Update from the RERC on Workplace Accommodations

Karen Milchus, Maureen Linden,
Work RERC, Georgia Tech.

RESNA 2011
Rehabilitation Engineering Research Center on Workplace Accommodations (Work RERC)

Identifies, develops and promotes new technologies that maximize independence and participation of people with disabilities, including aging workers, in the workplace.
Reasonable Accommodation

“Any change in the work environment or in the way things are customarily done that enables an individual with a disability to enjoy equal employment opportunities.” (Source: EEOC)

Work RERC survey respondents:

• 75% could not perform all of their job duties without workplace accommodations

• 15% had been fired or laid off in the past because they had not been able to get the accommodations they needed
Characteristics of Past Workplace Accommodation Research

• Practice Based Evidence (case studies)
• Few describe trends by people within / across user groups
• Few describe outcomes
Presentation Overview

Sample of Work RERC projects:

• Research on Accommodation Use
• Development of Assessment Tools
• Research on Workplace Participation
• Development of Context-Aware Technologies
Characteristics of Workplace Accommodation Use for those with Physical Limitations

Maureen Linden, Karen Milchus
RESNA 2011
Purpose

To examine the relationships between functional ability, job requirements, and characteristics of accommodation use.

Presentation Focus:
Accommodation used by those with physical limitations.
Methods

• Survey relating characteristics of the individual to the accommodation
  – Administered dominantly electronically
  – Marketed through consumer lists, national publication lists, social networking venues.

– Inclusion Criteria:
  • Individual has 1 or more functional limitations
  • Individual is currently employed or volunteers
Job Characteristics

- EEOC Categorization
- Relationship to Employer
- Location of Work
- Pay Rate and Hours/wk
Functional Limitations

Broad functional limitation categories were selected from the ICF and further delineated by specific activities.

Example: Mobility Limitation

“I can walk, but have difficulty bending, sitting, standing, or climbing stairs.”
Accommodations Characteristics

• Use of specific types of accommodations –
  – Universal features
  – Adaptations
  – Help or Assistance
  – Assistive Technology

• Satisfaction, Importance, Frequency of Use
  – Reported by nominal Likert scale

• Unmet Accommodation Needs.
Functional Limitation Distribution

373 respondents to the overall survey.
- 56% report mobility impairments (n=210)
- 28% report upper extremity impairments (n=104)

- 218 respondents reported physical limitations

<table>
<thead>
<tr>
<th>Limitation Group</th>
<th>% of those with Physical Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing</td>
<td>7 %</td>
</tr>
<tr>
<td>Vision</td>
<td>13 %</td>
</tr>
<tr>
<td>Speech</td>
<td>9 %</td>
</tr>
<tr>
<td>Mental Function</td>
<td>17 %</td>
</tr>
</tbody>
</table>

6/10/2011
Population Demographics

60% female; 43% over 55 years
88% Caucasian; 7% Hispanic origin

Completed education:
- 5% diploma / GED
- 39% have graduate degrees.

6/10/2011
Population Job Characteristics

<table>
<thead>
<tr>
<th>Job Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>One full-time</td>
<td>60%</td>
</tr>
<tr>
<td>One part-time</td>
<td>22%</td>
</tr>
<tr>
<td>Multiple Jobs</td>
<td>18%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee</td>
<td>78%</td>
</tr>
<tr>
<td>Self – Employed</td>
<td>13%</td>
</tr>
<tr>
<td>Volunteer</td>
<td>9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>10%</td>
</tr>
<tr>
<td>Same Place</td>
<td>62%</td>
</tr>
<tr>
<td>Home / Worksite</td>
<td>17%</td>
</tr>
<tr>
<td>Travelling</td>
<td>11%</td>
</tr>
</tbody>
</table>
Population – EEOC Job Category

- **Professionals, 41%**
- **Service Workers, 22%**
- **Managers, 19%**
- **Clerical, 11%**
- **Other, 8%**
Mobility Limitations

- No device use: 35%
- Walking aids: 15%
- Wheelchair, Scooter: 50%
# Upper Extremity Limitations

<table>
<thead>
<tr>
<th>Left UE limitation</th>
<th>Right UE limitation</th>
<th>RSI</th>
<th>Reading Diff.</th>
<th>Dexterity Diff</th>
<th>Reaching, Dexterity Diff.</th>
<th>difficulty on this side</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSI</td>
<td>RSI</td>
<td>23</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Reading Diff.</td>
<td>Reading Diff.</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Dexterity Diff.</td>
<td>Dexterity Diff.</td>
<td>3</td>
<td>2</td>
<td>13</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Reaching, Dexterity Diff.</td>
<td>Reaching, Dexterity Diff.</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>No difficulty on this side</td>
<td>No difficulty on this side</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>
### Upper Extremity Limitations

<table>
<thead>
<tr>
<th>UE Limit - Side One</th>
<th>RSI</th>
<th>Reading Diff.</th>
<th>Dexterity Diff</th>
<th>Reaching, Dexterity Diff.</th>
<th>Difficulty on this side</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSI</td>
<td>23</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Diff.</td>
<td></td>
<td>5</td>
<td>5</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Dexterity Diff.</td>
<td></td>
<td></td>
<td>5</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Reaching, Dexterity Diff.</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>No difficulty on this side</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>
# Upper Extremity Limitations

<table>
<thead>
<tr>
<th>UE Limit - Side One</th>
<th>RSI</th>
<th>Reading Diff.</th>
<th>Dexterity Diff.</th>
<th>Reaching, Dexterity Diff.</th>
<th>Difficulty on this side</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSI</td>
<td>23</td>
<td>5</td>
<td>13</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Reading Diff.</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Dexterity Diff.</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Reaching, Dexterity Diff.</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>No difficulty on this side</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>
Commonly-Used Accommodations: Mobility Impairments

78%* Built-in Features
52%* Adj. Work Sched.
49% Flexible Work Schd.
48%* Co-Worker Help
37%^ Mod. Work Surface
34%^ Different Work Area
29%* Adj. Seating & Supp

*P < .01; ^P < .05
Commonly Use Accommodations: Upper Extremity Impairments

- 60% Built-in Features
- 48% Adj. Work Schedules
- 47% Co-worker help
- 43% Flexible Schedules
- 43% Computer Input
Common Accommodations for Upper Extremity Impairment

- Built-in Features
- Adj. Work Sched
- Co-worker help
- Flexible Sched.
- comp_input

- B RSI
- B Reaching
- B Dexterity
- B. Dexterity/Reach
- Uni Full Function
Satisfaction with Accommodations

**Mobility**

- Neutral Satisfaction for:
  - Built-in Features
  - Adj. Seating and Supports
  - Different work Areas

- “Satisfied” to “Extremely Satisfied” with policy based accommodations

**Upper Extremity**

- “Satisfied” with each of the top 5 accommodations.
Perceived Importance of Accommodations

Mobility
- Built-in features ($P < 0.01$)
  - Neutral importance for non device users
  - Important to Very Important for device users

Upper Extremity
- Computer Access devices were rated very important
- Other accommodations were “important”
Unmet Needs

3% of those with Mobility Impairment reported mobility related unmet needs.
Unmet Needs

3% of those with Mobility Impairment reported mobility related unmet needs.

28% of those with Upper Extremity impairment reported related unmet needs.
- 14% need computer input devices
- 14% need built-in features
Conclusions

Those with mobility limitations reported few unmet needs, even though they reported “neutral” satisfaction with common based accommodations.

Technologies are not high on the list of common accommodations.

Difference in the rate of unmet needs
Making Accommodation Decisions: Developing Assessment Tools
Workplace Remote Assessment Protocol

• Problem: Accommodation experts are few, and they spend too much of their time traveling to remote work sites to conduct assessments

• Solution: Develop a protocol for rehab professionals to conduct workplace assessment remotely, using telerehabilitation technology
Workplace Remote Assessment Protocol

• Using technology previously used for remote home assessments

• Investigated use of 3D modeling system with U. of Pittsburgh (RERC on Telerehab)
Workplace Accommodation Wizard

• Problem: Employers and employees are making accommodation decisions, with limited knowledge about accommodations.
## Provision of Accommodations

<table>
<thead>
<tr>
<th>Involved in Accommodation Decisions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee</td>
<td>83%</td>
</tr>
<tr>
<td>Employer</td>
<td>61%</td>
</tr>
<tr>
<td>Medical Prof. (MD, OT, PT, SLP)</td>
<td>20%</td>
</tr>
<tr>
<td>Vocational Rehab.</td>
<td>27%</td>
</tr>
<tr>
<td>Insurance (private, workers comp)</td>
<td>1.5%</td>
</tr>
<tr>
<td>Family, Friends</td>
<td>11%</td>
</tr>
</tbody>
</table>
Workplace Accommodation Wizard

• Problem: Employers and employees are making accommodation decisions, with limited knowledge about accommodations.

• Develop web-based tool that will enable employers to assess employees’ needs and identify solutions for workplace accommodations

• Suggest accommodations, linking users to entries in Assistivetech.net
  – Office occupations (FIP - #H133G070063 )
  – Manufacturing / distribution jobs (RERC)
Accommodation Wizard Limitations

- Difficulty with walking, climbing stairs, bending, sitting, or standing
- Problems reaching, grasping, pinching, or controlling hand/finger motion
- Problems with seeing even WITH glasses or contacts
- Problems hearing when NOT using a personal assisted listening device
- Problems producing speech or thinking of the right words to say
- Problems with remembering things, processing information, expressing thoughts or appropriate behaviors, or perceiving information
Accommodation Wizard Tasks (Office)

- Using Doors (exterior and interior)
- Moving Between Building Levels
- Moving Around the Workplace
- Using the Restroom
- Using the Workspace
- Communicating Face-to-Face
- Accessing Print / Multimedia
- Using a Phone
- Using Computer Hardware
- Using Computer Applications
Accommodation Wizard

**Limitation:** Using hand and fingers

**Task:** Using a phone

**Problem:** Dialing Phone (keypad buttons difficult to operate)

**Possible Approaches:**

- One-touch dialing
- Larger buttons
- Environ. Control
- Voice dialing

[assistivetech.net]
Supporting Workplace Participation: Effects of Job Accommodations

Hsiang-Yu Yang, OTD; Frances Harris, PhD; Jon Sanford, M. Arch

Center for Assistive Technology & Environmental Access (CATEA), Georgia Institute of Technology, Atlanta, Georgia
## Activity vs. Participation (Community)

<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICF definition</strong></td>
<td>• Execution of a task or action by an individual</td>
<td>• Involvement in a life situation</td>
</tr>
<tr>
<td><strong>Common constructs</strong></td>
<td>• Individual tasks &lt;br&gt; • Independence &lt;br&gt; • performance</td>
<td>• Valued occupations &lt;br&gt; • Independence/Interdependence &lt;br&gt; • Social roles &lt;br&gt; • Social relationships</td>
</tr>
<tr>
<td><strong>Measure</strong></td>
<td>• Quality, Efficiency</td>
<td>• Sense of Belonging or Inclusion</td>
</tr>
<tr>
<td><strong>Distinction</strong></td>
<td>• Individual</td>
<td>• Social</td>
</tr>
</tbody>
</table>

(Dijkers, 1998; Fougeyrollas et al., 1998; ICF, 2001; Rochette et al., 2006; Winkler et al., 2006)
ADA Title I (Employment)

Ensures that qualified individuals:

- Have equal opportunity to apply for jobs;
- Have equal opportunity to work in jobs for which they are qualified and be promoted once working;
- Have equal access to benefits and privileges of employment that are offered to other employees;
- Are not harassed because of disability.

Requires an employer to provide reasonable accommodation.

“Essential functions”
ADA vs. ICF

ADA

Accommodations for work tasks → Activity Performance → Participation

ICF

Accommodations for work tasks → Activity Performance
Accommodations for inclusive interactions → Participation

WORK rerc
Importance of Workplace Participation

• Support job functions
  – execution of work-related tasks
  – coordination of group activities
  – transmission of office culture
  – team building

  (Kraut et al, 1993; Whittaker et al, 1994)

• Enhance work outcomes
  – higher individual and firm productivity
  – Increased satisfaction with colleagues and their work
  – Less turnover intention

  (Klein, D’Aunno, 1986; Pearce, Randel, 2004; Young, 1986; Whittaker, Guthrie, 2001)
Impact of Activity-Focused Accommodations

• Telework
  – Difficulty in coordination of group activities
  – Ineffective exchange of simple information
  – Stigmatization
  – Reduced participation in the work group
  – Social and professional isolation
  – Low job satisfaction
  – Poor job performance and reduced productivity

(Anderson, Bricout, & West, 2001; Bailey & Kurland, 2002; Baker, Moon & Ward, 2006; Bricout, 2004; Guthrie, 1997; Hesse, 1991; Kerrin & Hone, 2001; Kurland & Cooper, 2002; Nie, 2001; Venkatesh & Speier, 2000)
The Study

• Goal:
  – To better understand the influence of accommodations on participation as a sense of belonging and inclusion.

• Participants:
  – 50 employees with and 50 without mobility disabilities
  – Work > 50% FTE
  – In an office setting

• Measures:
  – Satisfaction with Activity and Inclusion
  – Accommodation Use / Unmet Needs
Measures

Respondents reported on their ability to perform activities and participate in specific environments.

Accommodation Use was itemized for Individual Workspaces and Shared workspaces.

Unmet needs were identified when
1. individual reported difficulty with an activity or environment AND
2. had not received an accommodation for that barrier.
Measures

• Job tasks
  – Quality
  – Efficiency

• Satisfaction with Workplace participation

<table>
<thead>
<tr>
<th></th>
<th>Formal</th>
<th>Informal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inside</strong></td>
<td>• Meetings</td>
<td>• Social interactions with coworkers and supervisor(s)</td>
</tr>
<tr>
<td><strong>Outside</strong></td>
<td>• Conferences</td>
<td>• Lunch outings, birthday parties, etc.</td>
</tr>
<tr>
<td></td>
<td>• Prof. development activities</td>
<td></td>
</tr>
</tbody>
</table>
Participants with mobility disabilities

- Types of mobility device

- Power wheelchair: 46%
- Cane/crutch: 20%
- Manual wheelchair: 22%
- Walker: 2%
- Scooter: 8%
- Brace: 2%
Unmet Accommodation Needs

• **3/50** with unmet needs in the **individual workspace**

• **25/50** with unmet needs in the **shared workspace**

• Significant difference between individual and shared workspace unmet needs (\(p=.000\))
Unmet Accommodation Needs

- % of employees with disabilities

- Communication: 0%
- Workstation: 0%
- Office entrance: 2%
- Computer: 4%
- Building entrance: 8%
- Moving around: 12%
- Furniture: 34%
Disability (ALL)

- Activity: 4%
- Informal Participation (in): 4%
- Formal Participation (in): 10%
- Formal Participation (out): 18%
- Informal Participation (out): 32%

Dissatisfaction with Activity and Participation
Impact of shared-space unmet needs

- Activity: 8% w/ unmet need, 0% w/o unmet need
- Informal P. (in): 5% w/ unmet need, 3% w/o unmet need
- Formal P. (in): 20% w/ unmet need, 0% w/o unmet need
- Formal P. (out): 28% w/ unmet need, 8% w/o unmet need
- Informal P. (out): 48% w/ unmet need, 16% w/o unmet need

Dissatisfaction with Activity and Participation
<table>
<thead>
<tr>
<th>Impact of shared-space unmet needs</th>
<th><strong>w/ vs. w/o</strong> unmet needs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Job tasks</strong></td>
<td></td>
</tr>
<tr>
<td>Performance &amp; efficiency</td>
<td>N.S.</td>
</tr>
<tr>
<td><strong>Workplace participation</strong></td>
<td></td>
</tr>
<tr>
<td>Formal</td>
<td></td>
</tr>
<tr>
<td>e.g. meetings, conferences</td>
<td>.014</td>
</tr>
<tr>
<td>Informal</td>
<td></td>
</tr>
<tr>
<td>e.g. chatting, social events</td>
<td>.016</td>
</tr>
</tbody>
</table>
Comparison of those with disabilities to those without

<table>
<thead>
<tr>
<th></th>
<th>w/ unmet needs</th>
<th>w/o unmet needs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Job tasks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance &amp; efficiency</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td><strong>Workplace participation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal (e.g. meetings, conferences)</td>
<td>.003</td>
<td>N.S.</td>
</tr>
<tr>
<td>Informal (e.g. chatting, social events)</td>
<td>.004</td>
<td>N.S.</td>
</tr>
</tbody>
</table>
Discussion

• Belonging and inclusion are more than (different than) just being able to complete job tasks.

• Evidence suggests that ADA assumptions about activity leading to participation have not be supported. The research indicates that activity and participation as suggested by the ICF, are independent constructs and that each requires accommodation.
ADA vs. ICF

**ADA**
- Accommodations for work tasks → Activity Performance → Participation

**ICF**
- Accommodations for work tasks
- Accommodations for inclusive interactions → Activity Performance → Participation
Implications

In order to support workplace participation,

- Consider whether additional accommodations are needed for workplace social interactions, in addition to those for task performance.

- Consider social impact of recommended task accommodations. For example, accommodations should address “proximity” and “similarity”
Hsiang-Yu “Claire” Yang, OTD, OTR
hsiang-yu.yang@coa.gatech.edu
Context-Aware Development Projects
What is “context aware”?

• Technologies that use various sensors to determine the “context” of their use (e.g., location, person, time) and react accordingly

• Two development projects:
  – Context Aware Prompting System (CAPS)
  – AwareComm
Context-Aware Prompting System (CAPS)

• Context aware prompting system that acts as a job coach for adults with cognitive disabilities working in assembly line jobs

• Testing it with “First Aid” chocolate boxes

• Project with RERC on the Advancement of Cognitive Technologies (U. of Colorado)
Context-Aware Prompting System

- Sensors detect when an item is removed from an inventory bin / when it is properly placed
Context-Aware Prompting System: Trials

• Linear Prompting System
  – Subjects forget to hit button to advance to next prompt
  – System is unable to recognize product orientation differences (which leads to further errors)
  – Subjects unable to fix errors using manual prompting

• Non-linear Prompting System
  – Subjects have been able to fix some errors using automated prompting

• Both Linear and Non-linear Prompting Systems
  – Subjects often wait for voice prompt to finish before performing task, effectively slowing down productivity
AwareComm

- Communication system that uses context-aware technology to help users access appropriate phrases faster
AwareComm Sub-Projects

• Workplace Conversation Study
  – Analyzing vocab. & conversational structure of people with / without AAC

• Tag Talker
  – User can “tag” utterances in a specific context
  – Speeds real-time access for specific situations

• AwareComm (full system)
  – Tagged vocabulary is pulled up depending on the context of the communication (e.g., time, location, conversational partner)
Where to Store Phrases about TagTalker?

- Work RERC
  - TagTalker
- Work RERC
  - Presentations
- TagTalker

- RESNA Conference
  - Developer’s Forum
- RESNA Conference
  - Work RERC Session
- Context Aware Projects
Tag Talker

I've prepared slides for the meeting with the advisory board.

Tag Talker uses a tagging model for content organization.

Meeting

We have an advisory board meeting today.

Advisory board

How can I help prepare for the advisory board meeting?

Evaluation tagtalker
TagTalker

- Intended to be used along with other methods for storing phrases

- Storing phrases
  1. Thinking of / writing down possible associations
  2. Choosing the best (this step not needed with TagTalker)

- Currently testing users’ success and efficiency at retrieving phrases
AwareComm

Claire Yang

DynaVox

WORKerc
AwareComm

More widget parts are needed.
Thank you

This research was conducted as part of the RERC on Workplace Accommodations, which is supported by Grant H133E070026 of the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education. The opinions contained in this publication are those of the grantee and do not necessarily reflect those of the U.S. Department of Education.