and address just one behavior. Strive for one minute or less, when possible. It is easier for a user to tap on a new task video than it is to scroll through a longer video for the next cue.
- 2) **Close-ups:** Remember that the device playing back the video may be palm-sized, so it is a good idea to use close-ups.
- 3) **Lighting:** Make sure that good lighting is available.
- 4) **Steady hands:** When possible, prop the video recording device on a table or at least try to hold it as steady as you can while recording; no one likes to watch a video that seems to have been shot on a boat in a pitching sea.
- 5) **Audio Prompts:** Record verbal step-by-step task or directional cues while shooting the video, since adding in a soundtrack later can be time-consuming.

- 6) Titling: Be sure to give the video an appropriate title, such as "make lunch", so the user can readily scroll to it on the device when needed.
- 7) Partnering: It's usually a good idea to collaborate with the end user in making the video. See if he/she can act in the video or help with shooting or editing. This can improve user buy-in for independently accessing the video when needed.

Training and Follow-Along

In beginning to use a behavioral guidance video, a user may wish to:

- (1) watch the video all the way through just before attempting a chosen activity,
- (2) have the video onscreen for play-and-pause guidance during the activity, and
- (3) watch the video again all the way through at completion of the activity in order to compare the video to her/his actual performance.

This strategy helps build competence and insight through repetition and practice. In many cases, users eventually wean themselves off of needing the video prompt at all. Many feel reassured, however, that they have a readily available guide on their device whenever it may be needed. This strategy has been shown successful with preschoolers, students and adults on job sites, and comparison studies have shown it to be more successful than other forms of picture prompting or behavioral rehearsal techniques.

A behavioral guidance video will only be successful if the user watches it and tries to follow the videotaped model. As noted, user participation in choosing what videos to make and in making the video can help with buy-in. Sometimes a reward system can help users get started in making use of the videos. When people see that using a behavioral guidance video reduces familial nagging, while increasing functional independence and control over behaviors, they often begin to use the videos spontaneously, and may then think of new videos to help them achieve more self-efficacy.

Premade Social Story Videos

If you do not feel comfortable making your own videos or would like to explore professional made versions on your portable device, you can do so. There are a number of video prompting apps available. Two good ones are: (1) *Going Places*, a free app that includes 6 community activity videos with captions (getting a haircut, for instance) and (2) *Everyday Skills*, a \$40 app that includes a library of 40 behavioral videos for children and adults.

I wish you luck in your film-making career and look forward to hearing about your efforts in using handheld computers to live fuller, more independent lives. Please contact me at logentry@vcu.edu.

Functional Assessment Tool for Cognitive Assistive Technology
(FATCAT)

Client: _____ Identifying No. _____

Assessment Date: _____

Functional Cognition:

Please ask client to rate how well the following tasks are performed, on a 1 to 10 scale, with 1 being *very poor* and 10 being *excellent*.

Home and Community Tasks	Performance
Home safety	1 2 3 4 5 6 7 8 9 10
Way-finding in the community	1 2 3 4 5 6 7 8 9 10
Performing routine activities	1 2 3 4 5 6 7 8 9 10
Keeping track of appointments	1 2 3 4 5 6 7 8 9 10
Taking medications on schedule	1 2 3 4 5 6 7 8 9 10
Performing multi-step tasks (cooking, shopping, etc.)	1 2 3 4 5 6 7 8 9 10
Multi-tasking (doing two or more things at the same time)	1 2 3 4 5 6 7 8 9 10
Following through on plans	1 2 3 4 5 6 7 8 9 10
Remembering important events	1 2 3 4 5 6 7 8 9 10
Remembering everyday events	1 2 3 4 5 6 7 8 9 10
Managing frustration	1 2 3 4 5 6 7 8 9 10
Staying focused on a project	1 2 3 4 5 6 7 8 9 10
Remembering facts (names, passwords, phone numbers)	1 2 3 4 5 6 7 8 9 10
Keeping track of keys, wallet, other items	1 2 3 4 5 6 7 8 9 10
Learning new information	1 2 3 4 5 6 7 8 9 10
Dealing with Distractions	1 2 3 4 5 6 7 8 9 10
Total score:	
Divide score by 16 for self-rating:	

Access to Device:

Yes	No	Client demonstrates:
		Ability to read information on PDA
		Ability to hear PDA alarm when 5-feet away
		Sufficient dexterity to navigate PDA interface
		Responds to alarm reminder and performs task as reminded

Current Use of Technology:

Check whether client is proficient (P), a novice (N) or doesn't use (NA) technology.

P	N	NA	Technology
			PDA (device type: _____)
			Cellphone
			Cellphone task management functions
			Personal computer word processing
			Personal computer email
			Personal computer web surfing
			Personal computer advanced (spreadsheets, money management)
			Gaming systems: Wii, PS3, X-Box (circle which)
			Handheld gaming device (Nintendo DS, etc.)
			Portable music player (ipod, etc.)
			TV Remote control

Needs and Preferences (Basic Functions):

Check	Function	Check	Function
	Reminder alarm		Calculator
	Calendar		Electronic sticky note
	Activity Schedule		Games
	To Do list		Photo Album
	Addresses, phone numbers		Store passwords
	Arm-strap		Pocket-sized
	Belt-clip		Around-the-neck lanyard

Needs and Preferences (Advanced Functions):

Check	Function	Check	Function
	Task-sequencing cues*		Video playback
	Voice memos		Camera
	Keyboard		GPS navigation
	Wireless capability		Vibrating alarm
	Behavioral coaching*		Directional maps
	Voice-over		Magnification

* If checked, determine modality of cues needed (text, graphics, video, etc.)

Other Needs and Preferences:

Device Provided:	
Case/accessories:	
Applications:	
Training strategy:	
Follow-up:	
Trouble-shooting:	

Addendum (vocational tasks):

Vocational Tasks	Performance
Getting ready for work	1 2 3 4 5 6 7 8 9 10
Getting to/from work Type of transport:	1 2 3 4 5 6 7 8 9 10
Clock in/clock out	1 2 3 4 5 6 7 8 9 10
Managing weekly work schedule/calendar	1 2 3 4 5 6 7 8 9 10
Work Tasks:	
	1 2 3 4 5 6 7 8 9 10
	1 2 3 4 5 6 7 8 9 10
	1 2 3 4 5 6 7 8 9 10
	1 2 3 4 5 6 7 8 9 10
	1 2 3 4 5 6 7 8 9 10
Managing breaks and break times	1 2 3 4 5 6 7 8 9 10
Co-worker relationships	1 2 3 4 5 6 7 8 9 10
Customer relationships	1 2 3 4 5 6 7 8 9 10
Following through on plans	1 2 3 4 5 6 7 8 9 10
Dealing with a change in routine	1 2 3 4 5 6 7 8 9 10
Asking for help, when needed	1 2 3 4 5 6 7 8 9 10
Managing frustration	1 2 3 4 5 6 7 8 9 10
Staying focused on a project	1 2 3 4 5 6 7 8 9 10
Learning new tasks	1 2 3 4 5 6 7 8 9 10
Dealing with Distractions	1 2 3 4 5 6 7 8 9 10
Total score:	
Divide by number of items for self-rating:	

Apps Resource Guide

In order to purchase any of these applications, go to Apple App Store on Internet, type the name of the application in the Search Box, and click on the App to purchase it. For Android versions, use Google Play. Apps with asterisks () have Android versions. Those without are Apple only.*

App	Function	\$US
Communication		
Voice4U*	<ul style="list-style-type: none"> - Includes a library of picture and voice prompts (for individuals with speech difficulties) - Allows download of your own photos and audio prompts 	\$29.99
Proloquo2Go	<ul style="list-style-type: none"> - Full-feature augmentative and alternative communication solution (full AAC solution) - Provides natural sounding, text-to-speech voices, up-to-date symbols, automatic conjunctions, and a default vocabulary of over 7,000 items 	\$189.99
iConversation	<ul style="list-style-type: none"> - Offers pre-loaded pictures and storyboards/routines (e.g., schedule) that facilitate language comprehension 	\$34.99
Speak it!*	<ul style="list-style-type: none"> - Copy or type text for text-to-speech - Uses natural sounding voices 	\$1.99
TapToTalk*	<ul style="list-style-type: none"> - Designed for children, picture-based icons that talk. Free, but annual \$100 subscription for self-designed library. 	Free
iMean	<ul style="list-style-type: none"> - Full-screen large-icon keyboard for text-input. Tap text you've typed to hear it read aloud. Can build library of often-used phrases. 	\$4.99
Talk Assist	<ul style="list-style-type: none"> - Type text for robotic speech. Free, no ads, saves history of phrases. Better demo tool. 	Free
Locabulary	<ul style="list-style-type: none"> - Interesting location-based app, offers phrase choices appropriate to where you are (doctor's office, shopping mall, etc. Uses GPS to automatically select phrases offered. 	Free
iBaldi	<ul style="list-style-type: none"> - A talking head with cross-section of tongue and mouth movements, for learning to speak. 	\$1.99
Dragon Dictation*	<ul style="list-style-type: none"> - Speak text and see it printed, must have wi-fi for it work. 	Free
Talking Tom*	<ul style="list-style-type: none"> - Cartoon cat repeats what you say in a cartoon cat voice. Responds to kindness and abuse. Good for encouraging reluctant verbalizers to do so. Many other Talking animals to choose from. 	Free
Voxer*	<ul style="list-style-type: none"> - Use your device as a walkie-talkie for wi-fi chat with other Voxer users. 	Free
Google Translate*	<ul style="list-style-type: none"> - Wi-fi based speech translator to different languages. Can type or speak text, and it will be printed and spoken for you in foreign language. Version for pc, too. 	Free
Behavior		
iReward	<ul style="list-style-type: none"> - Behavioral management reward system - Allows you to post a picture of a reward and give stars for behaviors that will win the reward 	\$4.99

iEarnedThat	- Behavioral management reward system. Fill in a puzzle and when complete win virtual reward.	\$2.99
PTSD Coach*	- Designed by VA, tool allows self-assessment, symptom tracking, provides health tips and links to providers.	Free
T2 MoodTracker*	- Designed by VA, track anxiety, depression, head injury, PTSD, stress symptoms on graph and share with care providers.	Free
MoodKit*	- Track mood, work through issues with question-prompt virtual therapist.	\$4.99
iCounselor Apps	- Offers CBT-based recommendations for symptoms of OCD, depression, anxiety and eating disorder (different app for each condition).	.99
ABC Data	- Data collection tool for counting behavior by simple tallies or percentages, recording session duration, and emailing the data	\$4.99
BehaviorTrackerPro	- Tracks ABC data, frequency and duration, and high frequency data - Graphs all of the data (by frequency, duration, or rate)	\$29.99
Task-Sequencing		
Notes	- Onboard iOS app, take text-based notes.	Free
List Recorder	- Audio based to do lists. Can create list within list.	\$2.99
Picture Scheduler*	- Task organizer- attach photo, video, or audio to reminder message - Ability to sort tasks into categories - Aids in recall of details- record notes (audio or video) to accompany a photo in a listed schedule - Directly links a reminder message to a prompting video!	\$2.99
First Then Visual Schedule	- Audio-visual prompting tool for scheduling daily events or steps to complete an activity - Visual schedules provide positive behavioral supports - Completely customizable (e.g. record their own voice, add their own images)	\$9.99
Corkulous	- Onscreen corkboard allows picture and sticky note daily prompts; create different boards for different tasks. Fully-featured pro version is \$4.99	Free
Errands	- Create to do lists within to do lists, and append picture to them for non-readers. Check off work when done. And you can set reminder alarms for your lists!	Free
StoryKit	- Create talking picture books directly on your device; task-sequencing/wayfinding, social stories, etc.	Free
Muzio	- Create picture-audio-text slide shows for step-by-step instruction	Free
SnapGuide	- Create and upload instructional task sequences, just like Powerpoints, with pix and text, to SnapGuide website. Explore website and watch those others have posted.	Free
Visules	- Create check-off task lists, can add photos for non-readers.	\$4.99
HomeRoutines	- Designed for busy homemakers, allows check-off task lists, lists within lists. Set goals and win virtual rewards, share successes with friends on Facebook.	\$4.99

Mental Note	- Take notes, add pictures, and audio.	\$4.99
Going Places	- A small library of social story slide shows for children. Can buy more from site.	Free
School		
iStudiez Pro	- Virtual school notebook, tracks classes and assignments, automatically links to iCal Calendar. Reminders.	\$2.99
iHomework	- Allows one to keep track of their homework, classes, projects and tests - Design of application resembles day to day notebook separated by colorful sticky pads that mark the pages - Notifies you when you have upcoming assignments by numbering them on your application icon - Can transfer homework or class entries to friends and email work reminders	\$1.99
inClass	- Another virtual school notebook, not as fully-featured, but FREE	Free
Penultimate	- Note-taking app allows you to append pix, draw, and save notes to Evernote.	Free
Awesomenote	- Note taking application and to-do manager - Able to customize with themes with different folder icons, colors, fonts, and paper backgrounds - Can send notes with photo attachments as emails, Post-it styled notes, as well as synchronization with Google Docs and Evernote	\$3.99
Evernote	- Create text, photo and audio notes that synchronize with your computer - Add, sync, access, and share files (PDF, Word, Excel, PowerPoint, etc)	free
Notability	- Audio record a lecture, type as you attend, and at home tap your note to hear just what the teacher was saying at that time. Saves time in notes review.	\$1.99
Sound Note	- Like Notability, and you can draw with a finger or use keyboard.	\$4.99
Visual		
Big Names	- With large, high-contrast text, it's easier to select and call a person from your contact list - Supports both portrait and landscape orientation - Has English, German, Japanese and French language support	\$1.99
iBraille	- Application translates English to Braille and vice-versa	free
Lumin	- Ideal application for individuals who are farsighted, those who have reading glasses, bifocals, or for anyone who needs to see more clearly - Uses your device camera to clearly display text or imagery - Can choose between 2x, 4x, 6x or 8x magnification and hold iPad (as well as iPod touch or iPhone) about 5 inches away from object that needs to be magnified	\$1.99
Looktel MoneyReader	- Uses device camera to read and speak denomination of paper money.	\$9.99
Ariadne GPS	- Links VoiceOver setting to Google Map to give you verbal turn-by-turn directions when walking.	\$9.99
Voice Brief	- Set up news, weather, email, other content feeds and Voice Brief will read them aloud to you.	\$2.99

TapTapSee	- Uses device camera to identify and speak names of objects, items, store goods, paper money denominations, etc. You will need wi-fi or cellular connection, as it works over Internet.	Free
Chime*	- An auditory timekeeper, chimes on hour or other time setting. Free; add additional chime sounds for money.	Free
Hearing		
iHear Dialer	- Dial phone numbers without looking at the keypad - Move fingers over keypad to hear phone number digits, then select digit by releasing - Able to choose between two voices (Alex and Jules) - Can dial last 6 previous numbers (history)	\$1.99
soundAMP	- Magnifies sound and plays it through earbuds – a poor man’s hearing aid.	\$4.99
Navigation		
Instamapper*	- GPS tracker with mapping- allows you to track a cellphone route and send your location to another phone or PC	free
Nav4All	- Navigation system for driving or walking (mobile phone navigation) - Has a tracking and tracing feature available (allows viewing of vehicle movements)	free
Footprints	- Works best with phone plan – register and allow others to track your location	free
Find Friends	- Comes with iOS 6, use Apple ID and track Contacts who log on.	free
AroundMe	- A local yellow pages with local map, wherever you are. Siri and Dragon Go do this too, of course.	Free
Dragon Go!*	- With wi-fi, you can speak a request to this app, and it will search your device and the web for an answer (weather, local coffee shop, etc.) Like Siri, but doesn’t talk back to you. Often works when Siri will not.	Free
Reminders		
iCal, Clock, Reminders	- These reminder apps come with iOS 6. Clock not on iPad.	Free
VoCal	- Spoken word reminder app for non-readers or those with visual impairment	.99
Voice Secretary	- Another spoken word reminder app, this one free (with ads) or \$1.99 without ads	Free
Astrid*	- Easy to use reminder app that allows others to send you reminders and track your activities. You can share to do lists, etc.	\$1.99
Bug Me!*	- Electronic sticky note with reminder alarm. You can append a picture, draw on it, etc. Works well for non-readers who need a picture prompt.	\$1.99
Voice Memos*	- Easy to use audio recording app. For to do lists, etc. Can be used as an augmentative communication tool, if you make a library of phrases to play back.	.99
Alarmed*	- Easy to use reminder app, with different sounds, timers. An alternative to Clock for iPad and Android.	Free

Due	- Another good Clock alternative, different reminder sounds, easy to use swipe interface	\$4.99
FreeTime	- This calendar shows not when you're busy, but when you're not. Pulls info from iCal on iOS device. Kinda interesting idea.	.99
Time timer*	- A pie-slice countdown timer, provides a visual for time elapsing, great for people who have trouble keeping track of time (breaks at work, for instance).	\$4.99
Tell Me Later*	- Very simple reminder app, easy to use.	.99
Health		
Tactical Breathing Trainer*	- Developed by VA, teaches a deep breathing method for relaxation.	Free
Breath2Relax*	- Developed by VA, deep breathing relaxation training with self-rating of stress.	Free
Simply Being*	- Guided relaxation instructions, with ambient sounds and nature sounds.	.99
PillBoxie	- An automated reminder app for medications. Shows you a picture of your pill, tracks usage.	.99
MediSafe Virtual Pillbox	- A free alternative to Pillboxie.	Free
Lose it!	- Track your calorie intake/output and set weight loss goals. Links to Nike Fuel Band and FitBit for more accurate activity tracking	Free
Sleep 101	- Uses accelerometer to record movement during sleep - Tracks sleep quality and rhythms to awaken you at best time	Free
AmbiSci PSP*	- For use with stereo earbuds; plays different sounds in different ears, for relaxation and better getting to sleep. Basic app is free; buy additional music.	Free
Sleep Machine*	- White Noise. Select calming music, set a timer, and take a nap.	\$1.99
Autogenic Training*	- Guided meditation focused on muscle relaxation, breathing and chakra meditation.	\$4.99
Provider Work Management		
QuickOffice*	- Create, edit and share Microsoft Office documents	Free
TurboScan	- Mobile device camera acts as PDF scanner (Android version = CamScanner (free))	\$1.49
EverNote*	- E-file box for notes, pictures, to do lists, voice recordings, etc., share across devices	Free
Hours Keeper*	- Track work hours, create time sheets, reports, invoices	Free
Mile Tracker	- Track mileage manually or by GPS on device (Android version = TripLog)	Free
Provider Resilience*	- Self-rate your health, stress and empathy; CBT-based help	Free

