A Bridge to Where?
“I had never had a place of my own. As a result, I had never worried about buying groceries and planning meals, paying the rent and the phone bill, balancing a checkbook, making appointments, figuring out how to keep the appointments I made – all the things adults just do. But starting out in society at the age of 28, I found these everyday tasks confusing, wonderful, and frightening.” (p. 202)
A Bridge to a Bright Future...
When I grow up, I want...

...to file all day.

...to be replaced on a whim.

...to be underappreciated.

...to paid less for doing the same job.
A Bridge to Where?
Building the Bridge: Changing How We Think About Disability
Historic Understandings of Disability

- Historically, disability was understood within a model that was an extension of the medical model, which conceived health as an *interiorized state* and health problems as an *individual pathology*; a problem within the person.

- Within such a context, disability was understood as a characteristic of the person; as residing with the person.
  - The person was seen as broken, diseased, pathological, atypical, or aberrant; as outside the norm.
  - Perhaps unavoidably, people with disabilities were, consequently, associated with numerous negative stereotypes.
  - Particularly with introduction of Mental Age estimates, led to “infantilization” of people with disabilities.
Changing Understandings

- In the context of health care, it became apparent by the late 1970s that individual pathology models offered a far too narrow perspective for effectively describing, understanding, and addressing the problems of people experiencing chronic or pervasive health issues, including disability.

- In 1980, the World Health Organization introduced the International Classification of Impairments, Disabilities, and Handicaps (ICIDH).
  
  - The ICIDH perspective for describing the impact of a health condition or pathology on human functioning were: (a) the *exteriorization of a pathology* in body anatomy and functions; (b) *objectified pathology* as expressed in the person’s activities (e.g. adaptive behavior skills), and (c) the *social consequences of pathology* (e.g. participation in social life domains).

- Later, (ICF, 2001) it was recognized that besides the impact of health condition factors (pathology), contextual and environmental factors are of pivotal importance for understanding human functioning.
  
  - Human functioning is best understood in the context of a person-environment fit or interaction model.
Changing Expectations: Changing Understanding

Disability

Personal Incompetence
Changing Expectations: Changing Understanding
Changing Expectations: Changing Understanding

Disability

Personal Competence

Environment
Implications of Changing Understandings of Disability

- Strengths-based
- Focus on environment/context, not fixing individual;
- Emphasizes supports, not programs
Supported Employment
This Matters

Supports

- Resources and strategies that:
  - promote the interests and causes of individuals with or without disabilities;
  - enable them to access opportunities, information, and relationships inherent within integrated work and living environments;
  - result in enhanced interdependence, productivity, community inclusion, life satisfaction, and human functioning.

- Personalized array of supports
An Array of Supports

- Specialized Services
- Generic Services
- Nonpaid Supports
- Family & Friends
Building the Bridge: Self-Determination and Transition in the 21st Century
Transition Principles for Empowerment

- Transition interventions should be designed to be maximally under the control of the individual, rather than others;
- Transition interventions should be designed to facilitate individual independence and autonomy;
- The least restrictive means that are still effective should be used; and
- The most natural interventions for the particular work environment should be used.
What is Self-Determination?

Self-Determination is a dispositional characteristic manifested as acting as the *causal agent* in one’s life. Self-determined people (i.e., causal agents) act in service to freely chosen goals. Self-determined actions function to enable a person to be the causal agent is his or her life.

*Causal agency*: To make or cause something to happen in one’s life.

*Volitional action*: Making a conscious choice or decision with deliberate intention.
Self-Determination and Disability

Within the context of the disability rights and advocacy movement, the construct as a personal characteristic has been imbued with the empowerment and “rights” orientation typically associated with the sense of the term as a national or political construct. Empowerment is a term usually associated with social movements, and typically is used, as Rappaport (1981) stated, in reference to actions that “enhance the possibilities for people to control their lives” (p. 15).
Self-Determination and Determinism

- The philosophical doctrine of determinism posits that actions are *caused* by events or natural laws that precede or are antecedent to the occurrence of the action. Behavior, then, is governed by these other events or natural laws.
Self-Determination and Determinism

- Self-determinism, or self-determination, implies that individuals *cause* themselves to act in certain ways, as opposed to someone or something else ‘causing’ us to act in certain ways.

- People who are self-determined embody the characteristic or quality of ‘self-determination,’ a noun referring to the degree to which that person acts or behaves in ways that are self- (instead of other-) caused.
"People with autism should be treated with the same dignity, respect, and equality as people without autism.” Jean-Paul Bovee

"We don't have to be told what self-determination means. We know it is just another word for a life filled with rising expectations, dignity, respect and opportunities.“ Robert Williams
What Do We Know About Self-Determination?

- People with disabilities are less self-determined than their non-disabled peers.
  - Seems clear that this is primarily because people with disabilities have fewer opportunities to make choices and express preferences across their daily lives.
- The environments in which people with disabilities live, learn, and work limit the development of self-determination.
- IQ is positively correlated (r=.15 to.20) with self-determination, but not predictive of self-determination status (high vs. low SD group).
  - IQ is predictive of where one lives/works, which in turn is predictive of self-determination status.
- Choice-making opportunities vary across environments, but those opportunities are strong predictors of self-determination status.
- Self-determination status predicts membership in higher quality of life groups.
What Do We Know About Self-Determination?

- Adolescents with disabilities who leave school as self-determined young people:
  - Are more independent one year after graduation.
  - Are more likely to live somewhere other than where they lived in high school one year after graduation.
  - Are significantly more likely to be employed for pay at higher wages one year after graduation.
  - Are significantly more likely to be employed in a position that provides health care, sick leave, and vacation benefits three years after graduation.
  - Are significantly more likely to live independently three years after graduation.

- Adults with disabilities rank self-determination as more important than do professionals and parents/family members.

- Teachers working with students with disabilities report that:
  - they are familiar with self-determination;
  - believe self-determination is an important component of education;
  - believe that student involvement in education planning is important;

- Parents of school-age students with disabilities perceive promotion of self-determination as important.
  - Report that they do not believe that their sons/daughters receive enough instruction on component elements of self-determined behavior at school.
What Do We Know About Self-Determination?

- Despite wide acceptance of the importance of self-determination, research has consistently found that explicit instruction to promote self-determination is limited.
  - Educational goals addressing self-determination are not included on many educational programs.
- Research identifies as barriers to the promotion of self-determination:
  - Teacher beliefs about whether the student will benefit tied to student level of disability;
  - Insufficient training to and knowledge about promoting self-determination.

- Meta-analytic (group and single-subject design) studies show that students with disabilities can acquire component elements if taught.
  - Student-directed learning strategies particularly powerful.
- Research documents that students with disabilities are not actively engaged/involved in educational planning meetings.
  - Research has also shown that students with disabilities can learn the skills to be active participants in their education planning meetings.
- Research suggests that student involvement has a reciprocal effect with self-determination. That is, students who are more self-determined are more likely to be involved in their educational planning, but getting students involved in their planning— independent of their level of self-determination—enhances self-determination.

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Five Year Longitudinal Study
(Wehmeyer, Palmer, Shogren,
Williams-Diehm, & Soukup, 2013)

- Purpose: Examine the effects of interventions to promote self-determination
- Randomized trial, placebo control group design study
- 50 school districts in six states (Arkansas, Kansas, Missouri, Nebraska, Oklahoma, and Texas)
- Students with diverse disability labels and their teachers participated
- Students’ school campuses were randomly assigned to a treatment or control group

Participants

• 493 middle and high school students

• Age
  – Range: 11-22 years
  – Mean: 16 years (SD 2.2)

• Disability
  – Learning Disability - 31%
  – Intellectual Disability - 27%
  – Other Health Impairment – 11%
  – Emotional /Behavioral Disorder – 9%
  – Autism – 5%
  – Other – 17%

• Gender
  – Female – 36%
  – Males - 64%

• Race / Ethnicity
  – Native American - 1%
  – Asian - 2%
  – African American - 19%
  – White - 60%
  – Hispanic – 18%
  – Other – 1%
Interventions

- The ChoiceMaker Curriculum (with The Self-Directed IEP materials)
  - Martin, Marshall, Maxson, & Jerman, 1993
- NEXT S.T.E.P. Curriculum
  - Halpern, Herr, Doren, & Wolf, 2000
- Self-Advocacy Strategy
  - Van Reusen, Bos, Schumaker, & Deshler, 2002
- Self-Determined Learning Model of Instruction
  - Wehmeyer, Palmer, Agran, Mithaug, & Martin, 2000
- Steps to Self-Determination (2nd Ed.)
  - Hoffman & Field, 2005
- Whose Future is it Anyway? (2nd Ed.)
  - Wehmeyer, Lawrence, Kelchner, Palmer, Garner, & Soukup, 2004
Research Question

Do interventions designed to promote self-determination lead to improvement in the self-determination scores of students with disabilities?

- Multi-level latent growth curve models (LGMs)
  - IV: Treatment Group, Disability, Gender
  - DV: The Arc’s Self-Determination Scale, AIR Self-Determination Scale
Findings

The Arc’s Self-Determination Scale

- Control
- Intervention

Time in Years

AIRS Scores

1  2  3
## Follow-Along Study: Self-Determination and Adult Outcomes

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<tr>
<td>Financial Independence – 2 Years Post</td>
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</table>
Building the Bridge:
Applied Cognitive Technology
Technology as a Critical Support

- Person-environment fit models move the focus from ‘fixing’ the person to narrowing the gap between personal capacities and demands of the environment;
  - Strengths-based and outcomes oriented.
  - Disability is part of the continuum of “typical human functioning” and not apart or separate from that.
  - Technology becomes a critical support to narrow that gap, and maybe the most important support.
Applied Cognitive Technologies

- Technology supports that enable people with cognitive disabilities to successfully function in typical environments, to increase participation in tasks and activities in typical environments, and to promote social inclusion, self-determination, and an enhanced quality of life.

- Different from Assistive Technology
  - Assistive Technology is understood in a very specific sphere of technology; technology devices and services designed specifically for people with disabilities to mediate impairments in communication, language, mobility, and, to lesser degrees, memory and comprehension.
Applied Cognitive Technologies

First wave in the field of Applied Cognitive Technologies:

- Prompting and cueing technologies to assist in memory and organization functions.
  - Limited focus on more complex problem-solving/decision making
  - Some focus on context-aware prompting systems
- Literacy supports and universal design for learning
- Sociobehavioral, adaptive behavior, and independent living supports.
- Communication technologies (primarily email)
- Monitoring technologies
Applied Cognitive Technologies

Second wave in the field of Applied Cognitive Technologies:

- Wayfinding and navigational supports.
- Smart homes and smart technology, including remote monitoring devices
- Voice communication technologies (mobile phones, then smart phones)
- Use of multimedia and web accessibility
Applied Cognitive Technologies

Third wave in the field of Applied Cognitive Technologies:

- Cloud and app-based technologies.
- Social media and social networks
- Self-determination and personal autonomy supports (e.g., photovoice, survey and life planning tools, remote monitoring that is not invasive, technology that is participation-based)
- Mobile digital image communication applications
- Health-related technologies
- Context aware and location-based learning.
Cognitive Accessibility

- Technology can provide a support that narrows or eliminates the gap between personal capacity and demands of the environment or context.

- Environments, technology, and materials that are “cognitively accessible” are those incorporate design features to ensure that people who need supports in cognitive areas—including language ability and auditory reception, reasoning and idea production, memory and learning, visual perception, cognitive speed, and knowledge and achievement—are able to access those environments and use the technology and materials.
THE PRINCIPLES OF UNIVERSAL DESIGN

1. EQUIitable USE
The design is useful and marketable to people with diverse abilities.

GUIDELINES
1a. Provide the same means of use for all users:
   - identical whenever possible; equivalent when not.
1b. Avoid segregating or stigmatizing any users.
1c. Make provisions for privacy, security, and safety equally available to all users.
1d. Make the design appealing to all users.

EXAMPLES
- Power doors with sensors at entrances that are convenient for all users.
- Integrated, dispersed, and adaptable seating in assembly areas such as sports arenas and theaters.

2. FLEXIBILITY IN USE
The design accommodates a wide range of individual preferences and abilities.

GUIDELINES
2a. Provide choice in methods of use.
2b. Accommodate right- or left-handed access and use.
2c. Facilitate the user's accuracy and precision.
2d. Provide adaptability to the user's pace.

EXAMPLES
- Scissors designed for right- or left-handed users.
- An automated teller machine (ATM) that has visual, tactile, and audible feedback, a keypad for card entry, and a keypad for keypad entry.

3. SIMPLE AND INTUITIVE USE
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

GUIDELINES
3a. Eliminate unnecessary complexity.
3b. Be consistent with user expectations and intuition.
3c. Accommodate a wide range of literacy and language skills.
3d. Arrange information consistent with its importance.
3e. Provide effective prompting and feedback during and after task completion.

EXAMPLES
- A moving sidewalk or escalator in a public space.
- An instruction manual with drawings and no text.

4. PERCEPTIBLE INFORMATION
The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

GUIDELINES
4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
4b. Maximize “legibility” of essential information.
4c. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
4d. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

EXAMPLES
- Tactile, visual, and audible cues and instructions on a thermostat.
- Redundant cues (e.g., voice communications and signage in airports, train stations, and subway cars).

5. TOLERANCE FOR ERROR
The design minimizes hazards and the adverse consequences of accidental or unintended actions.

GUIDELINES
5a. Arrange elements to minimize hazards and errors:
   - most used elements, most accessible, hazardous elements eliminated, isolated, or shielded.
5b. Provide warnings of hazards and errors.
5c. Provide fail-safe features.
5d. Disengage unconscious action in tasks that require vigilance.

EXAMPLES
- A double-cut key easily inserted into a recessed keyhole in either of two ways.
- An “undo” feature in computer software that allows the user to correct mistakes without penalty.

6. LOW PHYSICAL EFFORT
The design can be used efficiently and comfortably with a minimum of fatigue.

GUIDELINES
6a. Allow user to maintain a neutral body position.
6b. Use reasonable operating forces.
6c. Minimize repetitive actions.
6d. Minimize sustained physical effort.

EXAMPLES
- Lever or loop handles on doorknobs and faucets.
- Touch lamps operated without a switch.

7. SIZE AND SPACE FOR APPROACH AND USE
Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

GUIDELINES
7a. Provide a clear line of sight to important elements for any seated or standing user.
7b. Make reach to all components comfortable for any seated or standing user.
7c. Accommodate variations in hand and grip size.
7d. Provide adequate space for the use of assistive devices or personal assistance.

EXAMPLES
- Controls on the front and clear floor space around appliances, mailboxes, dressers, and other elements.
- Widened gates at subway stations that accommodate all users.

The principles were compiled by advocates of Universal Design, in alphabetical order:


NOTE:
The Principles of Universal Design are not intended to constitute all criteria for good design, only universally usable design. Certainly, other factors are important, such as aesthetics, cost, safety, gender and cultural appropriateness, and these aspects must also be taken into consideration when designing.

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# Universal Design and Technology Used by People with Cognitive Disabilities

<table>
<thead>
<tr>
<th>Universal Design Feature</th>
<th>Reported</th>
<th>Not Reported</th>
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<tbody>
<tr>
<td>Equitable Use</td>
<td>8%</td>
<td>92%</td>
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<tr>
<td>Flexible Use</td>
<td>26%</td>
<td>74%</td>
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<tr>
<td>Intuitive Use</td>
<td>8%</td>
<td>92%</td>
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<tr>
<td>Perceptible Info</td>
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<td>97%</td>
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<tr>
<td>Tolerance Error</td>
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<td>94%</td>
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<tr>
<td>Low Effort</td>
<td>1%</td>
<td>99%</td>
</tr>
<tr>
<td>Size/Space</td>
<td>0%</td>
<td>100%</td>
</tr>
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</table>
Universal Design Strategies

- **Error minimization strategies**
  - Remove buttons from screen rather than “graying them out.”
  - Flexibility and simplicity in user interface.
    - Reduced screen clutter
    - Provide only needed functions
    - Consistent placement of familiar buttons
Design Strategies

- Simplicity of Use
  - Minimize cryptic Metaphors/images
  - Minimize physically difficult options (double clicking, scroll bars).
  - Focus on primary functionality of app/device/website.
  - Cursor over voice vs. Cursor over text.
"It was just going to be a laser printer before we started adding features."
The Evolution of the Alarm Clock
The Evolution of the Alarm Clock
The Evolution of the Alarm Clock
The Evolution of the Alarm Clock
The Evolution of the Alarm Clock
The Evolution of the Alarm Clock
"IT asked me to drop this on your desk. They're your new passwords."
Barriers to Simplicity: Security
Barriers to Adoption and Use: Cost

“Our new product is designed for the average Joe with fifty million dollars.”
Universal Design for Learning

- Digital Talking Books.
- Smartphones, iPads, & Tablet PCs
- Cloud-based apps
- 3D Printing
- The Internet of Everything
And so, at dawn, that day in the first week of August, Mae Tuck woke up and lay for a while beaming at the ceiling. At last she said aloud, "The boys'll be..."

Mae’s husband, on his bare feet, was still asleep, and the melancholy of his mouth turned upward in a smile. Tuck also slept in; there were smoothed and slack. He snored gently, and for a while his breathers of his mouth turned upward in a smile. Tuck also slept in; there were smoothed and slack.

Mae sat up in bed and looked at him tolerantly. "I predict that the little spring by the ash tree will be important to the story."
I remembered that both Winnie's grandmother and the stranger are very interested in the music. She is excited to hear the music again, and he seems to find it meaningful that she has heard it before. So I predict that the music will be important in some way.

I predict that the tinkling melody will be important to the story.
Smart Transportation Systems

- **Smart Vehicle Technologies**
  - GPS: telemetry data
  - Mobile wireless WAN and LANs
  - I/O displays: support communications between operators and users

- **Mobile User Devices**
  - Sense user location and detects objects in complex environments
  - Compute/display personalized prompts, choices, & reminders; collect user selections; detect errors/breakdowns
  - Personalized to suit user abilities and needs
  - Facilitate communications (voice, text, video, etc.) with support communities

- **Mobility Agents**
  - Sense location of users, buses, stops, destinations, etc.
  - Detect/compute global constraints and instructions
  - “Hand-off” data and instructions to mobile devices
  - Report performance data
  - Detect breakdowns → notify support communities

- **Support Communities**
  - Plan, monitor, assess, and assist users
  - Available by computer, phone, or PDA

- **Data Servers**
  - Telemetry data
  - User profiles
  - Shared itineraries
  - Performance data
  - User status

- **Networks**
  - Wireless networks
  - Internet backbone

Source: Gerhard Fischer/Jim Sullivan, University of Colorado, Department of Computer Science
Thank You!