

Mobile Technologies for Everyday Cognitive Support

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AT for Cognition Lab, VCU

- 15 years of research on handheld devices & smart homes as cognitive-behavioral aids for brain injury, autism, degenerative neurological conditions
- 5-year study of iPod Touch for Autism at work (NIDRR)
- 5-year study of body-worn sensors and health-based self-management for veterans with PTSD (DOD)



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AT for Cognition

People with cognitive-behavioral challenges least likely group to use AT

"Small" AT strategies can be life-changers

Technology is changing rapidly

Challenge now is to select appropriate features from an all but overwhelming catalog of options



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Smartphones



Samsung Galaxy S8



Apple iPhone 7



Nokia Lumia 1520

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iPod Touch



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V i r g i n i a C o m m o n w e a l t h U n i v e r s i t y

Apple iPad(s)

- Large icons for dexterity-challenged
- Louder speaker for augmentative communication
 - Larger screen



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iOS Accessibility

Voice Over

Speak Screen

Dictate Text with Siri

Zoom

Assistive Touch

Touch accommodations

Predictive Text



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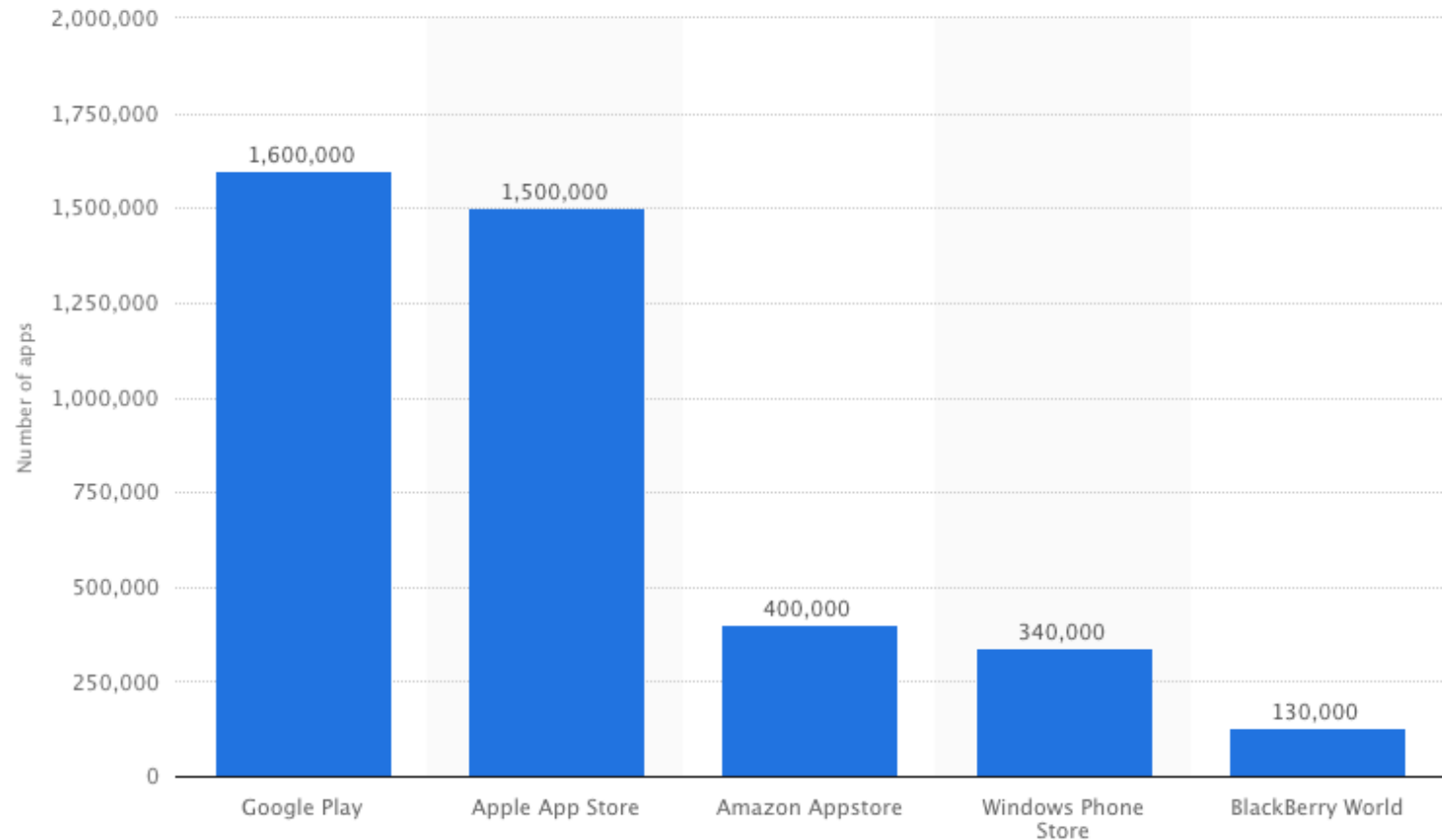
Switch Control & Scanning



AbleNet Blue 2 Switch

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The App Deluge



<http://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/>

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Reducing the Need for Personal Supports among Workers with Autism using an iPod Touch as an Assistive Technology: Delayed Randomized Control Trial

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ORIGINAL PAPER

Reducing the Need for Personal Supports Among Workers with Autism Using an iPod Touch as an Assistive Technology: Delayed Randomized Control Trial

Tony Gentry · Richard Kriner · Adam Sima ·
Jennifer McDonough · Paul Wehman

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Abstract Personal digital assistants (PDAs) are versatile task organizers that hold promise as assistive technologies for people with cognitive-behavioral challenges. This delayed randomized controlled trial compared two groups of adult workers with autism spectrum disorder (ASD) to determine whether the use of an Apple iPod Touch PDA as a vocational support improves work performance and reduces personal support needs on the job. Baseline data were collected on 50 adults with ASD who were beginning a vocational placement supported by a job coach. Participants were randomized to receive training in the use of a PDA as a vocational aid upon starting their job or after working 12 weeks without PDA support. Workers who received PDA training at the beginning of their job placement required significantly less hours of job coaching support ($p = 0.013$) during their first 12 weeks on the job

than those who had not yet received the intervention. Functional performance between the two groups was not significantly different. The significant difference in hours of job coaching support persisted during the subsequent 12 weeks, in which both groups used a PDA ($p = 0.017$).

Keywords Autism · Autism spectrum disorder · Assistive technology · Employment · Occupational therapy · Vocational rehabilitation

Introduction

Adults with autism spectrum disorder (ASD) face daunting challenges in the American workplace. Recent studies have found competitive employment rates from 4.1 to 11.8 % among working age individuals with ASD (Taylor and Seltzer 2011; McDonough and Revell 2010) and rates of any sort of post-secondary employment at 55 % among this population, lower than the rates for people with intellectual or learning disabilities (Shattuck et al. 2012). In fact, even individuals with ASD who have completed college have reported significant challenges with under-employment and chronic unemployment (Harbut and Chalmers 2004; Barnhill 2007; Hendricks and Wehman 2009; Henninger and Taylor 2013; Wehman et al. 2013). Across the ability spectrum, individuals with ASD have lower rates of participation in vocational or technical education, employment, and post-secondary education in 2 or 4-year programs than their peers with speech language impairments, learning disabilities or other intellectual disabilities for as long as 7 years post high school (Shattuck et al. 2012). These statistics are often attributed to functional difficulties related to cognition, behavior, communication

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V i r g i n i a C o m m o n w e a l t h U n i v e r s i t y

iPod Intervention

- 1-hour introduction and assessment
- 1-hour initial iPod adaptation and one-week trial
- 4-6 hours of additional consultation over next few weeks
- Mean intervention hours = 9.2



iPod Training

- Familiarize
- Task Reminders
- To Do lists
- Video prompts
- Wayfinding aids
- Social Stories
- Facetime Video Chat with Job Coach
- Address Contacts
- Behavioral and Anxiety Management Apps
- Medication Management Apps



Results

- During first 6 months on job:
- Similar levels of job performance and retention
- Both groups learned to use and maintain their iPods (only 3 lost/damaged); all felt the devices made them more independent on job and preferred them to direct supervision
- Now Group required a mean of **48** hours of job coaching first 12 weeks; Delayed group required **75** hours



The ATC Challenge

As with any assistive technology, first assess functional challenges in everyday life.

Examine the human supports now needed in order to perform chosen tasks.

Is there a low-tech or electronic substitute that can provide that support?

Seek the simplest, most straightforward solution that works.

Provide training and follow-along in real world situations to test usefulness of the chosen solution.

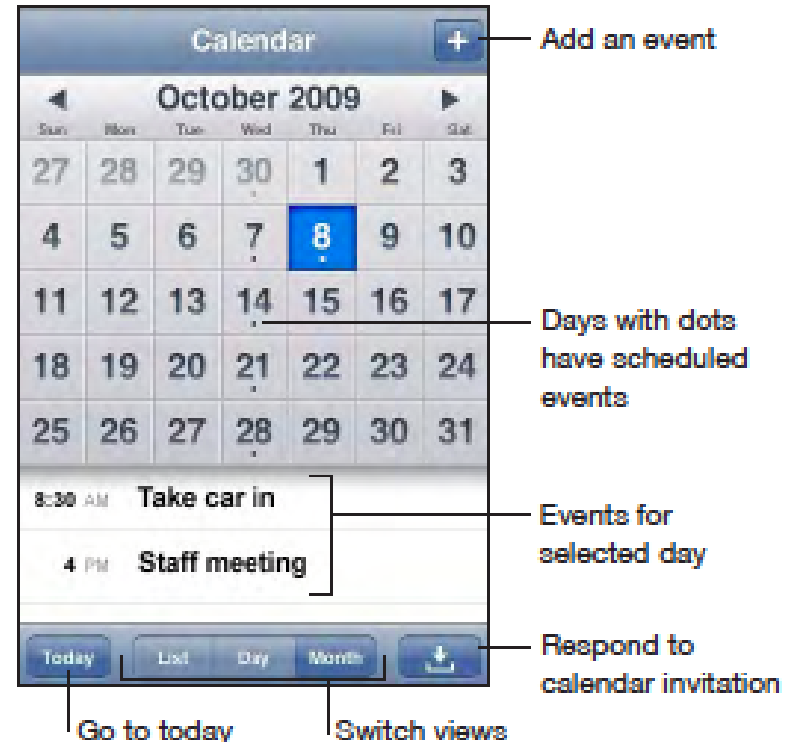
Solve one problem at a time.

Aim for no more than 4-5 apps for cognitive-behavioral support.



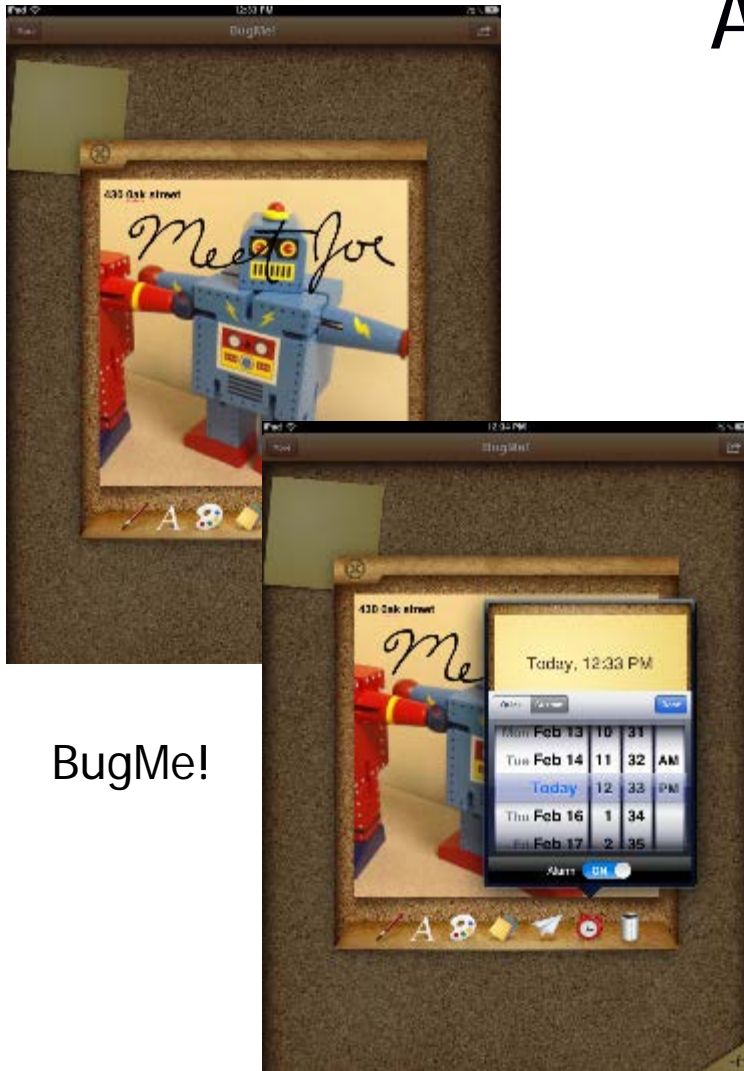
Typical reminders

- Medications
- Wake up
- Catch bus
- Clock in at work
- Breaktime (with timer)
- Lunch (with timer)
- Switch from one task to another
- Clock out and go home
- Plug in device to charge overnight



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Adapted Reminders



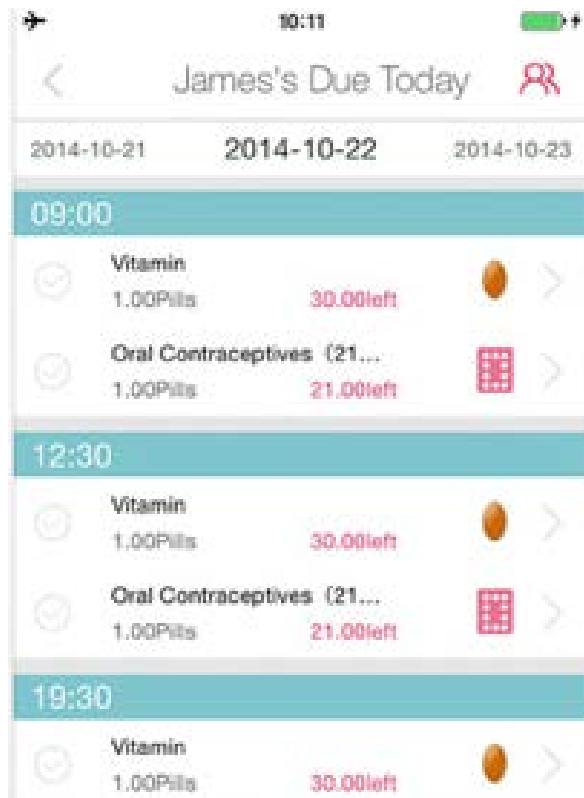
BugMe!



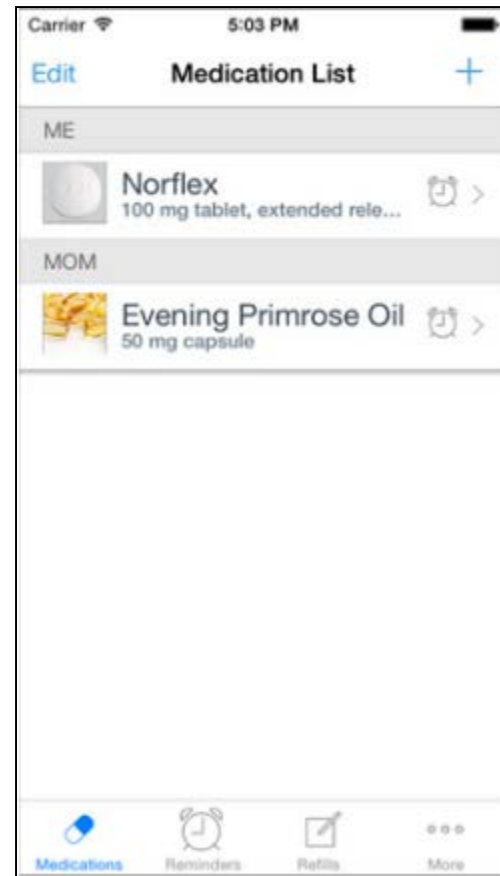
VoCal

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Medication Management



My Pillbox



Pill Reminder

VCU

Task List options



iOS
Notes



Google
Keep

VCU

Task-Sequencing Powerpoint

Loading Carts

Be sure to include
the
Listed items in
each cart



Task-Sequencing Video

- Best is to show client performing task successfully
- Can use during task
- Also pre- post-task for rehearsal/review

**Good morning
Len!
Let's make
coffee.**

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Behavioral Prompts

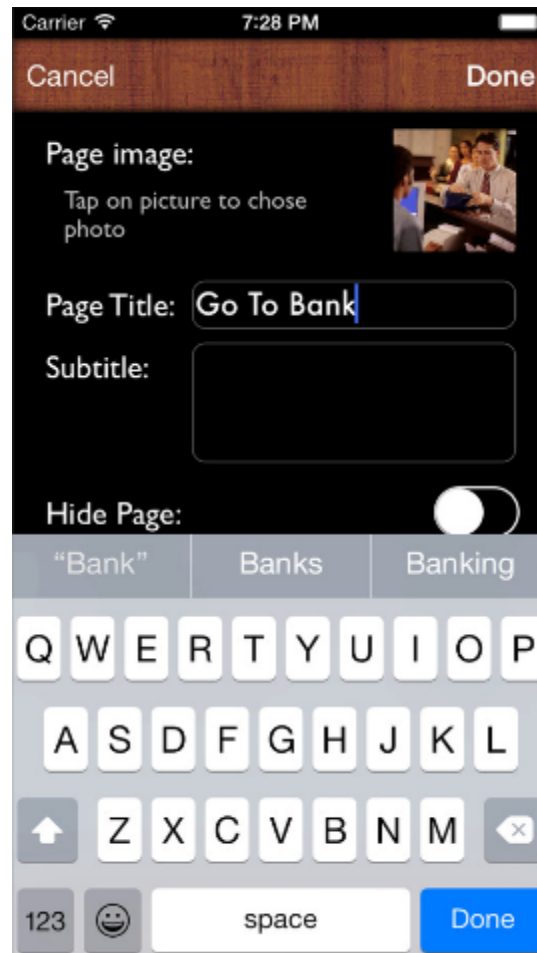
- 19 year old on first job
- Medical Supply aide at hospital
- *What to do when people bother you.*



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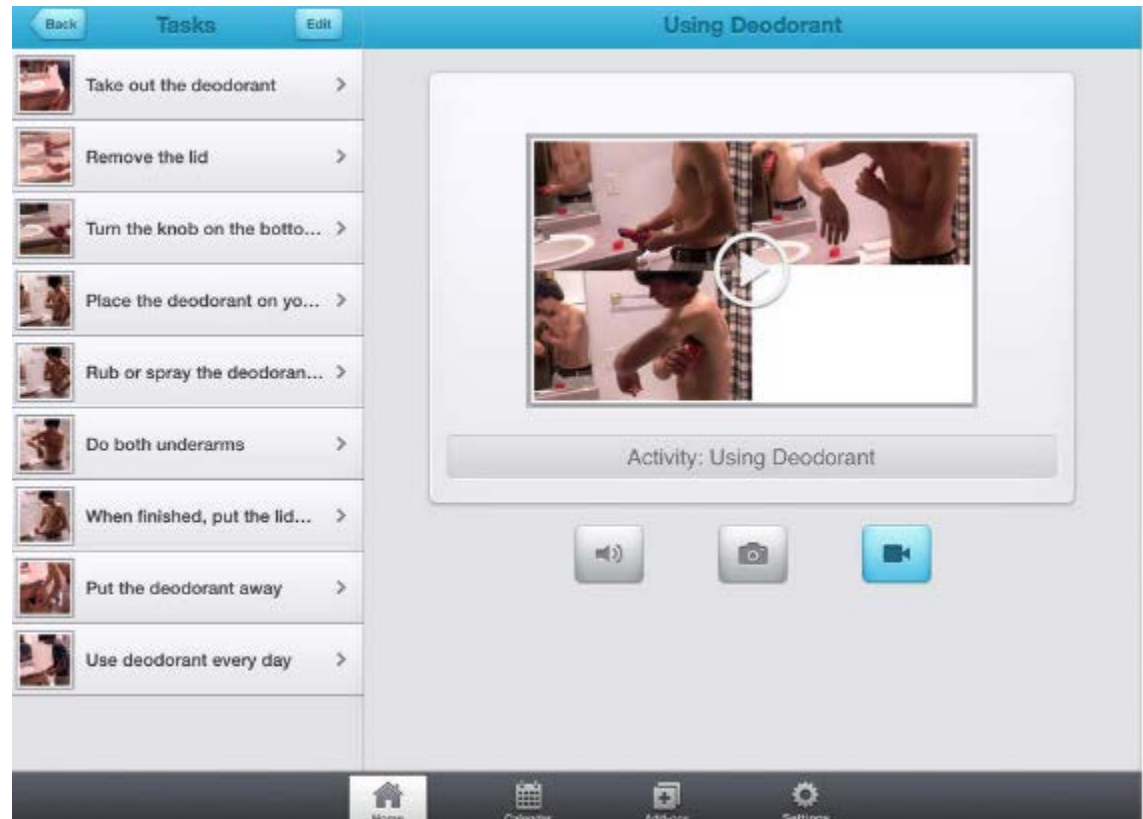
Plan it, Do it, Check it off

- iOS
- \$2.99
- Picture-based task sequences with audio prompts
- Tap to check done



Functional Planning System

- \$4.99
- iOS
- Text
- Photo
- Audio
- Video
- Set reminders for tasks



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Using Video prompts

- Task-Sequencing
- Way-finding
- Behavioral cues
- Social stories

- Short and to the point
- Close-ups
- Good lighting
- Voice Over while filming saves time
- Preview/play-and-pause/Review



Real-time help



- FaceTime (Apple iOS only)
- Skype (all platforms)
- Plain old phone

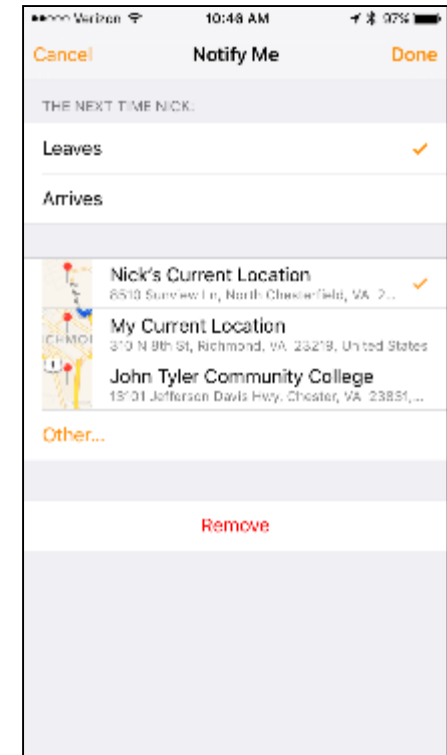
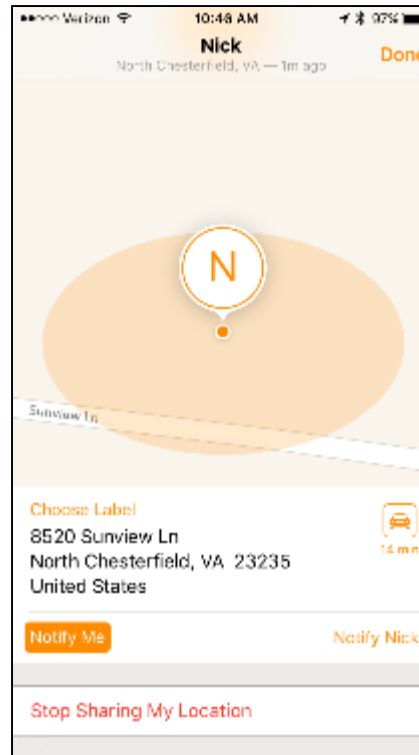
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Person Locators

iOS Find My Friends

Google +

Family Locator by Life
360



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Body-worn sensors

- Basis Peak
- Fitbits
- Jawbone "Up"
- Omron HJ
- Heart Rate monitors



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Apple Watch

- Big Dreams, sketchy reality?
- Accurate pulse &
- Blood Pressure
- Stress levels via skin conductivity
- Better pedometer



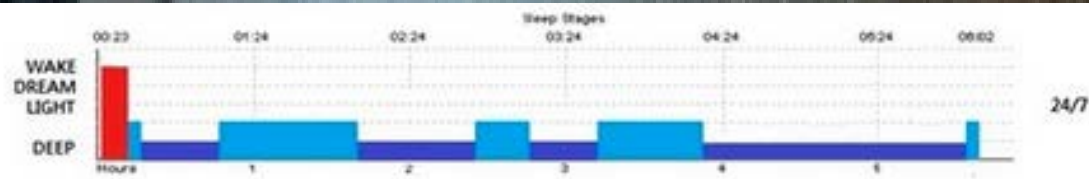
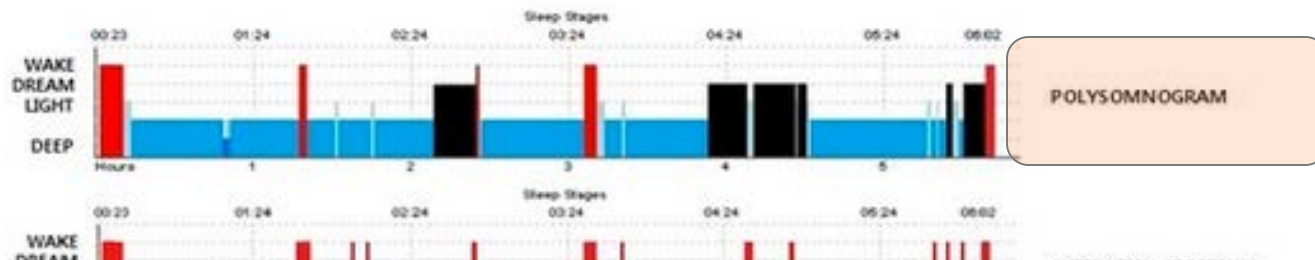
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But, maybe?

- iPhone safe in backpack
- Hands free reminders
- Directional wayfinding
- What else?



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Winter, C. (2014).

Mood Tracker



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Goal, Track, Reward

■ Example: Chronic Pain

Track for one Week

- Examine for triggers, relief, sleep, etc.
- Hypothesize a solution
- Set a functional goal
- Use actimeter for activity?
- Maintain diary
- Plan a reward



My Pain Diary app

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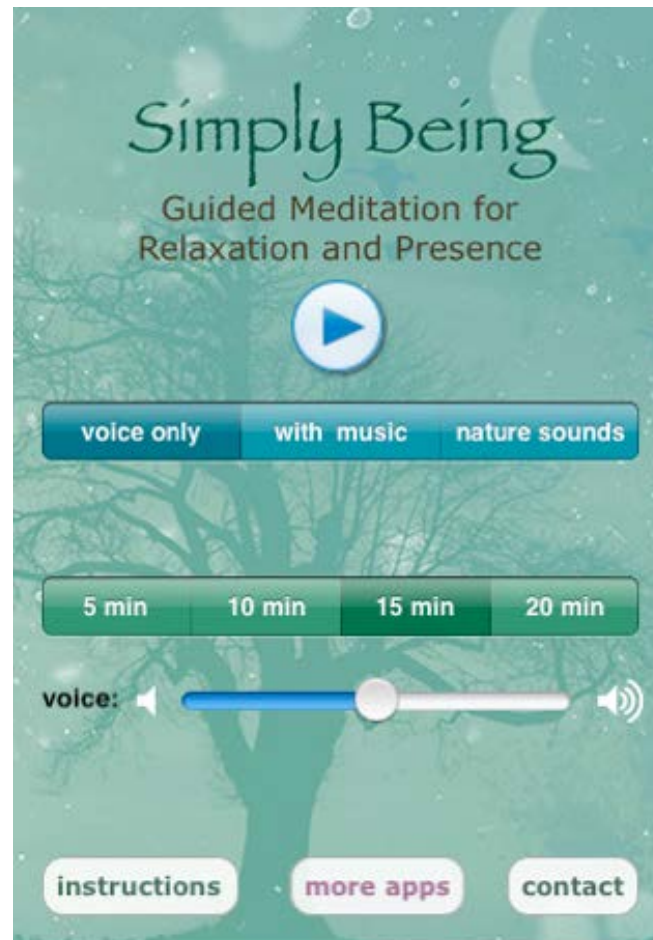
Does Health Tracking Help?

- People with two chronic conditions:
 - 56% say its affected their health approach
 - 45% say it has affected their decision on whether/how to treat an illness

Pew Survey, 2013.



Relaxation Apps



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Verizon 11:37 AM

Tactical Breathing Trainer



Intro

Tutorial

Practice

Settings

Augmentative Communication

- Confer with SLP to determine the right app for you
- Confer with OT for device adaptations
- Sometimes an AAC hardware will work better
- Consider school legacy tools



Free-standing devices

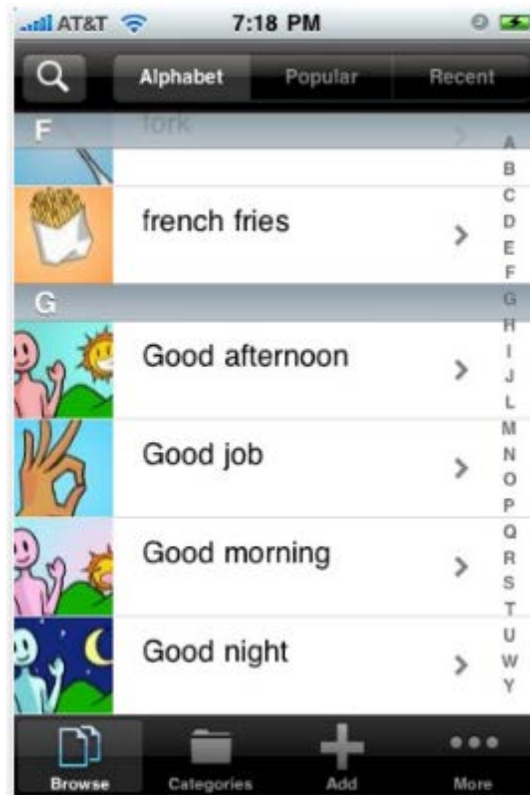
- Tobii
- Dynavox
- Go Talk
- Etc.





iOS
\$29.95

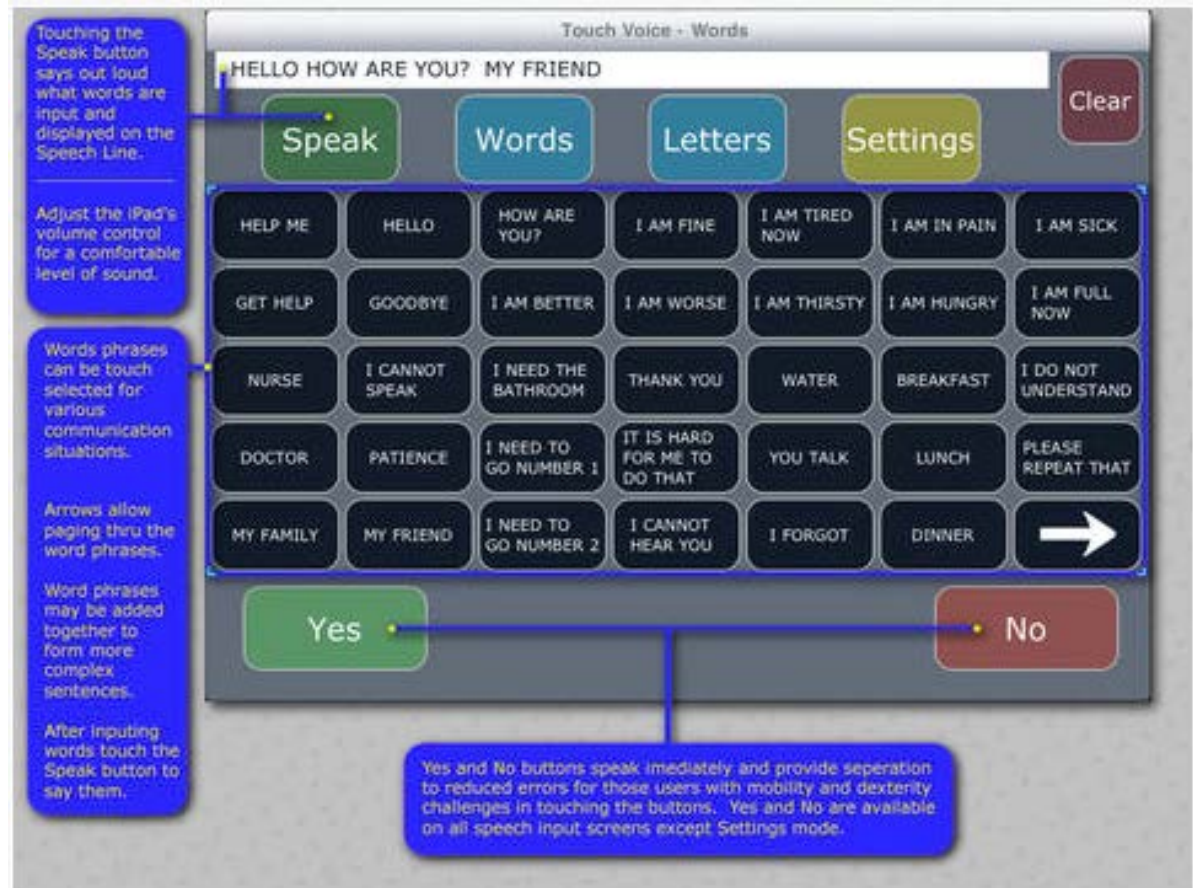
Voice4You



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Touch Voice

- \$20
- Short medically appropriate phrases
- iOS or Android



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Speak it!



iOS
\$1.99



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Personalized Suite

Basic Adaptations

- Reminders
- Task-Sequencing Cue
- Behavioral Management
- Way-Finding
- Health Tracking
- Augmentative Communication
- Device Access Adaptations?

Don't Forget...

- Protective Case or Belt Clip
- Simplify Screen for Easy Access
- Speakers?
- Keyboard?
- Behavioral Contract?



Case Study

- Stephanie Lau, VCU RRTC and her client Beth



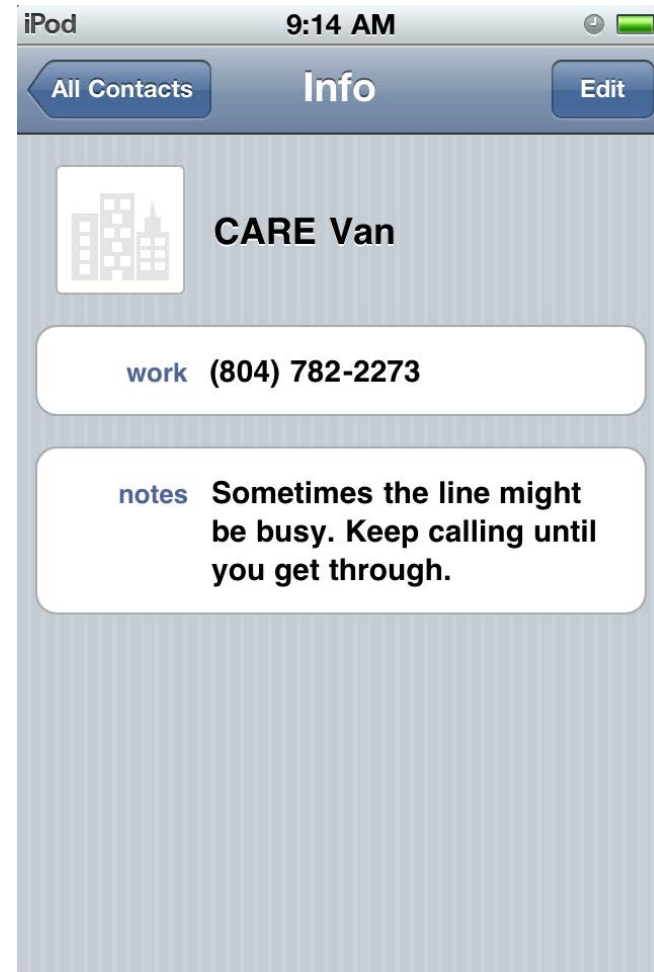
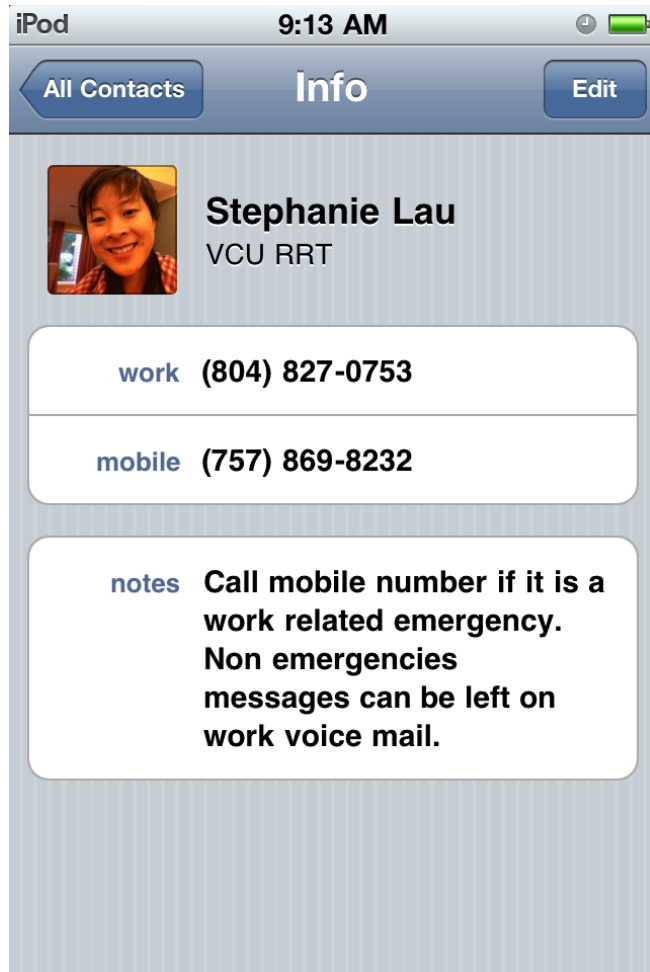
Virginia
Employment
Commission file
clerk

Challenges

- Older worker, unfamiliar with portable devices
- Perfectionist, easily flustered
- Wayfinding
- Switching tasks
- Completing all tasks each day
- Managing safe use of CareVan

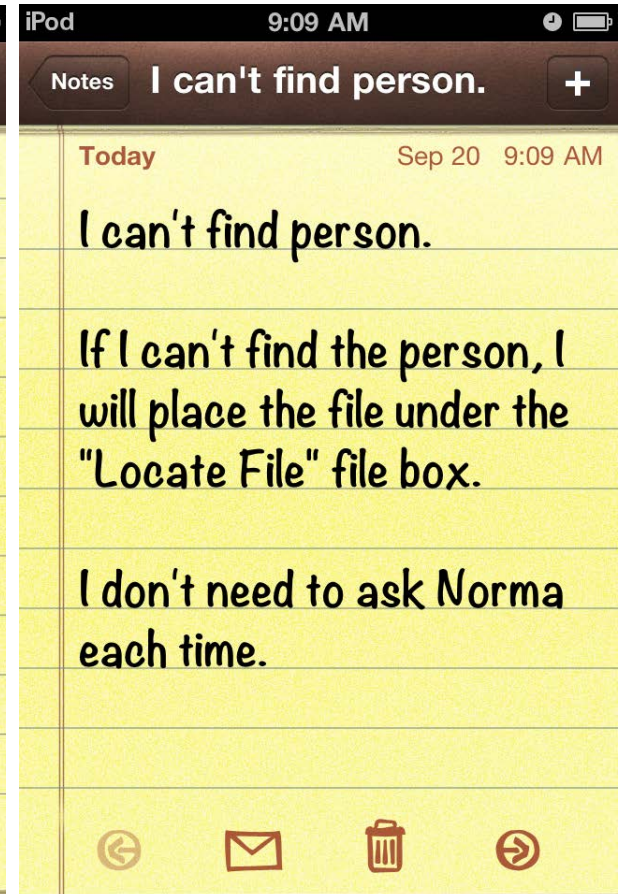
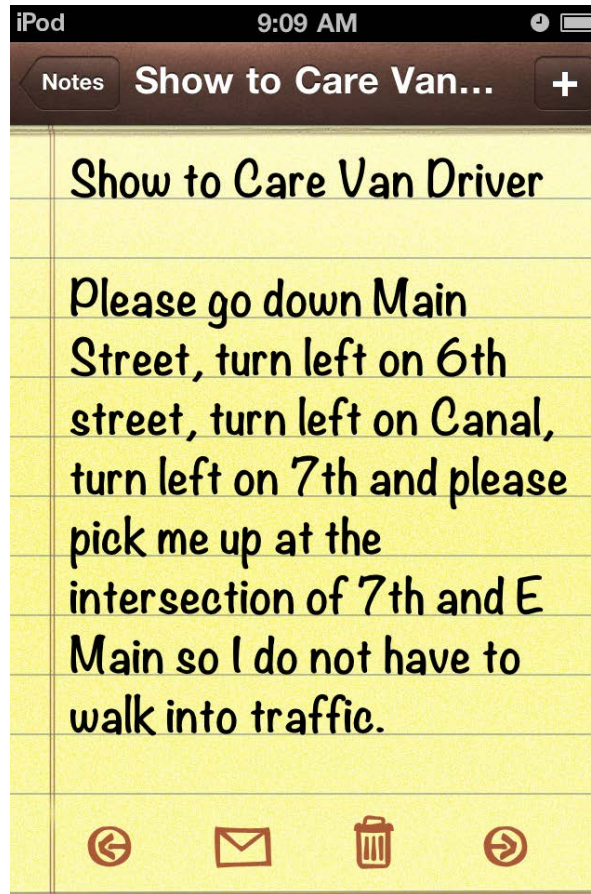
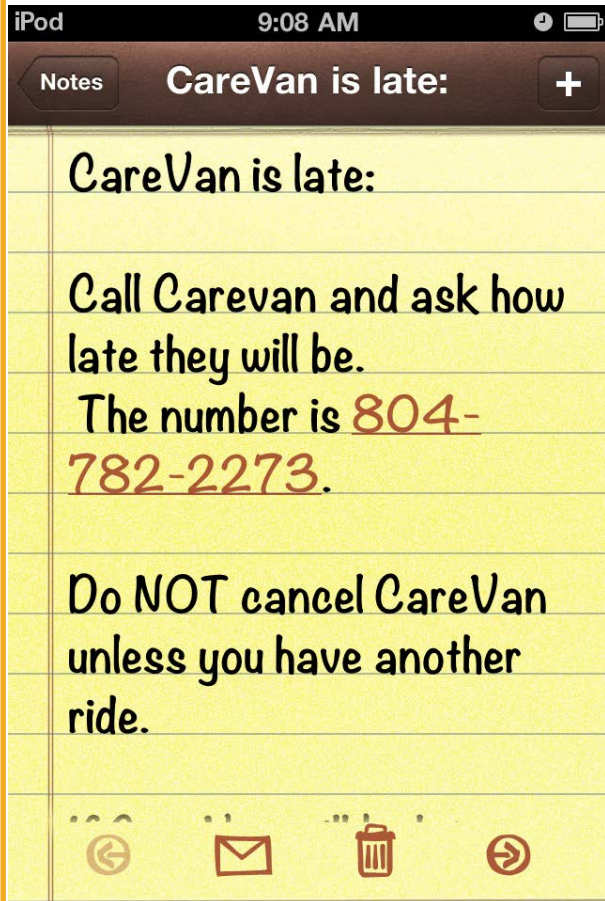


Contacts



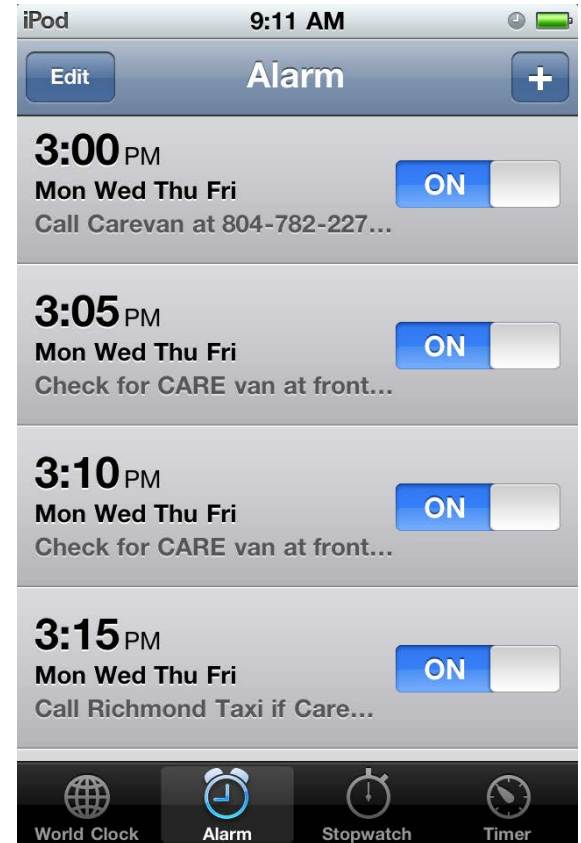
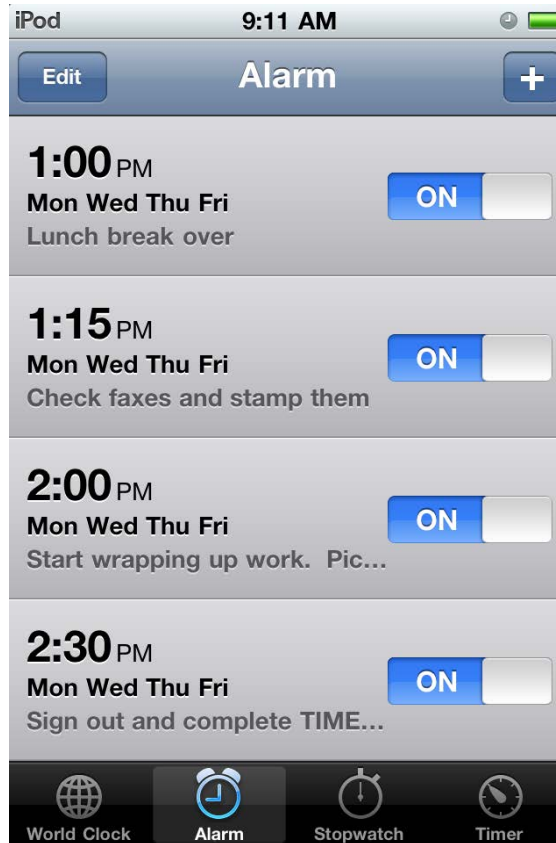
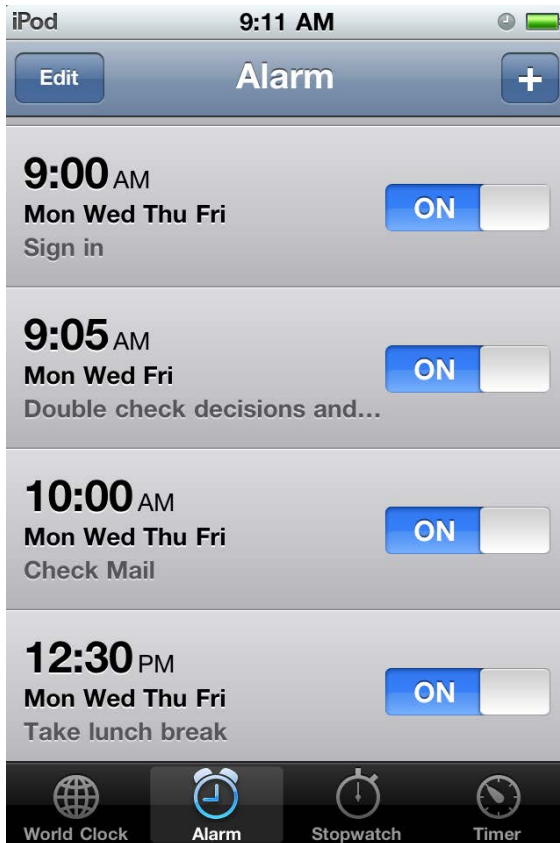
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Task Notes



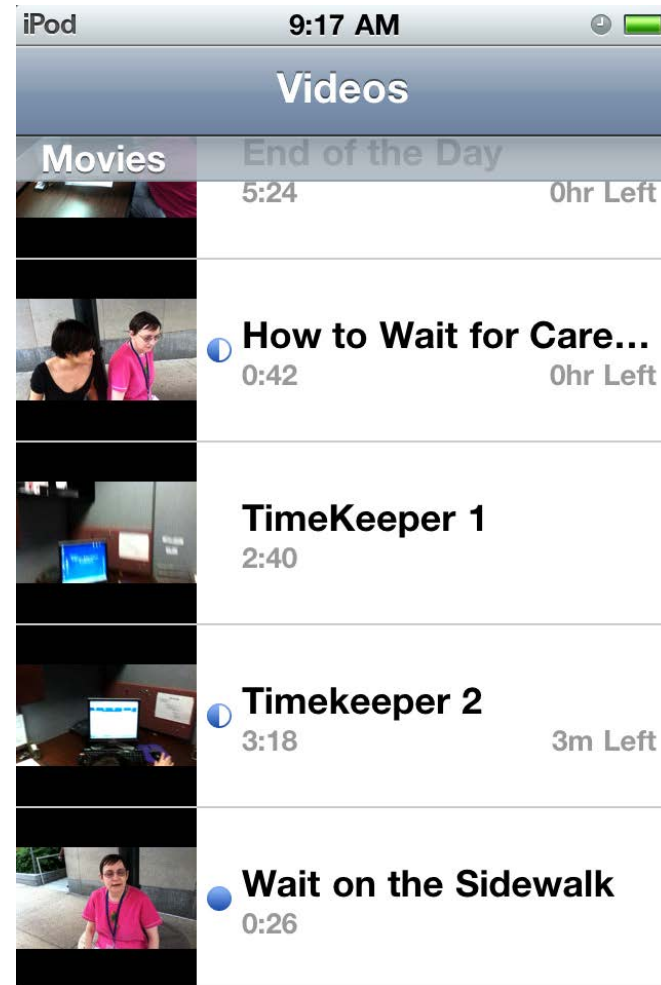
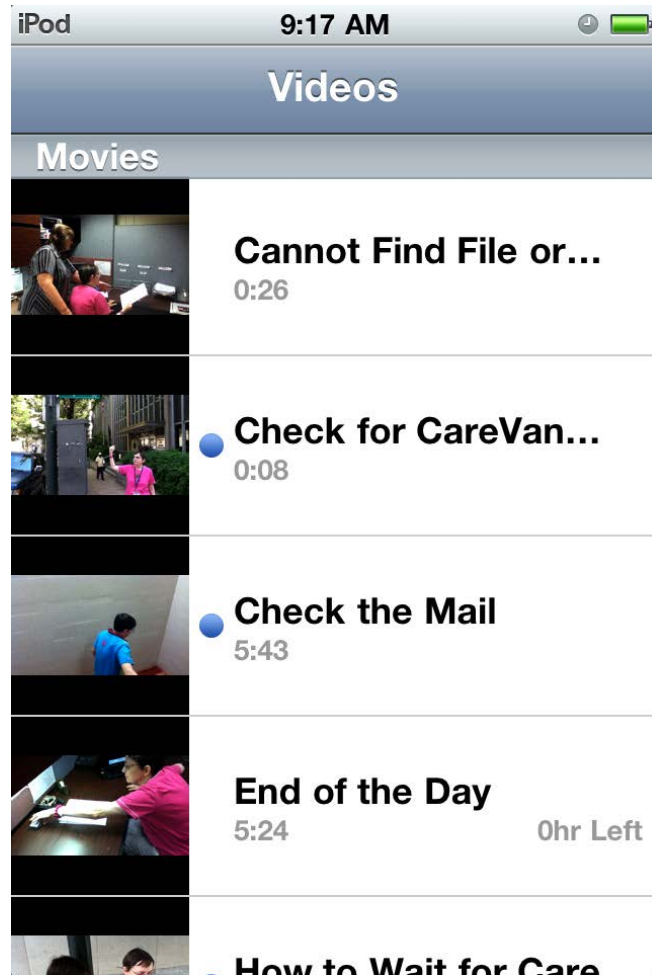
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Reminders



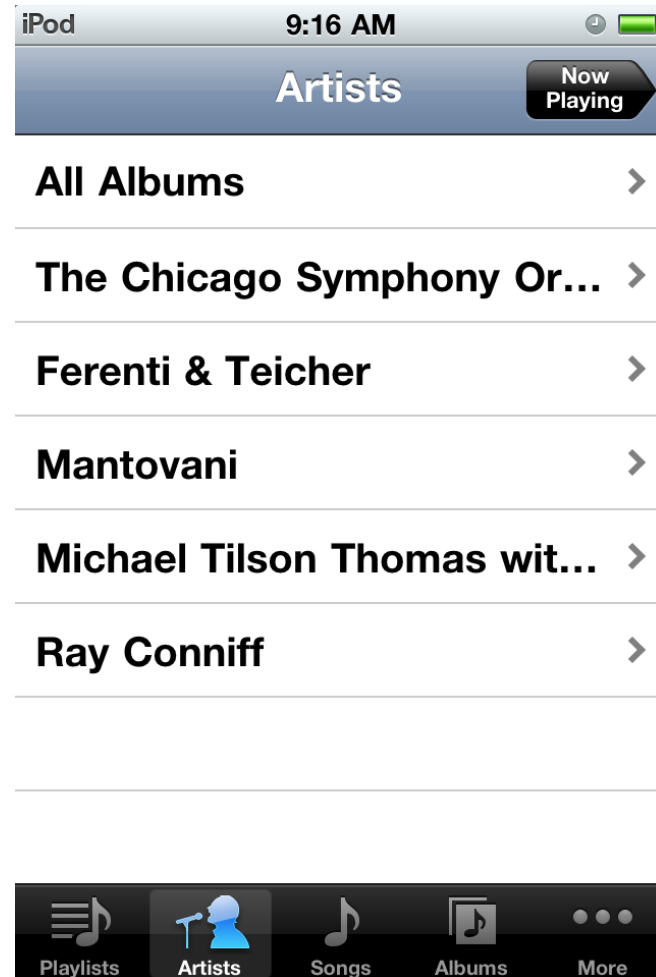
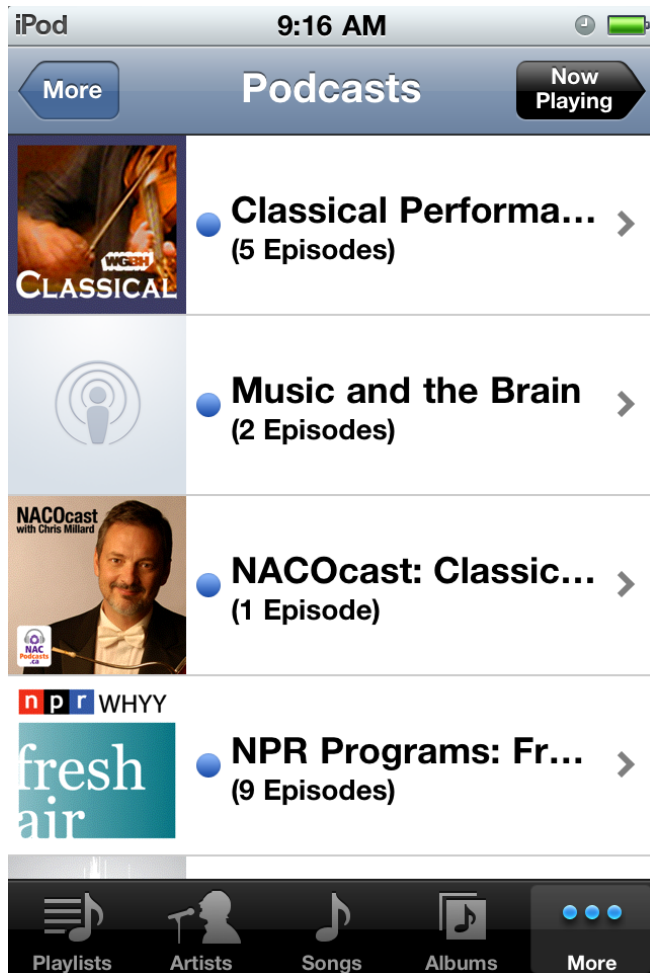
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Videos



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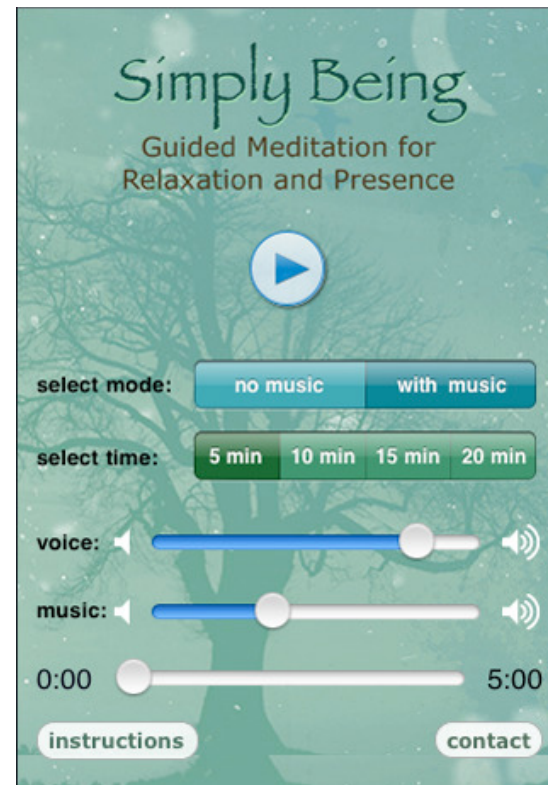
Entertainment



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Anxiety Management

- Simply Being
- Guided meditation app with music and voice
- Timer



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Result

- Manages bus difficulties with reminders, phone, and music
- Moves from task to task on time (alerts)
- Knows what to do (notes)
- Finds her way, observes appropriate, safe behaviors (videos)
- Relaxation and anxiety-management (apps and music)



Affordability

Who pays?

- Those who could benefit most are least likely to have smartphones and wearables.
- No insurance covers either at this time.
- Research must support health benefits of treatment strategies using these tools.
- Tools must become more reliable and user-friendly.



Facebook: "Assistive Technology for Cognition"

VCU OT students conducted this pilot study -- check it out!



Could iPod Apps Help Relieve Mental Illness?

www.styleweekly.com

After he set fire to his family's house near Martinsville in 1996, Nicholas Pannell was found not guilty by

Like · Comment · Share

1

6 people like this.

Write a comment...

84 people reached · 38%



Assistive Technology for Cognition shared a link.

May 21

Thanks, Richard, for the link to this informative site about apps and strategies for people with disabilities. Site sells a book on ipads for disability, too.



Insignio - Search | Bridging Apps
bridgingapps.org

Casey Wimsatt

A peer reviewed paper of a randomized controlled ...

1 · April 26 at 3:35pm



Social Skills Ireland

Hi just to let you all know this is airing on BBC2 thi...

April 17 at 6:07pm

More Posts



Assistive Technology for Cognition shared a link.

May 23

Will be presenting on current research utilizing ipod touch as vocational aid for people with autism. My talk is on Thursday afternoon. Hope to see you there -- Tony



2012 National Transition Conference: College and Careers for Youth with Disabilities

www.transition2012.org

Like · Comment · Share

3 people like this.

Chat (5)

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Thank you!

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V i r g i n i a C o m m o n w e a l t h U n i v e r s i t y