Wireless Technology Uses and Activities by People with Disabilities

John Morris, Ph.D., Jim Mueller, M.A.
Mike Jones, Ph.D., Ben Lippincott, B.A.

Shepherd Center

29th Annual International Technology and Persons with Disabilities Conference

March 18-22, 2014

AGENDA

1. Overview of the Wireless RERC

2. Overview of the Survey of User Needs (SUN)

3. SUN Sample

4. Wireless Activities

   a. Disability/non-disability divide
   b. Economic divide
   c. Age divide
   d. Urban-rural divide
   e. Disabilities divide

wireless RERC
Rehabilitation
Engineering
Research
Center

Overview of the Wireless RERC

- Founded in 2001
  - by grant from U.S. Dept of Education, National Institute on Disability and Rehabilitation Research (NIDRR)
  - Currently in Year 3 of our third 5-year grant cycle, which began in October 2011

- Partners
  - Shepherd Center
    - consumer research, industry outreach and training
  - Georgia Institute of Technology (Georgia Tech)
    - policy research, technology development

wireless **RERC** Rehabilitation Engineering Research Center

Overview of the Wireless RERC

Organized into 3 areas:

- Research
  - R1 - User-Centered Research
  - R2 - Policy Approaches to Accelerate Wireless Accessibility

- Engineering and Development
  - D1 - App Factory for Assistive and Accessibility Apps
  - D2 - Emergency Lifelines on Wireless Platforms

- Training and Outreach
  - T1 - Promoting Awareness of Access and Usability Needs
  - T2 - State of the Technology Conference
  - T3 - Student Capacity Building

wireless RERC
Rehabilitation
Engineering
Research
Center

Research Projects

R1 - User Centered Research

- Survey of User Needs (SUN)
- Consumer Advisory Network (CAN)
- Hearing Aid Compatibility Survey
- Focus Groups/User Studies/Technology Evaluations

R2 - Policy Approaches to Accelerate Access to Advanced Wireless Technologies

- Regulatory Filings
- Trends and Barriers Analysis
- Technology and Policy Highlights

wireless RERC
Rehabilitation Engineering Research Center

Development Projects

D1 - The App Factory

- Development of accessible and/or assistive apps
- Wireless RERC funds app developers through annual RFP
- Ability to fund up to 8 apps per year

BrailleTouch	IDEAL Currency Identifier	Access Note	Georgia ReadMore for ASL Learners
• Alternative text input app based on the Braille alphabet	• Identifies three generations of U.S. currency notes beginning in 1993	• Note taking app designed for people with substantial loss of vision	• Streams video of GPB's Georgia Read More program with ASL overlay

Development Projects (cont.)

D2 - Emergency Lifelines on Wireless Platforms

- **External Alerting Interface** - Control traditional altering devices such as bed shakers and light flashers from wireless devices via Bluetooth

- **WEA Video Platform** - Test methods to provide American Sign Language to Wireless Emergency Alerts

- **AAC Emergency Alerts** - Allow access to emergency communications channels such as 9-1-1 via AAC devices (Augmentative and Alternative Communications)

wireless **RERC** Rehabilitation Engineering Research Center

Training Projects

T1 - Promoting Awareness of Access and Usability Needs for Wireless Devices

- Industry & Consumer Outreach/Education/Support
- Re: Wireless - Industry/Consumer Newsletter
- SUNspots
- Events/Conferences/Webinars/Trade Shows

T2 - State of Technology Summit 2015

- Experts exploring micro and macro trends in wireless technology

T3 - Building Research Capacity in Wireless Accessibility and Usability

- Annual student design challenge
- Annual Healthy Environments and Active Living (HEAL) event at Georgia Tech

wireless
RERC

Rehabilitation
Engineering
Research
Center

AGENDA

1. Overview of the Wireless RERC

2. Overview of the Survey of User Needs (SUN)

3. SUN Sample

4. Wireless Activities

   a. Disability/non-disability divide
   b. Economic divide
   c. Age divide
   d. Urban-rural divide
   e. Disabilities divide

Rehabilitation Engineering Research Center

Overview of the Survey of User Needs

Survey of User Needs (SUN)

➢ Background

- Launched in 2002

- Now on its 4th version, which launched in 2012

➢ Results are shared with industry, developers, designers, regulators, advocates and consumers with disabilities

wireless
RERC
Rehabilitation
Engineering
Research
Center

Overview of the Survey of User Needs

Structure of the SUN	
Part 1	About you – Demographics (age, race, gender, etc)
Part 2	About your abilities
Part 3	About your wireless devices
Part 4	About your wireless activities
Part 5	About your wireless service plans

wireless RERC
Rehabilitation
Engineering
Research
Center

AGENDA

1. Overview of the Wireless RERC

2. Overview of the Survey of User Needs (SUN)

3. SUN Sample

4. Wireless Activities

    a. Disability/non-disability divide
    b. Economic divide
    c. Age divide
    d. Urban-rural divide
    e. Disabilities divide

wireless RERC
Rehabilitation
Engineering
Research
Center

Survey of User Needs - Sample

Data collection period: 09/06/2012 – 10/09/2013

Number of respondents/ with disabilities: 1381 / 1088

Gender:
- Female   58%
- Male   42%

Age:
- Range   18-89
- Mean   49
- Median   51
- Std Deviation   15.34

Survey of User Needs - Sample

Home location:

- Urban area 33%
- Suburban 49%
- Rural area 18%

Employment

- Full time 38%
- Part time 13%
- Retired 20%
- Not employed 29%

Survey of User Needs - Sample

WHAT IS YOUR RACIAL/ETHNIC BACKGROUND? (Check all that apply)	
Asian/Pacific Islander	3.7%
Black/African American	10.7%
Hispanic/Latino	4.3%
Native American	1.8%
White/Caucasian	80.8%
Other	2.3%
TOTAL	103.6%

Survey of User Needs - Sample

DO YOU HAVE ANY OF THE FOLLOWING DIFFICULTIES?	
Difficulty walking or climbing stairs	39%
Difficulty hearing	36%
Difficulty seeing	28%
Difficulty using hands or fingers	25%
Difficulty concentrating, remembering, deciding	25%
Frequent worry, nervousness, or anxiety	23%
Difficulty using arms	17%
Difficulty speaking so people can understand me	16%

wireless
RERC
Rehabilitation
Engineering
Research
Center

Survey of User Needs - Sample

Visual impairment and hearing loss*	
Blind	8%
Low vision	16%
Deaf	12%
Hard of hearing	25%

*Percent of total respondents with disabilities.

wireless RERC
Rehabilitation
Engineering
Research
Center

Survey of User Needs - Sample

WHAT IS YOUR ANNUAL GROSS HOUSEHOLD INCOME?			
	SUN	**ACS**	**Weight**
Less than $10,000	12.91	13.65	1.06
$10,000-$14,999	8.87	10.48	1.18
$15,000-$24,999	11.43	16.72	1.46
$25,000-$34,999	13.00	12.67	0.97
$35,000-$49,999	14.19	13.94	0.98
$50,000-$74,999	17.24	14.56	0.84
$75,000 or more	22.36	17.98	0.80

wireless
RERC
Rehabilitation
Engineering
Research
Center

Survey of User Needs - Sample

Weighting

- Necessary - Our convenience sample does not provide the degree of representativeness of a random sample

- Technique – What values multiplied by a probability distribution in SUN sample will give me the corresponding distribution in a reference sample?
    - weight X sample = reference sample
    - weight = reference sample / sample

- Reference Sample - Steven Ruggles, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database]. Minneapolis: University of Minnesota, 2010.

AGENDA

1. Overview of the Wireless RERC

2. Overview of the Survey of User Needs (SUN)

3. SUN Sample

4. Wireless Activities

   a. Disability/non-disability divide
   b. Economic divide
   c. Age divide
   d. Urban-rural divide
   e. Disabilities divide

Wireless Activities – SUN vs. Pew

Percentage of cellphone users who use their device to:	SUN*	Pew**
Send or receive text messages	71%	81%
Access the internet	60%	60%
Send or receive email	61%	52%
Download apps	48%	50%
Get directions, recommendations, LBS (GPS)	45%	49%
Listen to music	41%	48%
Participate in a video call or video chat	25%	21%

* All respondents who reported a disability and own a cellphone or smartphone
**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless RERC
Rehabilitation
Engineering
Research
Center

Wireless Activities – SUN vs. Pew

Percentage of cellphone users who use their device to:	SUN*
Voice calling	58%
Social networking	48%
Watching video	44%
Recording voice notes or reminders	24%
Shopping	32%
Playing games	45%
Monitoring health	14%

* All respondents who reported a disability and own a cellphone or smartphone

wireless RERC
Rehabilitation
Engineering
Research
Center

Wireless Activities by INCOME – SUN vs. Pew

Do you use your cellphone for web browsing / to access the internet? (by Income)*				
	Less than $35,000	$35,000 - $49,999	$50,000 - $74,999	$75,000 or more
SUN**	54%	61%	61%	76%
	Less than $30,000	$30,000 - $49,999	$50,000 - $74,999	$75,000 or more
Pew***	55%	60%	63%	79%

* The lowest two income ranges in the SUN did not match exactly with those of the Pew survey.

** All respondents who reported a disability and own a cellphone or smartphone

**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless **RERC** Rehabilitation Engineering Research Center

Wireless Activities by INCOME – SUN vs. Pew

Do you use your cellphone for text messaging? (by Income)*				
	Less than $35,000	$35,000 - $49,999	$50,000 - $74,999	$75,000 or more
SUN**	66%	76%	70%	81%
	Less than $30,000	$30,000 - $49,999	$50,000 - $74,999	$75,000 or more
Pew***	78%	80%	88%	88%

* The lowest two income ranges in the SUN did not match exactly with those of the Pew survey.
** All respondents who reported a disability and own a cellphone or smartphone
**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless RERC
Rehabilitation Engineering Research Center

Wireless Activities by INCOME – SUN vs. Pew

Do you use your cellphone for downloading apps? (by Income)*				
	Less than $35,000	$35,000 - $49,999	$50,000 - $74,999	$75,000 or more
SUN**	44%	45%	48%	65%
	Less than $30,000	$30,000 - $49,999	$50,000 - $74,999	$75,000 or more
Pew***	41%	48%	50%	66%

* The lowest two income ranges in the SUN did not match exactly with those of the Pew survey.

** All respondents who reported a disability and own a cellphone or smartphone

**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless RERC
Rehabilitation Engineering Research Center

Wireless Activities by AGE – SUN vs. Pew

Do you use your cellphone for web browsing / to access the internet? (by AGE)				
	18-29	30-49	50-64	65+
SUN*	63%	73%	57%	40%
Pew**	84%	72%	45%	19%

* All respondents who reported a disability and own a cellphone or smartphone
**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless RERC
Rehabilitation Engineering Research Center

Wireless Activities by AGE – SUN vs. Pew

Do you use your cellphone for text messaging? (by AGE)				
	18-29	30-49	50-64	65+
SUN	69%	81%	71%	56%
Pew	97%	94%	75%	35%

**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless RERC
Rehabilitation Engineering Research Center

Wireless Activities by AGE – SUN vs. Pew

Do you use your cellphone for downloading apps? (by AGE)	18-29	30-49	50-64	65+
SUN	55%	58%	45%	28%
Pew	77%	59%	33%	14%

* All respondents who reported a disability and own a cellphone or smartphone
**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless RERC Rehabilitation Engineering Research Center

Wireless Activities by Urban/Suburban/Rural Home home location – SUN vs. Pew

Do you use your cellphone for web browsing / to access the internet? (by HOME LOCATION)			
	Urban	Suburban	Rural
SUN*	60%	63%	56%
Pew**	65%	62%	47%

* All respondents who reported a disability and own a cellphone or smartphone
**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless RERC
Rehabilitation
Engineering
Research
Center

Wireless Activities by Urban/Suburban/Rural Home home location – SUN vs. Pew

Do you use your cellphone for text messaging? (by HOME LOCATION)			
	Urban	Suburban	Rural
SUN*	70%	72%	71%
Pew**	82%	82%	76%

* All respondents who reported a disability and own a cellphone or smartphone
**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless **RERC** Rehabilitation Engineering Research Center

Wireless Activities by Urban/Suburban/Rural Home home location – SUN vs. Pew

Do you use your cellphone for downloading apps? (by HOME LOCATION)			
	Urban	Suburban	Rural
SUN*	48%	50%	43%
Pew**	52%	52%	39%

* All respondents who reported a disability and own a cellphone or smartphone
**http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013

wireless
RERC
Rehabilitation
Engineering
Research
Center

AGENDA

1. Overview of the Wireless RERC

2. Overview of the Survey of User Needs (SUN)

3. SUN Sample

4. Wireless Activities

    a. Disability/non-disability divide
    b. Economic divide
    c. Age divide
    d. Urban-rural divide
    e. Disabilities divide

Wireless Use – All Respondents with Disability

If you own or use a cell phone or tablet, what kind do you use? (Check all that apply) - DISABILITY or IMPAIRMENT

	Voice calling	Texting	Internet	Apps	Social media
Cognitive	80%	81%	68%	53%	58%
Anxiety	71%	85%	69%	58%	56%
Seeing	80%	79%	65%	57%	48%
Hearing	54%	87%	74%	57%	53%
Speaking	49%	84%	76%	56%	60%
Using arms	76%	75%	66%	57%	52%
Using hands, fingers	75%	77%	68%	57%	56%
Walking, climbing stairs	75%	75%	63%	51%	52%

wireless **RERC** Rehabilitation Engineering Research Center

Wireless Use – All Respondents with Disability

If you own or use a cell phone or tablet, what kind do you use? (Check all that apply) - DISABILITY or IMPAIRMENT					
	Voice calling	Texting	Internet	Apps	Social media
Hearing Loss					
- Deaf	14%	95%	83%	58%	59%
- Hard of hearing	68%	84%	71%	59%	52%
- Blind	81%	74%	55%	58%	37%
- Low vision	75%	81%	65%	54%	51%

wireless **RERC** Rehabilitation Engineering Research Center

Thank you!

John Morris, Ph.D.

Research Scientist

john_morris@shepherd.org

404-367-1348