Emerging Cognitive Technologies: Are We Brave Enough for this Brave New World?

Daniel K. Davies
AbleLink Founder and President
Technology Museum of Innovation Laureate
Cognitive Support Technologies

Used Directly by Individuals with Cognitive Disabilities at Home, School, Work and out in the Community for *Smart Living*
Some Background

• Began Research Specifically on Using Technology for Individuals with Intellectual Disabilities in 1991

• Founded AbleLink Technologies in 1997 to Focus Exclusively on Cognitive Technology R & D

• Our Mission
  Research, Develop, and Deliver Cognitive Technology addressing the Specific Needs of Individuals with Cognitive Disabilities and Seniors Aging in Place
My Brother, John Roger Davies
AbleLink’s Cognitive Technology Research and Development

Developing Innovative Technologies for those with Cognitive Needs

• Conducted over 75 Research Projects Focused on Technology for:
  Intellectual and Developmental Disabilities
  Traumatic Brain Injury
  Seniors Experiencing Cognitive Decline

• Funding Organizations have included:
AbleLink’s Cognitive Technology Research and Development

Partnering to further Research and Development Outcomes

- 35+ peer-reviewed journal articles and book chapters on technology for persons with cognitive disabilities
- 25+ commercially available cognitive support technologies
  - accessible email
  - access to the internet
  - personal scheduling
  - accessing the community
  - video modeling for independent task support
AbleLink’s Cognitive Technology Research and Development

Partnering to further Research and Development Outcomes

• 35+ peer-reviewed journal articles and book chapters on technology for persons with cognitive disabilities
• 15+ commercially available cognitive support technologies
  • accessible email
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  • video modeling for independent task support
In the words of Karl!

Karl Kreklow: Friend and Research Participant from back in 1995
Nearly 20 Years Later

Technology: No Longer Optional for Full Access to Society
The Rights of People with Cognitive Disabilities to Technology and Information Access

13th Annual Coleman Institute Conference - October 2, 2013
The Basic Purpose of Technology

the application
of scientific advances
to benefit humanity

(The Franklin Institute - http://fi.edu.franklin.glossary.html)
As Functionality Increases (It Does More things)

“…the same technology that simplifies life by providing more functionality… also complicates life by making it hard to learn. …”
Donald A. Norman - The Design of Everyday Things, 1988 (pp. 30-31)
Technology Paradox

Example: Microwave Ovens
Technology Paradox
Example: Mobile Phones
Problem: Too Many Hurdles to Using Technology
Why? Mainstream Technology Not Cognitively Accessible
Everyday Technology Example
Easier to Use Personal Scheduling for iPad
Solution: Cognitively Accessible Technologies

Needs-based, person centered interface design results in two Types:

1) Everyday technologies that are cognitively accessible
2) Specialized technologies that augment cognitive ability
“Living the Smart Life” is a story which demonstrates AbleLink’s vision for how technology can make a difference in the lives of people with intellectual and developmental disabilities. As you will see in the movie, people with cognitive disabilities can benefit from the same mainstream technologies that everyone uses to manage and enjoy life when provided with the appropriate access. Greater independence and self-determination are very realistic outcomes for a population that, to this point, has benefited very minimally from other assistive technologies.

https://www.youtube.com/watch?v=TuHLj2U0SMQ
“Our organization needs to integrate cognitive technology into the fabric of our services... but where do we start?”
Smart Living Technology Program

Options for Integrating Person-Centered Cognitive Technology to Meet Individual and Agency Needs

- **Smart Living Project**: ATLAS VantagePoint – Accessible Surveys
- **Smart Living Project**: Transportation Support
- **Smart Living Technology Pilot Project**: Turnkey Technology Systems for Residential Living and Supported Employment
- **Innovation Partnership**: Integration and Expansion
Increasingly Service Agencies and Organizations Are Using Cognitive Technology to Improve Programs & Services
Cognitive Technologies Meet **Needs** Across Spectrum of Life

- Accessible Surveys for Promoting Self-Expression with **ATLAS**
- Visual & Audio Task and Personal Scheduling Support with **Visual Impact** and **Endeavor 3**
- Personal GPS for Enabling Independent Bus Travel with **WayFinder**
- Access to the Web and the World with **Endeavor Desktop**

**“Having My Voice Heard”**

**“Accessing My Community”**

**“Knowing When and How to ...”**

**“Accessing My Everyday Technologies”**
Cognitive Technologies Meet Needs Across Spectrum of Life

Accessible Surveys for Promoting Self-Expression with ATLAS

- "Having My Voice Heard"
- "Knowing When and How to ..."
- "Accessing My Community"
- "Accessing My Everyday Technologies"
ATLAS: Cognitively Accessible Tests and Surveys

Self-directed, survey tools, such as consumer satisfaction surveys, using multi-modal presentation and accessible design can increase independence and reduce staff time interviewing and entering/aggregating data.
ATLAS VantagePoint: Self-Directed Satisfaction Surveys
ATLAS VantagePoint: Self-Directed Satisfaction Surveys
VantagePoint Reports: **Cloud-based Data Collection and Reporting**

**AbleLink Technologies**

**VantagePoint Reports Home**

The following is a list of VantagePoint surveys that were taken for AbleLink Technologies. To show the entire list for a specific survey, click on the name of the survey. To download a comma-separated (CSV) file of all the surveys, click on the **Download Data** link. To view the survey reports, click on either the **Overall Results** or **Perception Report** buttons.

<table>
<thead>
<tr>
<th>Survey Name</th>
<th>Last Survey Taken</th>
<th>Total Surveys</th>
<th>Aggregate Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Views About Accessing My Community</td>
<td>01/06/16 - 09:31 AM</td>
<td>8 (Download Data)</td>
<td>Overall Results, Perception Report</td>
</tr>
<tr>
<td>My Views About My Work</td>
<td>01/04/16 - 08:36 PM</td>
<td>5 (Download Data)</td>
<td>Overall Results, Perception Report</td>
</tr>
<tr>
<td>My Views About My Home</td>
<td>01/04/16 - 08:34 PM</td>
<td>7 (Download Data)</td>
<td>Overall Results, Perception Report</td>
</tr>
<tr>
<td>My Views About My Day Program</td>
<td>01/04/16 - 05:52 PM</td>
<td>6 (Download Data)</td>
<td>Overall Results, Perception Report</td>
</tr>
</tbody>
</table>
THE CQL POST APP

PERSONAL | OUTCOME | SCREENING | TOOL

The POST App (Personal Outcome Screening Tool) for iPads, is an interactive, user-friendly app that provides a snapshot view of a person’s quality of life. The app was developed so that individuals receiving supports can actively engage in completing the questionnaire, either independently or supported by others.

The POST App uses easy-to-understand language, images and a touch screen. Specifically, it creates an opportunity for people to explore 21 quality-of-life outcomes, assess whether these outcomes are important to the individual, and what level of success they are having in achieving these outcomes.
October 14, 2015

WIHD will be open today with normal hours.

UCEDD
University Center for Excellence in Developmental Disabilities (UCEDD)
ATLAS Example: Health Care Visit Satisfaction Survey
Cognitive Technologies Meet Needs Across Spectrum of Life

- Personal GPS for Enabling Independent Bus Travel with WayFinder

- “Having My Voice Heard”
- “Accessing My Community”
- “Knowing When and How to …”
- “Accessing My Everyday Technologies”
Cognitive Technologies for Community Access

• **WayFinder**: An accessible Smart Phone program for providing multimedia prompts to individuals with cognitive disabilities for navigating public transit systems.
Cognitive Technology for Riding the Bus and Accessing the Community Independently
A vehicle/pedestrian accident left Laura too scared to take the bus independently. After a few weeks of pedestrian safety training and re-acclimation to independent travel, she now takes the bus to/from work three times a week.
When he started a Day Hab program, William wanted to learn the bus system rather than rely on staff or paratransit. Thanks to SMART Travel, he knows how to get to/from work and is so excited that he shows up on his days off!
ARCA’s Smart Travel Program – “Wildly Successful”

“The STP program is wildly successful. We trained two groups of ten individuals in the first year of collaborations with our governmental partners. The first group increased their public rides by 110% and the second group increased their rides by 84%.”

http://www.arc-a.org/Services/smarttravelprogram.php
Cognitive Technologies Meet **Needs** Across Spectrum of Life

- **Having My Voice Heard**
  - Accessible Surveys for Promoting Self-Expression with **ATLAS**

- **Knowing When and How to ...**
  - Visual & Audio Task and Personal Scheduling Support with **Visual Impact** and **Endeavor 3**

- **Accessing My Everyday Technologies**

- **Accessing My Community**
  - Personal GPS for Enabling Independent Bus Travel with **WayFinder**

- **Having My Community**
  - Personal GPS for Enabling Independent Bus Travel with **WayFinder**

- **Knowing When and How to ...**
  - Access to the Web and the World with **Endeavor Desktop**
Cognitive Technologies Meet Needs Across Spectrum of Life

- Visual & Audio Task and Personal Scheduling Support with Visual Impact and Endeavor 3

“Having My Voice Heard”

“Accessing My Community”

“Knowing When and How to ...”

“Accessing My Everyday Technologies”
Endeavor 3: Accessible Schedules for iPad

Activities for July 02, 2014

- Go Home 02:45 PM
- Do Your Homework 03:30 PM
- Feed your Dog 04:00 PM
- Take Your Medicine 07:45 PM
- Brush Your Teeth 10:45 PM
- Time for Bed 11:00 PM
Endeavor 3: Multimedia Reminders

Time to Feed Regis - July 11, 2014 - 05:30 PM

Event Date and Time:

July 2014

05:30 PM

Event Recurrence:
Every Weekday (Mon - Fri)

Event Description:
Time to Feed Regis

Event Audio:
Record Play

Event Image:
Take Photo
Open Library

Cancel Advanced Save Event
### Endeavor 3: Cloud-based Schedule Management

#### Veteran's Healthcare System

<table>
<thead>
<tr>
<th>INDIVIDUAL</th>
<th>NEXT EVENT</th>
<th>REMAINING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dan Davies</td>
<td>Lunch with Mike 5/28/2013 12:30 PM</td>
<td>1</td>
</tr>
<tr>
<td>Jim Dunshire</td>
<td>No Remaining Events Today</td>
<td>0</td>
</tr>
<tr>
<td>Jeffrey James</td>
<td>Brush Teeth 5/28/2013 6:45 PM</td>
<td>1</td>
</tr>
<tr>
<td>Mary Jones</td>
<td>Exercise 5/28/2013 2:30 PM</td>
<td>4</td>
</tr>
<tr>
<td>Matt King</td>
<td>Clean the Bathroom 5/28/2013 12:15 PM</td>
<td>1</td>
</tr>
<tr>
<td>Nathan King</td>
<td>Do your Homework 5/28/2013 3:45 PM</td>
<td>1</td>
</tr>
<tr>
<td>Miranda Smith</td>
<td>No Remaining Events Today</td>
<td>0</td>
</tr>
</tbody>
</table>

**Facility:** Polytrauma Rehabilitation Center

**Current Date:** 5/28/2013 12:03:31 PM

**Logged In As:** Administrator

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**AbleLink Technologies**
## Endeavor 3: Synchronizing with the Cloud

![Example of a smart living console](image)

<table>
<thead>
<tr>
<th>STATUS</th>
<th>EVENT NAME</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed</td>
<td>Breakfast</td>
<td>7:00 AM</td>
</tr>
<tr>
<td>Passed</td>
<td>Brush your teeth</td>
<td>8:30 AM</td>
</tr>
<tr>
<td>Passed</td>
<td>Take morning meds</td>
<td>9:00 AM</td>
</tr>
<tr>
<td>Passed</td>
<td>Lunch with Sarah</td>
<td>12:00 PM</td>
</tr>
<tr>
<td>Pending</td>
<td>Exercise</td>
<td>2:30 PM</td>
</tr>
<tr>
<td>Pending</td>
<td>Dinner</td>
<td>5:45 PM</td>
</tr>
<tr>
<td>Pending</td>
<td>Take evening meds</td>
<td>8:30 PM</td>
</tr>
<tr>
<td>Pending</td>
<td>Feed Flounder</td>
<td>9:00 PM</td>
</tr>
</tbody>
</table>
Endeavor 3: Events Launching Tasks

Event Description: Dinner

Event Date: May, 2013

Event Time: 05:45 PM

Event Image:

Event Audio:

Event Recurrence: Every Day

Save Changes
Roses for Autism - Story of the Farm

Packaging Farmer’s Market Roses

Weeding Roses
Prepare your workspace

GET READY!
1. Make sure area is dry
2. Get rubber bands
3. Collect two buckets
Trinity supports people with disabilities to live more full and abundant lives.

Learn how you can make a difference
Accessible Step-by-Step Task Instructions

Supportive Employment Program
Cognitive Technologies Meet Needs Across Spectrum of Life

- Access to the Web and the World with Endeavor Desktop

- "Having My Voice Heard"
- "Accessing My Community"
- "Knowing When and How to ..."
- "Accessing My Everyday Technologies"
Endeavor Desktop

The Endeavor Desktop Environment brings everyday technologies such as social networking, online access/communication, and productivity to individuals who have been excluded from full participation in the technology revolution due to barriers imposed by the complexity of everyday technologies.

Click to find out more...

Cognitively Accessible Operating System
Email, Web Surfing, Media Playing
Endeavor Desktop: Access Driven by Personal Interests and Needs
Interface Customizability: Accessibility Settings Applied to Each User
Digital StoryTeller

Cognitively Accessible Tool for Creating Personal Stories with an iPad

Matt’s Story of Self-Expression
Step-by-Step Story Building Program

Please select a picture for the cover of your book.

Ocean Creatures

Please record an audio message that describes this picture.
Matt’s story included ocean creatures, giraffes, tigers and “the very awesome birds”!
“NHS offers a full spectrum of individualized services to individuals with intellectual and developmental disabilities.”
Experience life to its fullest
“She uses her Endeavor Desktop every day to practice relaxation exercises, and read her MPR newsfeed. This helps her cope.”
Sarah’s Desktop is Personalized to Meet Her Needs
“It’s been a wonderful gift for her to manage a difficult and stressful situation without relapse into crisis. We are very grateful for this technology and the way it acts to support Sarah. *It has improved her quality of life.*”  

Hammer DSP
Andy’s Story

Learn Cleaning Validation from the Industry Experts!
FROM: Training & Professional Development  DATE: Today at 03:25 PM

Pictures of the Reunion
FROM: Rich Herold  DATE: Today at 02:55 PM

Bowling Saturdays
FROM: Brian  DATE: Today at 02:55 PM

conference call to
FROM: Mr. Williams  DATE: Today at 02:55 PM

Hey Steve,

It was good seeing you guys at the reunion this year. I can’t believe how much the boys have grown! We hope you all enjoy the rest of the summer and we look forward to seeing you soon!

Here are a few pictures I took at the reunion.

Talk to you soon,
Lara

Email from: Mr. Williams

PAUSE

Pictures of the Reunion

[Images of reunion pictures]
“I Love You Mom!”

“Andy sometimes had a very hard time expressing himself and verbalizing his feelings. He began using audio email and his social skills began to blossom. At first he was hesitant to give it a try. For several weeks his mom would send him emails and he would listen to them, but wouldn’t respond. Eventually with help from staff he began emailing by deciding ahead of time what he wanted to say in his email. Once he got over the hump of sending the first couple of messages, he began sending emails completely independently.

Because of his difficulties expressing himself verbally, Andy had not said ‘I love you’ to his mom in years. One day, he was sending emails in the dining room. The staff person nearby in the kitchen overheard him signing off from his email by saying, “I love you, mom.” Within 24 hours, his mom called the staff in tears to express just how much that meant to her. She continued to tell how Andy’s communication skills had improved over the short time since he had begun emailing with her.”
“NHS offers a full spectrum of individualized services to individuals with intellectual and developmental disabilities.”
From Today to Tomorrow . . .

What’s Needed for Moving Forward

• Recognition of the Rights of Individuals with Cognitive Disabilities to Technology and Information Access

• Continued R & D Funding for Development and Longitudinal Testing of New Cognitive Technologies

• Overcoming Existing Funding Obstacles to Providing Cognitive Technologies to the Individuals that Need Them

• Greater Education and Awareness Regarding the Impact Cognitive Technologies have on Enhancing Quality of Life
Concern for man himself and his fate must always constitute the chief objective of all technological endeavors... in order that the creations of our minds shall be a blessing and not a curse to mankind.

Albert Einstein
Science & Happiness