Prosthetic Cognition and Other Assistive Technology for Workers with Cognitive Disabilities

Breakout session for Oregon Vocational Rehabilitation Statewide In-Service Training Conference: 

Looking Ahead: Strategies for Better Outcomes
Day 1: August 13, 2014 (10:15 - 11:45 AM)

By Kathy Moeller, BA, Certified Brain Injury Specialist, Vocation Consultant
President, Cognitive Harmonics, Inc.

Creator of the BRAIN BOOK® Life and Work Management System 
and 
My Bionic Brain® Cognitive Communication Prosthetic and Work Manager

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Preface

Most of the slides in this presentation are applicable to a wide range of cognitive disabilities.

That said, many of them will focus on assistive technology that supports Vocational Rehabilitation Consumers who are seeking services in order to return to work following experience of a brain injury.

Some extrapolation may be required for applicability to other disabling conditions and circumstances.
Road map

● “Assistive Technology” defined

● “Prosthetic Cognition” defined

● What we find when we try to research each

● How much (or how little) the VR counselor needs to know

● How much (or how little) the consumer needs to know

● How prosthetic cognition can help workers TODAY

● What the future holds
But first . . . Breaking News

Mainstream discussion of “cognitive disabilities” in July 30, 2014 Forbes article

Using Technology To Mitigate Cognitive Disabilities

A 2013 ruling by the Department of Labor established a baseline for federal contractors to have 7% of their workforce be individuals with disabilities. Additionally, passage by the U.S. House and Senate of the Workforce Innovation and Opportunity Act (WIOA) demonstrates a growing emphasis on hiring more individuals with disabilities. However, for this trend to be successful for businesses, they must improve their recruitment and retention of these individuals.

On the horizon:

a new workplace culture that includes individuals with brain injury in the neurodiversity movement

“... Within the disabled community, one of the largest sectors is made up of individuals with a cognitive challenge of some type. . .”

“With a generation of students educated under the Americans with Disabilities Act (ADA), an aging workforce, and improved medical care that allows injured individuals to return to work, cognitive disabilities are likely to increase in the workplace. In fact, these challenges are, at some point, experienced by the entire workforce (including older workers), and can play a major role in productivity and successful team interactions...
Quote from Mr. Szczerba’s article (emphasis added)

“It’s likely that the trend will also move the other way, with tools initially developed for individuals with cognitive disabilities becoming popular with the general public.”

To better understand these issues, we spoke with Madelaine Sayko, president and co-founder of Cognitive Compass, an organization that advises businesses on approaches and resources to accommodate employees with cognitive disabilities.

According to Sayko, “The cognitive tool sector is expected become a $5 billion market in the near future – able to serve not only those with cognitive challenges but to support all employees in a range of executive function tasks.”

For example, many popular productivity tools (such as Evernote, Apple’s Siri, and Google Calendar) have been repurposed to assist those with cognitive challenges. It’s likely that the trend will also move the other way, with tools initially developed for individuals with cognitive disabilities becoming popular with the general public.

Sayko highlighted four interesting products that are specifically geared for the disabled but have the potential for broader appeal:

1) **My Bionic Brain**® (by Cognitive Harmonics) is an iPad-based work and personal life management tool designed to meet the needs of individuals with cognitive disabilities. The product enables organization and productivity at home and work by teaching skills that compensate for short-term memory impairment, disorientation, loss of emotional control, and difficulty with organization and time management.

2) **PEAT**® (by BrainAid) is a virtual executive assistant for use by people with a wide range of cognitive impairments including brain injury, ADHD, stroke, and pre-dementia. PEAT is an Android app based on artificial intelligence methods developed at NASA’s Ames Research Center to help individuals achieve greater functionality.

3) **BioZen**® (by the National Center for Telehealth and Technology) is another smartphone app, this one developed by the Department of Defense to assist service members experiencing PTSD and TBI. BioZen provides real-time biofeedback from body sensors to show users their attentive cognitive states and allow them to self-modify. One can imagine a product like this helping long-distance drivers and pilots to stay alert.

4) **Livescribe**® is an advanced, paper-based computer with a pen that records everything you hear and write. It synchronizes the audio you hear to what you write, so you never miss a word. An embedded infrared camera and audio recording capabilities are combined in a slightly larger-sized pen that is used on special digital paper. Beyond therapeutic assistance, it could be used as a memory enhancer and documentation device for students and businesspeople.

“These augmentative technologies represent the cutting edge for improving business functions, and they’re just a small sample of technologies that are coming to market,”

“Neurodiversity” Defined

Often discussed in the context of autism or ADHD, as the acceptance of neurodiversity becomes more mainstream, neurodiversity is expected to more routinely include brain injury as well.

What is Neurodiversity?

Neurodiversity means many things to people. Here’s my first person definition
Published on October 7, 2013 by John Elder Robison in My Life With Asperger’s

To me, neurodiversity is the idea that neurological differences like autism and ADHD are the result of normal, natural variation in the human genome. This represents new and fundamentally different way of looking at conditions that were traditionally pathologized; it’s a viewpoint that is not universally accepted though it is increasingly supported by science. That science suggests conditions like autism have a stable prevalence in human society as far back as we can measure. We are realizing that autism, ADHD, and other conditions emerge through a combination of genetic predisposition and environmental interaction; they are not the result of disease or injury.

http://www.psychologytoday.com/blog/my-life-aspergers/201310/what-is-neurodiversity
The role of “accommodation” in a neuro-diverse workplace

Indeed, many individuals who embrace the concept of neurodiversity believe that people with differences do not need to be cured; they need help and accommodation instead. They look at the pool of diverse humanity and see – in the middle – the range of different thinking that’s made humanity’s progress in science and the creative arts possible. At the edges they see people who are functionally crippled by being “too diverse.” When 99 neurologically identical people fail to solve a problem it’s often the 1% fellow who’s different who holds the key. Yet that person may be disabled or disadvantaged most or all of the time. To neurodiversity proponents, people are disabled because they are at the edges of the bell curve; not because they are sick or broken.
“Assistive Technology”

Examples & Definitions
For Non-cognitive Disabilities
Low-tech **Generic** Supports for Workers with Cognitive Disabilities
Low-tech device coupled with “strategy training”

**Tip of the Month**

*Cognitive Breaks*

By KathyM

A strategy I have found useful is something I call taking a cognitive break. A cognitive break is like any regular break except it’s shorter and quicker. I like to take one one-minute cognitive break every hour on the hour. It is best in a quiet darkened place, it doesn’t have to last very long.

A break room (in an office, for example) might have too much light or too many people to be effective. The bathroom sometimes works. Or even a spare room that no one is using that is completely quiet and where the lights can be turned off can be good too (don’t tell anyone, but I have actually used closets for these breaks).

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The idea is to take a complete break from all visual, auditory and mental stimulation for approximately one minute, every hour.

Whether you think you need it or not, this kind of break reduces the kind of fatigue we often feel at the end of a long day.

Now, if you can’t find such a place in your physical environment, you can take more aggressive steps to create the right environment for yourself. It can be as simple as buying inexpensive ear protectors (the kind hunters use). I wear them in combination -- first the ear plugs go in, and then the ear protectors go over the top. Then, if I need to block out the light, I can simply close my eyes.

This little ritual may sound a bit odd, but all I can tell you is it works! It has worked for me, and it works for others I know who have brain injury and are struggling with "cognitive fatigue." In my case, by taking cognitive breaks regularly, after about a year and a half after my injury, I was able to extend my "cognitive stamina" for working from only several hours per week, to four hours-per-day, five days-a-week.

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KathyM@cognitiveharmonics.com
Another Low-tech solution coupled with strategy training
A *FOCUS* Card is an external memory (visual) cue that “outsmarts” distractions and interruptions

“I’m currently working on this”
“When done, I plan to start working on that”
Another Low-tech solution coupled with strategy training

Based on the principle of “visual availability”
Hi-tech **Generic Supports**
Generic Note-taking software

Electronic “Sticky Notes” for a PC
Voice-to-text (visual) voicemail

Low- or no-cost alternative to listening to voice-mail messages.
See www.youmail.com
Specialized Low-tech Supports for Cognitive Disabilities
Highly Specialized (but still) Low-tech
Specialized Hi-Tech Reminder Systems

NeuroPage®

BrainAid’s PEAT®

My Bionic Brain®

MedMinder™

Pillboxie™ app.

More:
http://www.productiveandorganized.net/2011/01/10-reminder-systems-for-you-to-consider.html
Hi-tech support for managing troubling feelings

The following are strategies that help when I am feeling Overwhelmed.

Enter your strategies here.
Same solution, different access

**Paper-based**

**Electronic**
Low-tech solution for organizing communications
High-tech solution to “normalize” communications

I need to talk to you about the lighting in my office. Fluorescent lighting affects me differently from many other people. Many of us whose brains process light and sound differently need accommodations in order to be able to work. I wanted to let you know that I need to have an incandescent lamp for the desk in my office.

results of conversation

Supervisor John Doe said he would order a desk lamp with a "regular" (non-flourescent) bulb.
High-tech solution to support self help and supported skills training
Definition of “Assistive Technology” from the Assistive Technology Act of 2004 (“Tech Act”)

The Assistive Technology Act of 2004 defines an assistive technology device in the following way:

- ...any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. (29 U.S.C. Sec 2202(2))
- AT devices can be “low tech,” “medium tech,” or “high tech”—as the examples below show.
- power and manual wheelchairs, scooters, canes, walkers, and standing devices
- augmentative communication devices (speech generating devices), voice amplifiers, and speech recognition devices
- durable medical equipment and medical supplies, such as patient lifts and incontinence supplies
- orthotics and prosthetics, such as hearing aids and electric larynxes
- accessibility adaptations to the home, workplace, schools, group homes, nursing facilities, ICF/MRs, and other places (e.g., ramps, stair glides, lifts, grab bars, flashing smoke detectors, lever doorknobs, and environmental controls)
- special equipment to help people work, study, and engage in recreation, such as enlarged computer keyboards, reachers, amplified telephones, magnifiers, voice recognition software, and adaptive sports equipment
- accessibility modifications in the community, such as audio systems on public transportation, talking ATMs, and voting machines for the blind (Disability Rights Network of Pennsylvania, 2008)

Source: http://nichcy.org/laws/ata#purpose
Also see: http://www.resnaprojects.org/nattap/library/pubs.html
An **assistive technology service** is defined as:

- any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device.
- **Examples** of AT services—taken from the law itself—include:
  - An evaluation of the AT needs of an individual, including a functional evaluation of how AT would help the individual
  - Purchasing, leasing, or otherwise providing an AT device
  - Selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, replacing, or donating an AT device
  - Coordinating and using therapies, such as occupational therapy or physical therapy, with AT devices under an educational plan or rehabilitative plan
  - Training or technical assistance for an individual with a disability, or his or her family members, guardians, advocates, or authorized representatives
  - Training or technical assistance for educational or rehabilitation professionals, manufacturers of AT devices, employers, providers of training and employment services, and others who help individuals with disabilities
  - A service that expands access to technology, including email and Internet, to persons with disabilities.

**State AT Projects**

- Under the law, each U.S. state and territory receives a grant to fund an Assistive Technology Act Project (ATAP). These projects provide services to persons with disabilities for their entire life span, as well as to their families or guardians, service providers, and agencies and other entities that are involved in providing services such as education and employment to persons with disabilities.
Resources for Autism

Source: http://www.autismspeaks.org/family-services/resource-library/assistive-technology
Adult Autism and Employment

A Guide for Vocational Rehabilitation Professionals

By Scott Standifer, Ph.D.

http://www.dps.missouri.edu/Autism.html

“Cognitive Disability” defined

Defining cognitive disability is not easy, and definitions of cognitive disability are usually broad. Persons with cognitive disabilities may have difficulty with various types of mental tasks.

Intellectual disabilities, also known as developmental delay or mental retardation, are a group of disorders defined by diminished cognitive and adaptive development. Affecting more males than females, they are diagnosed in between one and three percent of the population.

Many cognitive disabilities have a base in physiological or biological processes within the individual, such as a genetic disorder or a traumatic brain injury.

Other cognitive disabilities may be based in the chemistry or structure of the person's brain. Persons with more profound cognitive disabilities often need assistance with aspects of daily living. Persons with minor learning disabilities might be able to function adequately despite their disability, maybe to the point where their disability is never diagnosed or noticed.
“Cognitive Disability” defined

**Clinical Diagnosis of Cognitive Disability**
Clinical diagnosis of cognitive disability can include Down syndrome, Traumatic Brain Injury (TBI), Autism, or Dementia. Clinical diagnosis may also include less severe cognitive conditions such as Dyslexia, Attention Deficit Disorder, Dyscalculia, and other learning disabilities.

**Functional Diagnosis of Cognitive Disability**
Sometimes it is more useful to avoid the medical perspective of cognitive disability and view them from a functional perspective instead. A Functional disability perspective ignores the medical and behavioral causes of cognitive disability and focuses on the abilities and challenges the person with a cognitive disability faces. Functional cognitive disabilities may involve difficulties or deficits involving problem-solving, attention, memory, math comprehension, visual comprehension, reading, linguistic, and verbal comprehension.

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“Prosthetic Cognition” defined

“Cognitive Prosthetics”
Is a subset of “Assistive Technology”

Examples and Definitions
Definition of “prosthesis” (emphasis added)

prosthesis (pros·the·sis)
noun

a device, either external or implanted, that substitutes for or supplements a missing or defective part of the body.

Source: www.dictionary.com
Definition of “cognition” (emphasis added)

cognition (cog-ni-tion)
noun
the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses...

Source: www.oxforddictionaries.com
**Definition of**

“cognitive prosthetic”

*(emphasis added)*

cognitive prosthetic
(cog-ni-tive pros-the-tic)
noun

an electronic computational device that *extends* the capability of human cognition...

Source: [www.oxforddictionaries.com](http://www.oxforddictionaries.com)
A Cognitive Prosthetic can be . . .

- low-tech or high-tech
- generic or specialized
- single-issue focused
- feature-rich (comprehensive)
Research

What happens when we Google

“assistive technology for cognition”
and

“cognitive prosthetic”? 
Results from Googling “assistive technology for cognition”

About 1,460,000 results (0.26 seconds)

Assistive Technology for Cognition
www.asha.org/Publications/.../Assistive-Technology-for-Cognition.ht...
by MKM Sohlberg - Cited by 2 - Related articles
Feb 15, 2011 – Cognitive aids increase the independent functioning of individuals with processing deficits by supporting the completion of functional activities ...

Assistive Technology for Cognition - IEEE Pulse
pulse.embs.org/Past_Issues/2008March/LoPresti.pdf
File Format: PDF/Adobe Acrobat - Quick View
by EF LOPRESTI - Cited by 22 - Related articles
PHOTODISC. Assistive Technology for Cognition. Acognitive disability represents a substantial limitation in mental tasks (such as planning, information pro-

Assistive Technology for Cognition | Facebook
www.facebook.com/.../Assistive-Technology...Cognition/175561992...
Assistive Technology for Cognition. 250 likes · 1 talking about this.

Cognitive Function and Assistive Technology for Cognition: A ...
journals.cambridge.org/article_S1355617711001548
by A Gillespie - Cited by 3 - Related articles
The relationship between assistive technology for cognition (ATC) and cognitive function was examined using a systematic review. A literature search identified ...

Assistive Technology For Cognition (ATC)
cognitive tech.washington.edu/presentations/summer.../slide1.html
Slide 1 of 37 Index < Previous Next >. Assistive Technology For Cognition (ATC). Kurt Johnson, Pat Brown, Mark Harniss. Photo of Kurt Johson, Mark Harniss, ...

[PDF]
Use of cognitive aids and other assistive technology - Computer ...
File Format: PDF/Adobe Acrobat - Quick View
by D AMTMANN - 2009 - Cited by 17 - Related articles
Purpose. To investigate the use of assistive technology (AT), unmet needs for AT, and examine correlates of use of memory aids and cognitive strategies among ...
Results from Googling “cognitive prosthetics”

About 81,000 results (0.18 seconds)

Neuroprosthetics - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Neuroprosthetics
Neural prostheses are a series of devices that can substitute a motor, sensory or cognitive modality that might have been damaged as a result of an injury or a ...
History - Sensory prosthetics - Motor prosthetics - Sensory/motor prosthetics

The Institute for Cognitive Prosthetics
www.brain-rehab.com/
Mar 29, 2012 – About the rehabilitation program that specializes in services for persons with cognitive, visual, and perceptual deficits following a stroke or brain ...

[CDF]
Cognitive Prosthesis
www.lpi.usra.edu/publications/reports/CB-1089/ford.pdf
File Format: PDF/Adobe Acrobat - Quick View
by KM Ford - Cited by 23 - Related articles
Cognitive Prostheses. Kenneth M. Ford. Institute for Human % Machine Cognition. University of West Florida. ABSTRACT. This emerging concept of ...

Cognitive Prosthetics - Virginia Commonwealth University
www.vcu.edu/partnership/pda/documents/Newsletters.pdf
File Format: PDF/Adobe Acrobat - Quick View

Speech Devices Cognitive Prosthetic Devices - Prosthetic and ...
www.prosthetics.va.gov/.../Speech_Devices_Cognitive_Prosthetic_De...
File Format: PDF/Adobe Acrobat - Quick View
CLINICAL PRACTICE RECOMMENDATIONS. COGNITIVE PROSTHETIC DEVICES. I. Background a. VHA's Prosthetic and Sensory Aids Service Strategic ...

The development of personalised cognitive prosthetics.
www.ncbi.nlm.nih.gov/pubmed/19162773
by CD Nugent - 2008 - Cited by 8 - Related articles
Mobile Apps
(3 of 26,200,000 Google results)

“27 Life-Changing iPhone and iPad Apps for People with Brain Injury”
BrainLine, BrainLine
http://www.brainline.org/content/2011/05/23-lifechanging-iphone-ipad-apps-for-people-with-brain-injury.html

“Traumatic Brain Injury Apps” (Wikispaces.net)
http://specialed.iu1.wikispaces.net/Traumatic+Brain+Injury+Apps

ASHA 2012 - Mobile Apps for Managing Memory Impairment after Brain Injury, Rehabilitation Engineering Research Center
http://www.wirelessrerc.org/content/publications/asha-2012-mobile-apps-managing-memory-impairment-after-brain-injury
The increasing use of technology to help individuals compensate for cognitive impairments is one of the most notable advances in neuropsychological rehabilitation in recent years (Wilson, 2009). Cognitive aids increase the independent functioning of individuals with processing deficits by supporting the completion of functional activities in natural settings. These aids also can reduce caregiver burden and stress by helping individuals with cognitive impairment function more independently (Lopresti, 2004). A less obvious benefit is that the aids can reduce the “digital divide” for clients with cognitive impairments who often have been denied the advantages provided by technology (Sohlberg et al., 2005).

A large body of literature supports the efficacy and effectiveness of external aids for improving independence and life participation for people with cognitive impairments. A review spanning 20 years of literature on assistive technology for cognition concluded that technological solutions can help people with acquired brain injury (ABI) participate in many activities that would not otherwise be possible (Lopresti et al., 2000). A practice guidelines paper synthesized the findings from 21 studies involving a total of 270 participants; it concluded that training in the use of external aids should be a practice standard in ABI treatment (Sohlberg et al., 2007).

External aids have been called “cognitive orthoses,” “cognitive prosthetics,” “assistive technology” (Cole, 1999), and more recently, “assistive technology for cognition” or ATC (Lo Presti et al., 2004). Although some ATC researchers limit their definition to devices that use computer technology and are specifically designed to help people compensate for cognitive impairments, ATC refers to a range of tools that includes low-tech and mainstream devices as well as specialized technology.

Despite the rehabilitative potential of technological devices and the growing number of affordable, accessible devices, clinicians may not implement them, in part because they may be uncomfortable or inexperienced with technology (Hart et al., 2004; Sohlberg et al., 2007). Another barrier to patients’ effective use of cognitive aids may be the limited systematic training they receive in using selected aids.

Clinicians treating patients with cognitive impairments can help reverse this trend—and the first step is to become familiar with the range of technology potentially useful to their patients.

Assistive Technologies for Cognition

The most important predictor of long-term success with ATC is careful selection of external aids to ensure they are well-matched to the user and the environment (Scherer et al., 2007). The assistive technology literature describes a wide variety of aids, ranging from low-tech tools designed for single-task guidance to highly technical devices that compensate for cognitive impairments across environments and task domains. Table 1 lists sample tools categorized by complexity and target task.

Digging Deeper...

From The Institute for Cognitive Prosthetics:

Imagine delivering intensive cognitive rehabilitation services from your clinic to any client's home that has the Internet. Patients can be treated no matter what the weather, no matter what the distance from the clinic. Imagine therapists being able to take full advantage of the patient's setting, so therapy is more effective, more engaging, more obviously useful.

The promise of computer technology for brain injury rehabilitation is achieved with the software suite and rehabilitation techniques of The Institute for Cognitive Prosthetics.

Since the mid 1980s, we have provided rehab technology for the continuum from full-day programs to add-in services. Our tools and technology have been extensively used in the treatment of patients by licensed therapists.
Newsletters

From respected experts in the field. This from Virginia Commonwealth University.

Source: http://www.vcu.edu/partnership/pda/documents/Newsletters.pdf
Agency Publications
This one by the Idaho Assistive Technology Project
University of Idaho
Then there are the blogs...

Source: http://assistivetek.blogspot.com
Apps for Seniors

More and more seniors are embracing the mobile technology revolution. They have embraced the technology and want to be able to engage like everyone else. This has been demonstrated at recent training I have provided at Touchmark on West Century (see picture below). Although individual’s needs and wants may be different there are some basic [...]
And a number of Assistive Technology Partnership(s)

Source: https://www.at4all.com
Professional Groups & Associations

Linkedin

Assistive Technology Professionals

Your message was successfully sent.

I am needing some help. Could anyone please suggest some funding sources for Assistive technology evaluation research? I am interested in working on the topic of AT devices evaluation especially those used by individuals with Cognitive disabilities. Any help is greatly appreciated. I could furnish further details too.

Follow Vishnu
Piya
1 day ago

Assistive Technology Professionals

What is your experience with the "latest and greatest" AT for individuals with cognitive disabilities?

Kathy Moeller, Certified Brain Injury Specialist
Inventor, Job Coach, Vocational Rehabilitation Consultant
Top Contributor

I am preparing a presentation on this topic for a state-wide conference (Oregon) for VR counselors next month and want to be sure I don’t exclude something just because I may not know about it. Your experiences with technology you are familiar with that work well, and why, would be particularly appreciated. Thanks in advance.
Feel free to send a private e-mail if appropriate (KathyM@CognitiveHorizons.com).
KathyM
What if you just want a simple list of options?
Facebook Resources

Assistive Technology for Cognition Community

Timeline | About | Photos | Likes

- People
  - 653 likes
  - Invite your friends to like this Page

About

- People with cognitive-behavioral challenges are finding creative ways to use PDAs, tablets and smart home technologies in building more productive.

Photos

- Assistive Technology for Cognition shared a link.
  - July 1, 12

App designers discuss "information overload" and what's coming to help us better manage our busy lives.

Photos

- What's Next for Getting Organized
  - www.thewhatandso.com

Four glimpses of a future without information overload.

Like | Comment | Share

3 people like this

Write a comment.
More Resources for Vocational Rehabilitation Counselors

Resources for Vocational Rehabilitation

Assistive Technology Screening & Evaluation Tools for individuals with cognitive disabilities:

Step 1: For all consumers: Challenges and AT Tools Checklists: Challenges Checklist for Worker with Cognitive Disability – STEP 1 of Screening Process and AT Checklist for Workers with Cognitive Disability.

Step 2: Use only if My Bionic Brain is being considered. Either the PowerPoint, Is My Bionic Brain Right for You? SCREENING TOOL – Is MBB Right for You or POF, SCREENING TOOL – Is MBB Right for You.

Step 3: For all consumers who are issued assistive technology: Post AT use Checklist: Post Checklist Assessing Issues Resolution.

Brain Injury Association of America Webinar, April 2014: OUTSMARTING BRAIN INJURY AND GETTING BACK TO WORK — PowerPoint and Handouts

OUTSMARTING BRAIN INJURY AND GETTING BACK TO WORK — April 2014 BIAA Webinar

For webinar recording and handouts: http://www.biausa.org/education/alternativewebinars

“Cue Don’t Rescue” – PowerPoint for Employers and Helpers

CUE.DONT.RESCUE – A PowerPoint for Employers and Job Coaches

Available at: http://blog.askkathym.com/resources-for-vocational-rehabilitation/
Conclusion ...

We all need help sorting through the options because the options are overwhelming and difficult to sort out.

and

Cognitive Prosthetics appear to be “anything and everything” that serves as an assistive device that supports cognition.
How much (or how little) does the VR Counselor need to know?

In an ideal world the VR counselor should know:

- Typical challenges that individuals with brain injury and other cognitive impairments are likely experiencing and why they are so difficult to work with
- How these challenges are ideally addressed (compensated for) for most workers most of the time
- How typical memory and executive function challenges impact the likelihood of successful use of assistive technology
- How the “Four Parts of Cognition” impact choice of accommodations, technologies and job matching
- Difference between “cognitive rehabilitation / cognitive exercise” model and the “compensatory skills training” model
- Role of each in the vocational rehabilitation process
- How to avoid creating vocational plans that set up an individual up for underemployment
- Danger of over-emphasis on the commonly heard expression, “Every brain injury is different” (and how many brain challenges are often very similar)
- How individuals with brain injury typically learn (especially the value of errorless learning and massed practice, coupled with the challenge of skills transfer)
- How to develop a good rapport with a consumer with cognitive challenges
- How to partner with a consumer to assess the individual’s strengths and challenges
- How to partner with a consumer to develop and assess the individual’s self-awareness and insight about their strengths and challenges
- How the double whammy of having an invisible disability factors into the counselor’s and consumer’s decision to use assistive technology
- How assistive technology the consumer has already tried (if any) impacts outcome and/or rejection of options
- How to foresee if the assistive technology options being considered are likely to be successful
- How technical support will be handled, and by whom
- Other counselors’ or AT staff’s or successful consumers’ experience with various AT options
- How to interpret medical and neuropsychological reports
- Role of nurturing a “Cue Don’t Rescue” culture and practice in support of sustainable, long-term employment
- How a “Cue Don’t Rescue” environment supports workers’ sense of empowerment and long-term self-reliance
- Best practice with respect to the role of skills trainer, job coach, peer mentor and job developer, including ideal training and experience for each
- Why return-to-work outcomes for individuals with brain injury are so low
- Why the cost for successful return-to-work outcomes for individuals with brain injury is so high
- What factors contribute to higher-than-average long-term return to work outcomes?
- How the debate about whether brain injury is a physical or mental health disability matters
Typical Challenges following Brain Injury


Based on Research by TBI Model Systems

What is cognition? Cognition is the act of knowing or thinking. It includes the ability to choose, understand, remember and use information. Cognition includes:

– Attention and concentration
– Processing and understanding information
– Memory
– Communication
– Planning, organizing, and assembling
– Reasoning, problem-solving, decision-making, and judgment
– Controlling impulses and desires and being patient
Brain injury is one of the most challenging disabilities to deal with

Thinking / Cognitive Symptoms

See all cognitive symptoms content

"I was trying to hide my struggle from my family and the team," says retired NHL hockey player Pat LaFontaine, after he experienced a concussion. “I would lie there questioning what was wrong with me. My thoughts were all over the place, so I tried to stop thinking.... I remember trying to read a story to my two daughters. We were sitting in bed and I was trying to keep my focus and concentration on reading that story. I started to skip words. I went back and tried to say the words again. I was ahead of myself and didn’t comprehend the story. I was focusing on just trying to read the words right and getting very concerned when I couldn’t. Finally I put the book down and told the girls I was sorry but I didn’t feel like reading.”

Like Pat, many people have sustained a concussion and walked away only to later find that their lives are somehow different after the injury. They may not realize that their changes in mood, behavior, and thinking abilities may have been altered by TBI. Because these invisible impairments tend to go undetected, they can often plague a person’s life for weeks, months, or even years.

http://www.brainline.org/landing_pages/categories/cognitivesymptoms.html
Importance of the Cognitive Loop
The Four Parts of Cognition in the Cognitive Loop
The Four Parts of Cognition in the Cognitive Loop

• Information Capture
The Four Parts of Cognition in the Cognitive Loop

• Information Capture
• Information Storage
The Four Parts of Cognition in the Cognitive Loop

- Information Capture
- Information Storage
- Information Retrieval
The Four Parts of Cognition in the Cognitive Loop

• Information Capture
• Information Storage
• Information Retrieval
• Information Use
Mild vs. Moderate vs. Severe Injury

The cognitive system is integrated and complex. Even a slight disruption in the “loop” can cause significant impairment on the job.

Do not be surprised if a diagnosis of “mild” injury requires significant compensatory tools and skills training.
Mild vs. Moderate vs. Severe Injury

The greater the damage, the more likely there will be more involved impairment with associated functional challenges.

And when any of the impairments are *invisible*, success on the job can be even more challenging.
Mild vs. Moderate vs. Severe Injury

You get the picture . . .
The CAPTURE Challenge

Seriously?
“If it’s important you’ll remember it”

It doesn’t work that way. It’s like saying the “The important spaghetti sticks.”
The STORAGE and RETRIEVAL Challenge
The USE Challenge
(and the problem with TO DO Lists)
Cognitive Rehabilitation Models

Cognitive Exercise vs. Compensatory Skills Training
Cognitive Exercise vs. Compensatory Skills Training

The former is based on a physical therapy model.

The latter is based on a wheelchair, orthotics or prosthetics model.

Assistive Technology generally, and Cognitive Prosthetics specifically, fit into the latter category.
Exercise Model

BRAIN TRAIN® Cognitive Retraining software: http://www.brain-train.com

Lumosity: http://www.lumosity.com

Memory and Attention Exercises: http://www.brainhq.com/why-brainhq/about-the-exercises/memory
What if we all got compensatory skills-based rehab?

Consumers present their perspectives in terms of recovery, not rehabilitation, this being a long-term outcome process which is not complete until restoration of quality of life is established and maintained. Therefore, an important “discovery” of this paper is to recognize that different languages are being spoken in reference to goals by the medical/scientific community compared to the language of consumers and families. Consumers face an ongoing search for access to systems and appropriate services when talking about “rehabilitation goals.”

Kathy Mosler is a skills trainer and creator of the Brain Book® Life Management System; a compensatory skill and residual strength building program for persons with brain injury. Kathy experienced a brain injury in 1990, but received appropriate acute care, 5 months in residential program therapy and 9 months of outpatient treatment to in which she learned how to apply new life skills to a professional environment. In her 1994 first published article post trauma, “Compensatory Skills Training,” she states:

I am passionate about the value of practical compensatory skills training because solid strategies are essential for people with head injury to succeed at work. Many of my peers would be working, too, if they were given the opportunity to learn how to compensate. The main difference between my situation and the situations of many of my clients is that many of the individuals with whom I work enter the vocational rehabilitation process without receiving much in the way of compensatory skills training. Based on the so called “medical model,” many people with head injury are discharged from acute care, deemed medically stable and ready to return to their homes and families—with little or no cognitive rehabilitation therapy.

It saddens me to encounter people exactly like myself who receive little or no follow-up care for practical compensatory skills development. Often, they do not realize that they are lacking in this area. What they do know is that things are not working right, they are hurting, and they need ‘something’, not quite knowing what that ‘something’ is.” (Moeller, 1994)
“Many of my peers would be working too, if . . .”

Kathy Moeller is a skills trainer and creator of the Brain Book® Life Management System, a compensatory skill and residual strength building program for persons with brain injury. Kathy experienced a brain injury in 1990, but received appropriate acute care, 5 months in residential program therapy and 9 months of outpatient treatment to in which she learned how to apply new life skills to a professional environment. In her 1994 first published article post trauma, “Compensatory Skills Training,” she states:

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Quote from NIH article 1999

Discussion with Bob Woodruff, Seattle University, July 2011

“Things haven’t changed much (since 1994)”
1994 To 2014 -- 20 years later

<table>
<thead>
<tr>
<th>Then</th>
<th>Now</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
Cognitive Prosthetics were inevitable

NeuroPage®

BrainAid’s PEAT™

My Bionic Brain® Work Manager

BRAIN BOOK® Life and Work Manager

More:
http://www.productiveandorganized.net/2011/01/10-reminder-systems-for-you-to-consider.html
How to establish a productive working relationship with the consumer

- Brain injury is confusing to people who don’t have one. It’s natural to want to say something, to voice an opinion or offer advice, even when we don’t understand... it’s (also) easy to get burnt out and say things out of frustration. Here are a few things you might find yourself saying (or thinking) that are probably not helpful:

http://www.brainline.org/content/2012/10/9-things-not-to-say-to-someone-with-a-brain-injury.html
Things to NOT say (or even think):

1. You seem / look fine to me.
2. Are you sure you just aren’t trying hard enough?
3. You’d make more progress if you weren’t so negative.
4. How many times do I need to tell you (reschedule appointments), etc.?
5. Do you have any idea how much I do (the agency is doing) for you?
6. Your problem could be all the medications you take.
7. Let me (job coach, co-worker, employer) do that for you.
8. Try to think more positively.
9. You’re lucky to be alive.
10. That happens to all of us.
11. You need to lower your expectations.
12. Don’t you remember ________?
How to partner with a consumer to assess strengths and challenges

For downloadable copy go to http://blog.askkathym.com/resources-for-vocational-rehabilitation/

**CHALLENGES Checklist**

<table>
<thead>
<tr>
<th>Consumer: __________________</th>
<th>Date: __________</th>
<th>VR Counselor: __________________</th>
</tr>
</thead>
</table>

The purpose of this questionnaire is to identify current workplace challenges and stressors. Please answer the following questions to the best of your ability.

**How often . . .**

<table>
<thead>
<tr>
<th>Do my memory problems interfere with getting things done on time?</th>
<th>Never</th>
<th>Seldom</th>
<th>Often</th>
<th>Depends</th>
<th>Comments</th>
</tr>
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<tbody>
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<tr>
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</tbody>
</table>

**Challenge not listed:**

**Challenge not listed:**
Ask about Previous Experience with Assistive Technology

<table>
<thead>
<tr>
<th>Check Box</th>
<th>Not used</th>
<th>Somewhat effective</th>
<th>Effective</th>
<th>N/A</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Email (Email, Text, Instant Messaging)</td>
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<td>Text messages</td>
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<td>Telephone</td>
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<td>Computer</td>
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<td>Web-based applications</td>
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<td>Print calendars</td>
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<td>Reusable calendars</td>
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<td>Smart phone</td>
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<td>Lap top computer</td>
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<td>Leslie calendar</td>
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<td>Digital calendar</td>
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Use this space below to describe other issues not listed above:

*Note: VR Counselor's Questionnaire (Tools & Technologies) for Consumer*
# Post Checklist

The purpose of this questionnaire is to evaluate the resolution of various challenges following your use of Assistive Technology.

## When I use my Assistive Technology, this is how often . . .

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How much (or how little) does the Consumer need to know?

In an ideal world the educated consumer would know:

- Typical challenges
- How the “Four Parts of Cognition” impact choice of accommodations, technologies and job matching
- Their specific strengths and challenges
- How assistive technology they have already tried (if any) impacts outcome and/or rejection of options
- How to seek help from a successful peer mentor
- How to ask for assistance from their Voc Rehab counselor
- How a “Cue Don’t Rescue” culture supports sustainable, long-term employment
How prosthetic cognition can help workers **TODAY**

These are the most common work-place “deal breakers.” Explore assistive technology solutions that support the worker’s ability to:

- remember to do things they need or want to do at work
- remember (or be able to find) work instructions and workplace tools
- capture information they are not likely to remember

- find information and documents they need when they need it
- plan their time well
- make decisions and solve problems
- manage troubling feelings and impulsive behaviors

- communicate effectively
- organize their priorities
- transfer skills and tools from one situation to another and one job to another
- manage all the “soft skills” related to success on the job
The supports will be effective **IF** they fill all the gaps in the Cognitive Loop?

Ask:

Does solution under consideration support the connection of *all four parts* of the Cognitive Loop?
To what degree does the individual need an ordinary working memory to fill the gaps in the cognitive loop in order to use the solution effectively?
Also

- How is use of the technology supported?

- What is the role of reasonable accommodations?

- How important is the job match?
Resources for technology, compensatory skills training and other supports

AbleLink: http://www.ablelinktech.com

RJ Cooper: http://www.rjcooper.com

Virginia Commonwealth University, Assistive Technology for Cognition Laboratory: http://www.sahp.vcu.edu/occu/research/at_cognition.html

For Oregon specifically: Access Technologies: http://www.accesstechnologiesinc.org

The AskKathyM blog: http://blog.AskKathyM.com
A Respected Specialist’s Overview

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.

<table>
<thead>
<tr>
<th>App</th>
<th>Function</th>
<th>$US</th>
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</thead>
<tbody>
<tr>
<td>Voice4U*</td>
<td>Includes a library of picture and voice prompts (for individuals with speech difficulties). Allows download of your own photos and audio prompts</td>
<td>$29.99</td>
</tr>
<tr>
<td>Proloquo2Go</td>
<td>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</td>
<td>$189.99</td>
</tr>
<tr>
<td>iConversation</td>
<td>Offers pre-loaded pictures and storyboards/roles (e.g., schedule) that facilitate language comprehension</td>
<td>$34.99</td>
</tr>
<tr>
<td>Speak it!*</td>
<td>Copy or type text for text-to-speech. Uses natural sounding voices</td>
<td>$1.99</td>
</tr>
<tr>
<td>TapToTalk*</td>
<td>Designed for children, picture-based icons that talk. Free, but annual $100 subscription for self-designed library.</td>
<td>Free</td>
</tr>
<tr>
<td>iMean</td>
<td>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.</td>
<td>$4.99</td>
</tr>
<tr>
<td>Type-N-Talk</td>
<td>Type text for robotic speech. Free, but comes with advertisements. Nice demo tool.</td>
<td>Free</td>
</tr>
<tr>
<td>Talk Assist</td>
<td>Type text for robotic speech. Free, no ads, saves history of phrases. Better demo tool.</td>
<td>Free</td>
</tr>
<tr>
<td>Locabulary</td>
<td>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.</td>
<td>Free</td>
</tr>
<tr>
<td>iBaldi</td>
<td>A talking head with cross-section of tongue and mouth movements, for learning to speak.</td>
<td>$1.99</td>
</tr>
<tr>
<td>Dragon Dictation*</td>
<td>Speak text and see it printed, must have wi-fi for it work.</td>
<td>Free</td>
</tr>
<tr>
<td>Talking Tom*</td>
<td>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.</td>
<td>Free</td>
</tr>
<tr>
<td>Voger*</td>
<td>Use your device as a walkie-talkie for wi-fi chat with other Voger users.</td>
<td>Free</td>
</tr>
<tr>
<td>Google Translate*</td>
<td>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.</td>
<td>Free</td>
</tr>
</tbody>
</table>

Gentry-VCU-2013

For more information or updates, contact Dr. Gentry at Virginia Commonwealth University: Logentry@vcu.edu
Using a Handheld Computer as a Cognitive-Behavioral Tool
Tony Gentry, PhD OTR/L
Virginia Commonwealth University
Assistive Technology for Cognition Laboratory
Department of Occupational Therapy

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, 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 FBA 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 routines, 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, Periodic and HomeMates 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. SimplyBreathe, 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 Point 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 tngentry@vcu.edu.

Download at:
What the future holds
Next ten years . . .

● Choosing solutions will continue to be challenging and overwhelming for the next decade, especially as individuals with cognitive challenges are encouraged to try to myriad of off-the-shelf solutions that are designed for non cognitively-impaired individuals.

● Future products that specialize in use by individuals with brain injury will start to better address the cognitive loop challenge.

● To the degree that they successfully accomplish this, they will be adopted.

● Individuals with brain injury will play an increasingly larger role in their development and adoption.

● More work-focused solutions will be forthcoming.

● Competition will increase and prices will come down over time.

● Someday the question will not be “Should the individual have assistive technology?” but “What is the BEST assistive technology for this particular individual?”
Perspective

Once upon a time...

Circa 1595  2014
38 short years ago ...

Circa 1976

“The Apple I was sold as an assembled circuit board and lacked basic features such as a keyboard, monitor, and case.

The owner of this unit added a keyboard and a wooden case.”

Source:
http://en.wikipedia.org/wiki/History_of_Apple_Inc.#Pre-foundation
38 years later
Imagine what we’ll have less than 38 years from now?

- Neural implants
- Interfaces between neural systems and computer chips
- Brain “pacemakers”
- Cell phone transmitters surgically implanted underneath skin behind the ear
- Wearable **Evernote®, Awesome Note, My Bionic Brain®**
- Google Glass and multiple competitors
QUESTION:

To be effective for individuals with brain injury, what will the new technology all need to be capable of?
ANSWER:

They will close all the gaps in the Cognitive Loop

Information CAPTURE

Information STORAGE

Information RETRIEVAL

Information USE
QUESTION:

To be effective for individuals with brain injury, what does a person’s current "low tech" solution need to be capable of?
ANSWER:

*They will close all the gaps in the Cognitive Loop*

Information **CAPTURE**

Information **STORAGE**

Information **RETRIEVAL**

Information **USE**
QUESTION:

And when you consider hi-tech options that are available now, what does the proposed solution need to be capable of?
ANSWER:

They will close all the gaps in the Cognitive Loop

Information CAPTURE

Information STORAGE

Information RETRIEVAL

Information USE
Our collective challenge is to ...

Recognize that:

(1) Assistive Technology for cognitive impairment is difficult to understand and assess, and

(2) Brain injuries and cognitive disabilities from other etiologies are even more difficult to understand.

Yet, as a community of individuals with cognitive disabilities and our service providers, until we all understand BOTH well, successful outcomes will continue to low.
If this is overwhelming to those of us in service to workers with cognitive challenges (and it is), imagine sorting through these options as a consumer, particularly in the absence of good cognitive rehabilitation.

The disability it is not only difficult to live with, work with and cope with, the injury itself is difficult for the person experiencing it to understand.

*Please remember. . . For the worker to be successful on the job, ALL FOUR PARTS OF THE COGNITIVE LOOP need to be “present and accounted for”*
To recap:
“Low tech” Solutions
Parts 1 and 2: CAPTURE & STORAGE
Parts 3 and 4: 
“Low tech” RETRIEVAL & USE
More low-tech examples of RETRIEVAL & USE
Hi-tech Options for Parts 1 and 2: Capture & Storage
Parts 3 & 4:
Examples of “Hi-tech” RETRIEVAL & USE
The design challenge

“The problem is that most Assistive Technologies used by people with cognitive disability are not designed for those people so it’s more about finding a coping strategy for using that technology which is a lot less hassle than the coping strategy for not using the technology.”

Gareth Ford Williams
Head of Accessibility
Future Media at BBC
From “VR Research in Brief”
(emphasis in red added)

The State-Federal VR System and People with TBI

- The State-Federal Vocational Rehabilitation (VR) system is not well known to people with TBI. In a sample of people who had been hospitalized with a brain injury, only about one-third were aware of their state’s VR program (Sykes-Horn, Wrigley, Wallace, and Yoels, 1997). This may account at least in part for the fact that the number of individuals served by the entire VR system each year is a small fraction (5–6 percent) of the number of working-age people hospitalized with TBI each year, which is estimated at 120,000 (Langlois, Rutland-Brown, and Thomas, 2004). The clear implication is that better outreach from the VR system to people with TBI is needed, both those newly injured and those who have chronic injuries and remain unemployed.

- Greater outreach is warranted, as research also shows that the number of people with TBI who fail to return to work is relatively great. Although estimates vary across studies (for many reasons), data from the Colorado state registry of all people hospitalized with a brain injury in that state shows that about one-half had not returned to work by one year after the injury (Whiteneck, Mellick, Brooks, Harrison-Felix, Noble, and Terrill, 2001).

- A second study, by Kendall and colleagues, found that this rate falls to about a 20 percent failure rate at ten years after injury (Kendall, Muenchberger, and Gee, 2006).

- Their study also showed that VR services helped only about 50 percent of those served. This study points to a problem with most research that has been done on returning to work after TBI: outcome is assessed at only a single point. But despite the limitations of available research, the fact that retention of employment is a huge problem for people with TBI is well-established. Thus, it is not at all clear from the research described below that what helps a person make a start in an employment setting will keep him or her there.

Source: http://www.statedata.info/
Return-to-work statistics for individuals with brain injury

Question: What is the total percentage of individuals with a diagnosis of Traumatic Brain Injury that successfully return to the workplace for at least 90 days after placement and what is the average and range of length of time from opening to closure of case?

Answer:

“The RSA-911 contains closed case data information for all 80 VR agencies. For cases closed during FY 2013, there were 8,978 individuals with a Traumatic Brain Injury. Among them, 2,618 (29.3%) were closed successfully with employment outcomes. The average length of time for 2,618 cases in VR from application to closure is 2.57 years with minimum 0.16 years to maximum 16.46 years.”

Source, or to request more information: Joe.Pepin@ed.gov
VR Outcomes for individuals with TBI, All other Cognitive Impairments, and all others not belonging to one of those groups in 2012

Source: Rehabilitation Services Administration 911 data for 2012

State VR Programs serve over 1 million individuals annually. Approximately 600,000 individual exit VR programs each year. VR outcomes and experiences for these 600,000 exiters are reported in the RSA 911 data files. This data report uses RSA 911 data to summarize outcomes for exiters with Traumatic Brain Injury, all other Cognitive Impairments (no TBI), and all others not in those categories. Data are also split by whether or not the impairment was indicated as significant in the individual’s case record.

DATA INCLUDED IN THIS REPORT
- Total # VR exiters in 2012 – Table 1
- % of individuals with TBI that successfully return to the workplace for at least 90 days after placement – Table 2
- What % of the time do people who return to the employment work – Table 3
- The average length of time a case is open in months or range of months – Tables 4 and 5
- The average cost and/or range to the VR agency – Tables 6 and 7

DATA REQUESTED BUT NOT INCLUDED BECAUSE IT IS NOT AVAILABLE IN THE RSA 911
- Total number of brain injured workers, otherwise cognitively impaired individuals, and all disabled workers annually seeking state Vocational Rehab services in the U.S
- The average cost of job development
- The average cost of job coaching

Table 1. Number of individuals who exited VR programs in 2012 by TBI and other disability status

<table>
<thead>
<tr>
<th></th>
<th>No significant disability</th>
<th>Significant disability</th>
<th>Total</th>
<th>Column %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Count</td>
<td>Count</td>
<td>Column %</td>
</tr>
<tr>
<td>TBI</td>
<td>411</td>
<td>8,140</td>
<td>8,551</td>
<td>2%</td>
</tr>
<tr>
<td>All other Cognitively Impaired</td>
<td>11,471</td>
<td>129,834</td>
<td>141,305</td>
<td>27%</td>
</tr>
<tr>
<td>All others: no TBI or other Cognitive Impairment</td>
<td>40,559</td>
<td>331,772</td>
<td>372,331</td>
<td>71%</td>
</tr>
<tr>
<td>Total</td>
<td>52,441</td>
<td>469,746</td>
<td>522,187</td>
<td>100%</td>
</tr>
</tbody>
</table>

www.StateData.info
Institute for Community Inclusion
UMass Boston
<table>
<thead>
<tr>
<th></th>
<th>No significant disability</th>
<th>Significant disability</th>
<th>Total</th>
<th>Column %</th>
</tr>
</thead>
<tbody>
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<td></td>
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<td>331,772</td>
<td>372,331</td>
<td>71%</td>
</tr>
<tr>
<td>Total – All disabilities</td>
<td>52,441</td>
<td>469,740</td>
<td>522,187</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 1 summary: Individuals with TBI were approximately 2% of all people who exited state VR programs in 2012. Most individuals with TBI who exited (95%) were marked has having a significant disability. Comparatively, 92% of other cognitively impaired individuals and 89% of all others with no TBI or cognitive impairment had a significant disability.
<table>
<thead>
<tr>
<th>Table 2. Closure status for individuals who exited VR programs in 2012 by TBI and other disability status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>TBI</strong></td>
</tr>
<tr>
<td>Applicant, before a determination of eligibility</td>
</tr>
<tr>
<td>Applicant, after EE, before elig.</td>
</tr>
<tr>
<td><strong>Closed after an employment outcome</strong></td>
</tr>
<tr>
<td>Closed after services initiated, no employment outcome</td>
</tr>
<tr>
<td>Closed after elig., before services w/IPE initiated</td>
</tr>
<tr>
<td>Closed after elig., from order of selection</td>
</tr>
<tr>
<td>Closed after elig., before Indiv. plan for employment (IPE)</td>
</tr>
<tr>
<td><strong>All other Cognitively Impaired</strong></td>
</tr>
<tr>
<td>Applicant, before a determination of eligibility</td>
</tr>
<tr>
<td>Applicant, after EE, before elig.</td>
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<td><strong>All others: no TBI or other Cognitive Impairment</strong></td>
</tr>
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<tr>
<td>Closed after elig., before Indiv. plan for employment (IPE)</td>
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<tr>
<td><strong>Total – All disabilities</strong></td>
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<tr>
<td>Applicant, before a determination of eligibility</td>
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<tr>
<td>Closed after elig., from order of selection</td>
</tr>
<tr>
<td>Closed after elig., before Indiv. plan for employment (IPE)</td>
</tr>
</tbody>
</table>
Table 2 summary: When an individual exits their VR program, a VR counselor assigns a “closure status” to each individual. The ideal outcome is that a person exits with an employment outcome. As Table 2 shows, about 35% of all individuals who exited VR in 2012 exited with an employment outcome. Looking at the four disability groups in Table 2 we see that when compared to the other groups, individuals with TBI have a lower rate of exiting into employment than individuals from other disability groups. This is true for people with TBI who do or do not have a significant disability.

Table 3. Average hours worked per week at closure for individuals who exited VR programs in 2012 by TBI and other disability status (only includes individuals who exited with a job)

<table>
<thead>
<tr>
<th></th>
<th>No significant disability</th>
<th>Significant disability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBI</td>
<td>36</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>All other Cognitively Impaired</td>
<td>33</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>All others: no TBI or other Cognitive Impairment</td>
<td>35</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Total – All disabilities</td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 3 summary: Looking at the four disability groups in Table 3, we see individuals with TBI who exit their VR program with a job work fewer hours per week on average than individuals from other disability groups. For all disability groups in Table 3, individuals with a significant disability work fewer hours per week on average than those without a significant disability.

Table 4. Days from application for VR services to exit from VR services for individuals who exited VR programs in 2012 by TBI and other disability status

<table>
<thead>
<tr>
<th></th>
<th>No significant disability</th>
<th>Significant disability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBI</td>
<td>Mean</td>
<td>Median</td>
<td>Min.</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>154</td>
<td>1</td>
</tr>
<tr>
<td>All other Cognitively Impaired</td>
<td>457</td>
<td>232</td>
<td>1</td>
</tr>
<tr>
<td>All others: no TBI or other Cognitive Impairment</td>
<td>351</td>
<td>182</td>
<td>1</td>
</tr>
<tr>
<td>Total – All disabilities</td>
<td>374</td>
<td>191</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4 summary: The number of days an individual is in the VR system, from the day they apply until the day they exit, can be an indicator of how well the VR system is equipped to serve individuals and can also be an indicator of how challenging it is for certain groups to complete a VR program. Looking at the columns for mean in Table 4, we see that individuals with TBI are typically in the VR system for longer than individuals from other disability groups. Not surprisingly, having a significant disability increases the amount of time and individual is in the VR system.
Table 5. Days from application for VR services to exit from VR services for individuals who exited VR programs in 2012 by TBI and other disability status (only includes individuals who exited with a job)

<table>
<thead>
<tr>
<th></th>
<th>No significant disability</th>
<th>Significant disability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>Min.</td>
</tr>
<tr>
<td>TBI</td>
<td>750</td>
<td>459</td>
<td>112</td>
</tr>
<tr>
<td>All other Cognitively Impaired</td>
<td>823</td>
<td>581</td>
<td>70</td>
</tr>
<tr>
<td>All others: no TBI or other Cognitive Impairment</td>
<td>487</td>
<td>295</td>
<td>77</td>
</tr>
<tr>
<td>Total – All disabilities</td>
<td>548</td>
<td>322</td>
<td>70</td>
</tr>
</tbody>
</table>

Table 5 summary: Not everyone in Table 4 is someone who exited with a job. When looking at the amount of time an individual is in the VR system, it is interesting to look at the subgroup of individuals who exited with a job. This is the group shown in Table 5. Looking at the columns for mean in Table 5, we see that individuals with TBI who exit with a job are typically in the VR system for longer than individuals from other disability groups. Not surprisingly, having a significant disability increases the amount of time an individual is in the VR system. Typically, individuals with TBI who exit with employment are in the VR system for over 2 years before exiting with a job.
Table 6. Total cost of services purchased from VR for individuals who exited VR programs in 2012 by TBI and other disability status

<table>
<thead>
<tr>
<th></th>
<th>No significant disability</th>
<th>Significant disability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>Min.</td>
</tr>
<tr>
<td>TBI</td>
<td>$1,050</td>
<td>$20</td>
<td>$0</td>
</tr>
<tr>
<td>All other Cognitively Impaired</td>
<td>$956</td>
<td>$79</td>
<td>$0</td>
</tr>
<tr>
<td>All others: no TBI or other Cognitive Impairment</td>
<td>$1,449</td>
<td>$65</td>
<td>$0</td>
</tr>
<tr>
<td>Total — All disabilities</td>
<td>$1,338</td>
<td>$66</td>
<td>$0</td>
</tr>
</tbody>
</table>

Table 6 summary: Another metric that is interesting to look at is the total cost of services provided an individual while they were in their VR program. Compared to individuals with other disabilities, the mean cost of services purchased for individuals with TBI is typically higher. It should be noted that VR programs provide a wide range of services. Unfortunately, the RSA 911 does not allow us to know specifically how much was spent on the different services provided. It is also important to note that the cost of providing VR services may be miniscule when compared to the reduction in costs for public program transfers if a person gains sustainable employment.

Table 7. Total cost of services purchased from VR for individuals who exited VR programs in 2012 by TBI and other disability status (only includes individuals who exited with a job)

<table>
<thead>
<tr>
<th></th>
<th>No significant disability</th>
<th>Significant disability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>Min.</td>
</tr>
<tr>
<td>TBI</td>
<td>$4,644</td>
<td>$3,412</td>
<td>$0</td>
</tr>
<tr>
<td>All other Cognitively Impaired</td>
<td>$3,229</td>
<td>$1,345</td>
<td>$0</td>
</tr>
<tr>
<td>All others: no TBI or other Cognitive Impairment</td>
<td>$4,286</td>
<td>$2,600</td>
<td>$0</td>
</tr>
<tr>
<td>Total — All disabilities</td>
<td>$4,099</td>
<td>$2,466</td>
<td>$0</td>
</tr>
</tbody>
</table>

Table 7 summary: Not everyone in Table 6 is someone who exited with a job. When looking at the cost of services purchased for an individual while they were in the VR system, it is interesting to look at the subgroup of individuals who exited with a job. This is the group shown in Table 7. Compared to individuals with other disabilities, the mean cost of services purchased for individuals with TBI is typically higher. It should be noted however that these are individuals who exited VR with employment, a very positive economic outcome.

For more information contact: Frank.Smith@umb.edu
Three Things to take away with you today!

1. The Four Parts of the Cognitive Loop

The successful IPE will support the Worker’s need to navigate the workplace “mine field” such that they are able to manage all four parts of cognition:

- **CAPTURE** Information
- **STORE** Information
- **RETRIEVE** Information
- **USE** Information
2. The Five Parts of a good Plan

The successful IPE will give consumers the S.T.E.A.M. they need to be successful – *in this order!*

S  STRATEGIES

T  ECHNOLOGY

E  DUCATION

A  CCOMMODATIONS

M  ATCH (GOOD JOB MATCH)
3. **Know your consumer’s CHALLENGES**


To obtain master for duplication:

Dark Ages no more...

When faced with the challenge that our various cognitive inconveniences present to us, regaining function is no longer a mystery...

“It’s time to celebrate the fact that we’ve started to crack the code... it’s all about closing gaps in the Cognitive Loop with smart prosthetic cognition.”

Kathy Moeller
Spring 1998
Thank you for your time.

E-mail: KathyM@CognitiveHarmonics.com
Website: www.CognitiveHarmonics.com
Cell: 541.772.3465
Fax: 971.244.7282

To stay up-to-date with resources I develop or learn about, you are invited to subscribe to my “Ask Kathy M” Blog. To subscribe go to: http://blog.AskKathyM.com
What was the question?

http://www.youtube.com/watch?v=HzSaoN2LdfU