



Rehabilitation Research
Design & Disability

University of Wisconsin–Milwaukee

Rehabilitation Research Design
& Disability (R2D2) Center
PO Box 413
Milwaukee, WI 53201-0413
(414) 229-6803 *phone*
(414) 229-5628 *TTY*

R₂D₂ Accessibility & Universal Design Community Design Solutions (CDS) Annual Report

July 2011-December 2012

Community Design Solutions (CDS) aims to improve the quality of life in Milwaukee and Wisconsin by designing or changing environments toward increased accessibility and refining decision making processes effecting the design of the environment. CDS provides key support in numerous projects including working with UWM's Rehabilitation Research Design and Disability (R2D2) Center on the Milwaukee Idea Home, the ACCESS-ed and ACCESS Main Street Websites, UD ITEACH Project, Design and Disability Instruction, multiple assistive technology training programs (ATAD, TechSpec, ETI), and the Accessibility Ratings for Buildings Project (AR-B). Detailed information can be found at the following websites:

- CDS Website: www.uwm.edu/MilwaukeeIdea/CDS/
- R2D2 Center Website: www.r2d2.uwm.edu/
- ACCESS-ed Website: access-ed.r2d2.uwm.edu/
- ACCESS Main Street Website: access-mainstreet.r2d2.uwm.edu/
- UD ITEACH Website: uditeach.r2d2.uwm.edu/
- TechSpec website: techspec.r2d2.uwm.edu/
- ETI Website: r2d2.uwm.edu/eti/
- AR-B Project: r2d2.uwm.edu/access-ratings-for-buildings/

Table of Contents

I. Executive Summary/Highlights	3
R ₂ D ₂ Highlights from July 2011 – December 2012:	3
The Universal Access Team	6
II. 2011-2012 Project Achievements	7
• Websites	7
• UWM Campus Implementation of Physical Facility Design	9
• UD ITEACH Project	9
• TechSpec Project	10
• ETI	11
• Access Rating for Buildings	12
• Interdisciplinary Instruction on Universal Design and Accessibility	14
III. Planned Activities	16
• Instruction/Training	16
• UWM Campus Implementation of Physical Facility Design	16
• Website Design	16
• Proposals and Projects	17
• UD ITEACH Final Report and Publications	17
• TechSpec	17
• ETI	17
• Access Rating for Buildings (AR-B)	17
• Theses	17
• Academic and Community Outreach	17
IV. Appendices	18
Appendix A – Thesis/Dissertation Research Projects Completed	18
Appendix B - Presentations July 2011 – December 2012	19
Appendix C - Publications & Proceedings July 2011 – December 2012	21

I. Executive Summary/Highlights

An interdisciplinary Universal Design (UD) team, based in UWM's R₂D₂ Center and a component of CDS, continues successful work on several projects. This year's activities continue to "push the envelope", incorporating universal design (UD) into physical, instructional, service and informational environments to promote cutting edge campuses and communities that shift from accommodating and adapting for individuals to infusing universal design and accessibility and integrating assistive technology. Overall, this past year's activities generated increased interest and enthusiasm for universal design, accessibility and the use of assistive technology in communities and campuses nationally and internationally.

R₂D₂ Highlights from July 2011 – December 2012:

- **Major Publication:**
 - Steinfeld and Smith (2012) published an article in the Proceedings of the IEEE (Impact factor 6.81) on "Universal Design for Quality of Life Technologies." This paper presents the value of the universal design for the modern and future technology era.
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6232430>
- **Proposed 2 major grants:**
 - RERC on Low Vision
 - Equal Access to Images: Toward Automating the Writing of Effective Text Equivalents - research and development projects for the writing, collection and automation of Equivalent Text Descriptions (EqTDs). (NIDRR)
- **Six presentations at the 2012 Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) Conference, Baltimore, MD:**
 - EqTDs: Making alternative text more functional, Effects of providing accessibility info to people with disabilities
 - Assistive Technology Training Programs at UW-Milwaukee, ACCESS-life: Universal design resource website
 - Assessing disability compliance using smartphone
 - Accessible medical diagnostic equipment is now the law
- **Five presentations at the 2012 AOTA Conference, Indianapolis, Indiana:**
 - Measurement of restaurant accessibility by people with disabilities: Preliminary validity of a restaurant universal design assessment
 - Incremental universal design: Making progress toward accessibility and universal design in measurable steps
 - Do consumers with disabilities want accessible labels on products? A discrete choice modeling experiment
 - A comparison of two assistive technology outcome measures for the public school setting.

- **Three presentations at the Wisconsin Occupational Therapy Conference (WOTA) 2012, Middleton, WI:**
 - Smart hand held computer applications for cognitive, accessibility, and health monitoring interventions
 - Full day seminar - Evaluating accessibility in the world around you: Measurement tools and assessment approaches for public spaces, home residences, products, information sources and educational materials
 - Keynote - Occupational science & technology: Can we practice OT without technology?
- **Seven additional presentations provided at national and international conferences in Australia, the UK, Florida, and Virginia.**
- **Four chapters submitted for publication in Sheryl Burgstahler's, UD in Higher Education - Promising Practices, e-publication:**
 - Infusing UD on Campus: The DARC (Departmental Accessibility Resource Coordinators) Approach
 - The Student Campus Accessibility Needs Information Tool;
 - Resources for Assessing and Implementing Universal Design in Higher Education: Developing a Website Linking Worldwide Resources
 - Tools to Measure Accessibility as Indicators of Universal Design on Campuses The TechSpec Assistive Technology Training project (RSA funded) entered its third year of five, with 4 soon-to-be graduates completing the first cohort, and 8 new scholars beginning the ATAD Certificate Program.
- **The TechSpec Grant**
 - Three of the graduating students are serving their respective states on committees promoting Assistive Technology use and training for vocational rehabilitation consumers.
 - 6 students attended and participated in assistive technology related conferences, including 2012 Rehabilitation Engineering Society of North America (RESNA) annual conference and the annual Closing the Gap Conference.
 - 8 new scholars just started Cohort 2 and are expected to graduate in 2014.
 - Over 150 students have completed Introductory Assistive Technology coursework.
- **The Evidence Based Technology Integration Practice (ETI) Grant**
 - Entered its third year of five
 - 20 scholars completing Level 1 training
 - 9 scholars continuing into Level 2 training.
 - Recruitment started for three scholars from Level 2 to progress to Level 3 Leadership Training.

- **Interdisciplinary Instruction**

- R2D2 Instructors revised and taught a fully on-line section of the Design & Disability course to several participants in the ATAD Certificate Program (and TechSpec Program) from throughout the U.S.A.
- 10 Students worked at from R2D2 assisting in several projects, including: Research activities: literature searches, data collection, statistical analysis; conference presentations and/or exhibits at RESNA, AOTA; and WOTA, and preparation of grant proposals and manuscripts for publication.
- Two graduate students completed M.S. research theses
- One student completed a Support for Undergraduate Research Fellows (SURF) award, with exciting research findings for people with visual impairments
- One student awarded a new Advanced Opportunity Program (AOP) Fellowship.

- **The Access Rating for Buildings Project (AR-B)**

- Collaborations and consultation from several universities, local government representatives, non-profit organizations serving people with disabilities, legal representatives, and private industry representatives shared their expertise and an Advisory panel meeting to enhance the project.

- **The ACCESS-Life Websites**

- Moderation activities were implemented to launch the sustainability phase of the resource rich ACCESS-Life Websites.
- Permission was granted for our wrbsites to implement the new IDeA Center, Universal Design Identity Program, logo.

- ***The Universal Access Team***

Rehabilitation Research Design & Disability (R₂D₂) Center Director:

- Roger O. Smith, Ph.D. Professor, Occupational Science & Technology

R₂D₂ Staff:

- Aura Hirschman, MS, CRC, Universal Design Outreach Coordinator
- Melissa Lemke, MS, Biomedical Engineer
- Dennis Tomashek, MS, Researcher
- Keith Edyburn, BS, Engineer
- Tereza Snyder, BFA, Programmer
- Cheryl Locher, MS, Operations Manager
- Chelsea Miller, BS, Program Assistant
- Stephanie Willingham, Administrative Assistant

Graduate and undergraduate students:

- | | |
|-------------------------|-----------------------|
| • Jaclyn Schwartz, MS | • Lauren Below, BS |
| • Meenu Sagar, MS | • Rachael Baumann, BS |
| • Carrie Jennerjohn, MS | • Paula Begeman |
| • Autumn Milanowski, MS | • Malorie Hauch |
| • Minsoo Park, MS | • Amy Xiong |
| • Kati Liegl, BS | • Elliot Grant |
| • Traci Dolski, BS | • Nathan Spaeth |



II. 2011-2012 Project Achievements

- **Websites**



The ACCESS-ed and ACCESS Main Street websites are the first websites allowed to use the new Universal Design Logo created by the The IDeA Center, Universal Design Identity Program, a Universal Design Leadership Initiative sponsored by the National Endowment for the Arts (NEA). The program lead to the development of the Universal Design Symbol



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(http://udeworld.com/images/stories/UD_Logo_3_inch_72_dpi.jpg) to identify products, places, objects, systems, methods, or ideas that are universally designed.

Moderation has been added as a feature of the ACCESS-ed and ACCESS Main Street websites to insure that the websites will be self-sustaining and remain relevant in the future. Moderators are being trained to insure that the over 700 entries on the websites remain current and that new and updated resources are added as they become available.

Our Moderators will:

- Review user comments and suggested resources
- Check out entry issues
- Locate new resources
- Edit annotations

ACCESS-ed promotes Universal Design in Higher Education. Resources are centered on increasing the accessibility of higher education campuses, including instruction, services, web/media and physical environments.

<http://accessed.r2d2.uwm.edu/>

ACCESS Main Street promotes Universal Design in the Community and Workplace. Resources are centered on increasing the accessibility of communities, including services, websites, media, buildings and grounds, and particularly workplace accessibility for employees, employers and consumers.

<http://access-mainstreet.r2d2.uwm.edu/>.



Figure 1. Screenshot of ACCESS-ed Website Home Page

- ***UWM Campus Implementation of Physical Facility Design***



With the input of numerous colleagues and the UWM Planning Committee, we have assisted in the assessment of the design, usability, and accessibility of various aspects of the UWM campus, including:

- The newly renovated Denmark Lounge and dining area (Enderis Hall)
- Computer kiosks
- Elevators
- Commencement procedures and physical set up

- ***UD ITEACH Project***



This demonstration project to ensure that students with disabilities receive a quality higher education concluded project activities as of October 1, 2012. The UD ITEACH Project, funded by the US Department of Education reinforced universal design in education (UDE) dissemination and training through:

- Over a dozen presentations at state, national and international conferences (See Appendix B).
- Four chapters submitted for publication
- Development of a Student Campus Accessibility Needs Inventory (SCAN IT)
- Development of dozens of accessibility measurement tools and faculty training tools
- The ACCESS-ed website, the only website of its kind promoting Universal Design in Education tools and resources.
- A dissemination network of Departmental Accessibility Resource Coordinators (DARCs) throughout the campus
- Implemented campus-wide UDE policy and other interventions.

- ***TechSpec Project***



This Technology Specialization Program (TechSpec) provides intensive on-line interdisciplinary training in rehabilitation technology for 24 students, in three consecutive cohorts, targeting practicing vocational rehabilitation counselors. Program graduates from all around the U.S.A. are now able to provide competent assistive technology and accessible design case management and practice as well as provide leadership to advance the field. The curriculum is based on the Assistive Technology and Accessible Design graduate certificate. Eight participants nationwide are recruited for each of three cohorts. Participants take one course each semester. Another 50 students per semester participate in the Introduction to Assistive Technology course.

- The first Cohort is concluding in 2012, with 6 students having completed 17 graduate credits and the ATAD Certificate. Three of the graduating students are serving their respective states on committees promoting Assistive Technology use and training for vocational rehabilitation consumers.
- All 6 students attended and participated in assistive technology related conferences: 4 went to the 2012 Rehabilitation Engineering Society of North America (RESNA) annual conference and 2 went to the annual Closing the Gap Conference. 3 also participated in preconference training sessions.
- The second cohort began in the Fall of 2012 and 8 of the 8 scholars are expected to graduate in 2014.
- A third cohort will be recruited to begin in the Fall 2014.
- 150 students have completed Introductory Assistive Technology coursework.

- **ETI**



The Evidence-based Technology Integration (ETI) Training Program, built on the Assistive Technology and Accessible Design graduate certificate at the University of Wisconsin-Milwaukee, Department of Occupational Science & Technology, provides training support for students and professionals interested in interdisciplinary training in pediatric assistive technology. The program includes three funded program levels, including Level 1 introductory training with a survey course (OCCTHPY 620 Introduction to Assistive and Rehabilitation Technology), Level 2 advanced training with completion of the ATAD graduate certificate (includes project), and Level 3 leadership training with a community partner affiliation in pediatric assistive technology. Training scholarships are being offered through January of 2015, and at least 75 students total will receive foundational training in assistive technology and accessible design for pediatric populations over the course of the ETI training grant (2012-2016).

- Cohort 1 began in Fall 2011 with 8 students.
- Cohort 2 began in Spring 2012 and will conclude in Summer 2013, including 12 students. 9 students from Cohort 1 continued on to Level 2. 4 students joined the 2nd level from their professional practices.
- Cohort 3 will begin in Spring 2013
- Cohort 4 will begin in Spring 2014.

- ***Access Rating for Buildings***



The Access Ratings for Buildings (AR-B) Project, funded by the National Institute of Disability and Rehabilitation Research (NIDRR), is developing a mobile and web-based system for providing up-to-date accessibility information about public buildings for people with disabilities, their families and friends, and building owners. The AR-B system combines both ADA information and user experience ratings within one platform, so that users have access to the most useful information for their particular needs.

Major progress has been demonstrated in recent months:

- An Advisory Panel meeting, on June 15, 2012, included collaboration with Marquette University UbiComp Lab, Misericordia University, Assistive Technology Research Institute, The Center for Inclusive Design & Environmental Access (IDEA), University at Buffalo, The State University at New York, Washington University at St Louis, Wharton School of Business, as well as other UW System campuses, UWM Departments, city and county representatives, non-profit disability organizations, legal representatives, and private industry representatives.
- All documentation for the consumer experience including the application programming interface, app mock up, and story boarding has been completed, and the application is now in the coding process.
- Novel smartphone tools to measure slope distance, time, sound, light, and font have been created in partnership with the UBICOMP Lab at Marquette University to facilitate building ratings.

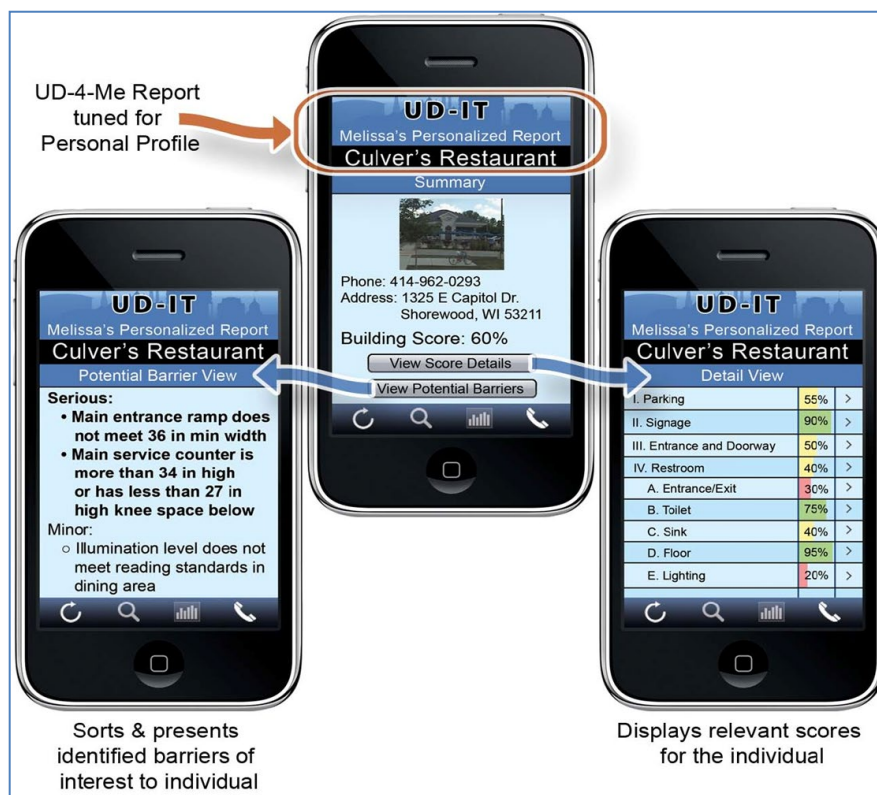


Figure 2. Three example screens on an iPhone illustrate ARB application.

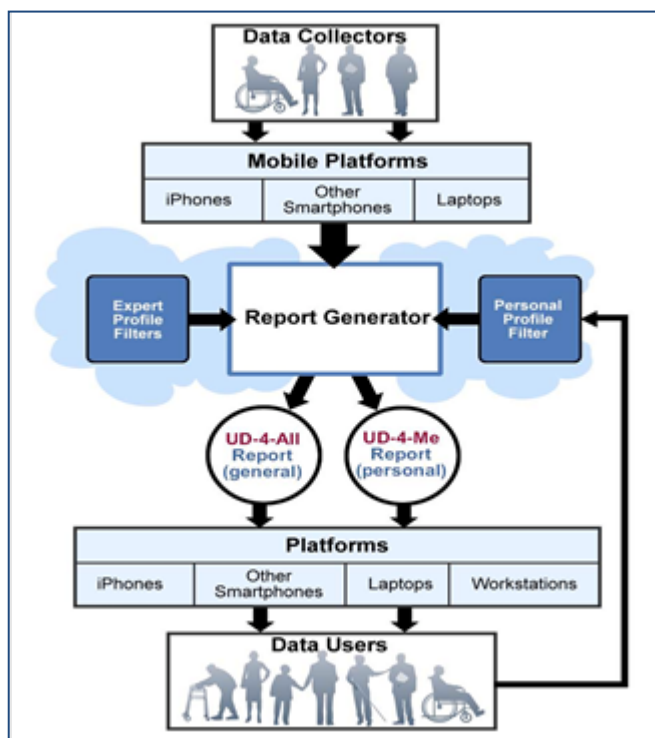


Figure 3. An ARB flow chart displays data collection, the app, and the data users.

- ***Interdisciplinary Instruction on Universal Design and Accessibility***



- The Design and Disability (OCCTHPY 625) course, a requirement for the Assistive Technology and Accessible Design Certificate, went on-line for the first time this past year, successfully exposing students from a variety of disciplines to creatively apply the techniques of UD in various settings and professions. Students in D & D classes completed numerous projects assessing the design of playgrounds and recreation facilities, medical facilities, university campuses and buildings, agricultural sites, etc.
- The Assistive Technology and Accessible Design Certificate training program awarding certificates to two graduate students in the Occupational Science and Technology Department.
- 10 Students from Computer Science and College of Health Sciences (CHS). worked at R2D2 assisting in several projects, including:
 - Research activities: literature searches, data collection, statistical analysis.
 - Conference presentations and/or exhibits at RESNA, AOTA, and WOTA,
 - Preparation of grant proposals and manuscripts for publication.
- 2 students completed master's theses this year and dissertation instruction and advising continue to be provided for students within the R2D2 Center (Refer to Appendix A for Bibliography).
- The Milwaukee Idea Home (MIH) has been utilized for instructional purposes such as class demonstrations and field trips, and offers students an incredible opportunity to experience and learn about accessibility and universal design first hand.
- One student received a Support for Undergraduate Research Fellows (SURF) award which enabled her to produce exciting research findings for people with visual impairments regarding their experiences with the design of buildings.
- One student was awarded a new Advanced Opportunity Program (AOP) Fellowship.



Picture 1. The Introduction to Assistive Technology and Accessible Design class participates in a lab class on powered mobility.



Picture 2. The Introduction to Assistive Technology and Accessible Design class participates in a lab class in Augmentative and Alternative Communication (AAC), using Eye Gaze Technology.

III. Planned Activities

Community Design Solutions allows us to continue working in a range of ways in the area of universal design and accessibility. As always, a set of new and continuing activities, including both community-based, and campus-based projects are anticipated for the current and coming year. Planned activities include:

- ***Instruction/Training***

- TechSpec and ETI Programs training hundreds of students in assistive technology delivery, assessment and leadership.
- Milwaukee Idea Home tours as part of instructional courses.
- Design & Disability on-line and on-site courses to graduate students across schools and colleges (CEAS, Education, CHS, and SARUP), at UWM, and for students and design practitioners who participate from all over the world.
- Ongoing interdisciplinary support and collaboration to graduate students across colleges related to universal design.

- ***UWM Campus Implementation of Physical Facility Design***

- Coordination with UWM Physical Plant and UW System improving accessible design.
- R2D2 Director and staff will continue involvement in:
 - UWM Campus Computer Kiosk Design and Installation Committee
 - Graduate School Research Strategic Planning Sub-Committee on Partnerships with Other Institutions, Businesses, Non-profits and Government Agencies
 - UW System Presidents Advisory Committee for Disability Issues (PACDI).
 - UWM Chancellor's ADA Advisory Center (ADAAC).

- ***Website Design***

- Updating and editing of the R2D2 Center websites and improving the accessibility as an example to the public.
- Moderation of the ACCESS-ed and ACCESS Main Street websites by volunteer consumers will sustain both websites as up-to-date and relevant to consumers into the future.

- ***Proposals and Projects***
 - Resubmit EqTD proposal
 - Home Assessment Application proposal (based on ARB application).
- ***UD ITEACH Final Report and Publications***
 - Final report to the U.S. Department of Education by December 31, 2012.
 - Continued work on the manuscripts related to activities of “UD ITEACH, a Demonstration Project to Ensure that Students with Disabilities Receive a Quality Higher Education” will result in some published articles.
- ***TechSpec***
 - Conclude Cohort 1 – 6 scholars to receive ATAD Certificate.
 - Continue Cohort 2 in support of current TechSpec scholars.
- ***ETI***
 - Currently recruiting for:
 - The start of Cohort 3 set to begin in January 2013 with 10 students
 - Level 2 of Cohort 2 set to begin Summer 2013 with 8 students
 - Level 3 of Cohort 1 which is set to begin in Fall 2013 with 3 students
 - Reevaluating DPI requirements to better fit already practicing OT’s, PT’s, and SLP’s planning to complete the program off-site.
- ***Access Rating for Buildings (AR-B)***
 - Researchers look forward to beta testing many portions of the app in the upcoming months.
 - Continuing work on creating application interfaces based on feedback from experts and potential users.
- ***Theses***
 - Manuscript preparation of thesis work to be published by graduate students in the R₂D₂ Center.
 - Three students in pursuit of Master’s Thesis completion
- ***Academic and Community Outreach***
 - R₂D₂ staff members continue to propose presentations and disseminate project activities and developments at major conferences, including RESNA, AOTA, WOTA, ACRM, etc. and through presentations to community agencies serving people with disabilities.

IV. Appendices

Appendix A – Thesis/Dissertation Research Projects Completed

Jennerjohn, Carrie A. (2011, August) Development and preliminary validation of a decision-assist resource for older homeowners to age in place. Unpublished master's thesis, University of Wisconsin-Milwaukee.

Sagar, M. (2012, May). Development and preliminary validation of a functional outcome measure for augmentative and alternative communication. Unpublished master's thesis, University of Wisconsin-Milwaukee.

Appendix B - Presentations July 2011 – December 2012

Anson, D., Smith, R. O., & Hirschman, A. M. (2012, June 30). EqTDs: Making alternative text more functional. Presented at the *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Erfurth, A., & Smith, R. O. (2012, April 26-29). Measurement of restaurant accessibility by people with disabilities: Preliminary validity of a restaurant universal design assessment. Presented at the *AOTA*. Indianapolis, IN.

Grant, E., Milanowski, A., & Smith, R. O. (2012, November 2). Smart hand held computer applications for cognitive, accessibility, and health monitoring interventions. Presented at the *WOTA Conference*. Middleton, WI.

Hirschman, A.M., Begeman, P., Tomashek, D., & Smith, R.O. (2012, November 2). Evaluating accessibility in the world around you: Measurement tools and assessment approaches for public spaces, home residences, products, information sources and educational materials. Presented at the *WOTA Conference*. Middleton, WI.

Hirschman, A., & Smith, R. O. (2012, April 26-29). Incremental universal design: Making progress toward accessibility and universal design in measurable steps. Presented at the *AOTA*. Indianapolis, IN.

Lemke, M., Story, M., & Winters, J. (2012, June 28-July 3). Accessible medical diagnostic equipment is now the law. Workshop. Presented at the *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Mendonca, R. (2012, July 2). Effects of providing accessibility info to people with disabilities. Presented at the *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Mendonca, R., & Smith, R. O. (2012, April 26-29). Do consumers with disabilities want accessible labels on products? A discrete choice modeling experiment. Presented at the *AOTA*. Indianapolis, IN.

Smith, R. O. (2011, November). Measuring the impact of AT - Does it work? Keynote Speaker. Presented at the Recent Advances in Assistive Technology & Engineering (RAaTE) Conference. New Coventry, UK.

Smith, R. O. (2012, August 29). Assistive & Rehabilitation Technologies (A&RT) Outcomes: The impact and how do we document the benefits? Keynote Speaker. Independent Living Centre, Assistive Technology Learning, Yooralla, Melbourne, AU.

Smith, R. O. (2012, August 31). Assistive & Rehabilitation Technologies (A&RT) Outcomes: The impact and how do we document the benefits? Keynote Speaker. Novita Children's Services, Regency Park Centre, Adelaide, AU.

Smith, R. O. (2012, November 2-3). Occupational science & technology: Can we practice OT without technology? Keynote Speaker. Presented at the *WOTA Conference*. Middleton, WI.

Smith, R. O. (2012, August 22-24). The Benefits & Cost of Assistive & Rehabilitation Technology are Clear: Why Do We Need Evidence. Presented at the *Australian Rehabilitation & Assistive Technology Association (ARATA)*. Sydney, Australia.

Smith, R. O., & Hirschman, A. M. (2012, June 28-July 3). Assistive Technology Training Programs at UW-Milwaukee. Presented at the *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Smith, R. O., & Lawler, M. (2011, August). TechSpec 2011. Presented at the 14th Annual RSA Project Directors' Conference: Working for a Better Tomorrow. Arlington, VA.

Smith, R. O., Snyder, T., Edyburn, K. D., & Hirschman, A. M. (2012, July 1). ACCESS-life: Universal design resource website. Presented at the *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Smith, R. O., & Tomashek, D. (2012, January 25). Responsible conduct of research, research design. Presented at the *Assistive Technology Industry Association (ATIA) Research Symposium*. Orlando, FL.

Tanviruzzaman, M. D., Rizia, R., Ahamed, S., & Smith, R. O. (2012, June 30). Assessing disability compliance using smartphone. Presented at the *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Watson, A. H., & Smith, R. O. (2012, April 26-29). A comparison of two assistive technology outcome measures for the public school setting. Presented at the *AOTA*. Indianapolis, IN.

Appendix C - Publications & Proceedings July 2011 – November 2012

Anson, D., Smith, R. O., & Hirschman, A. M. (2012, June 30). EqTDs: Making alternative text more functional. Proceedings from *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Mendonca, R. (2012, July 2). Effects of providing accessibility information to people with disabilities. Proceedings from *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Smith, R. O., Snyder, T., Edyburn, K. D., & Hirschman, A. M. (2012, July 1). Access-life: Universal design resource website. Proceedings from *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Steinfeld, E., & Smith, R. O. (2012). Universal design for quality of life technologies. Proceedings from *IEEE*, 100, 2539-2554.

Tanviruzzaman, M. D., Rizia, R., Ahamed, S., & Smith, R. O. (2012, June 30). Assessing disability compliance using smartphone. Proceedings from *RESNA 35th International Conference on Technology and Disability: Research, Design, Practice and Policy*. Baltimore, MD.

Watson, A. H., & Smith, R. O. (2012). Comparison of two school-based assistive technology outcome instruments. *Technology and Disability*, 24, 1-10.