Use of mHealth Technologies by People with Vision Impairment

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CSUN Assistive Technology Conference 2019

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Acknowledgment

The Rehabilitation Engineering Research Center for Community Living, Health and Function (LiveWell RERC) is funded by a 5-year grant from the National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR) in the U.S. Department of Health and Human Services (grant number 90RE5023).

The opinions in express here are those of the authors and do not necessarily reflect those of the U.S. Department of Health and Human Services or NIDILRR.

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NIDILRR
National Institute on Disability, Independent Living, and Rehabilitation Research

LiveWell RERC: Mission

1. Promote ICT access to existing and emerging technologies for all people regardless of ability

2. Develop and validate ICT application to improve the capacity for independent living and community participation

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LiveWell RERC: Research Partners

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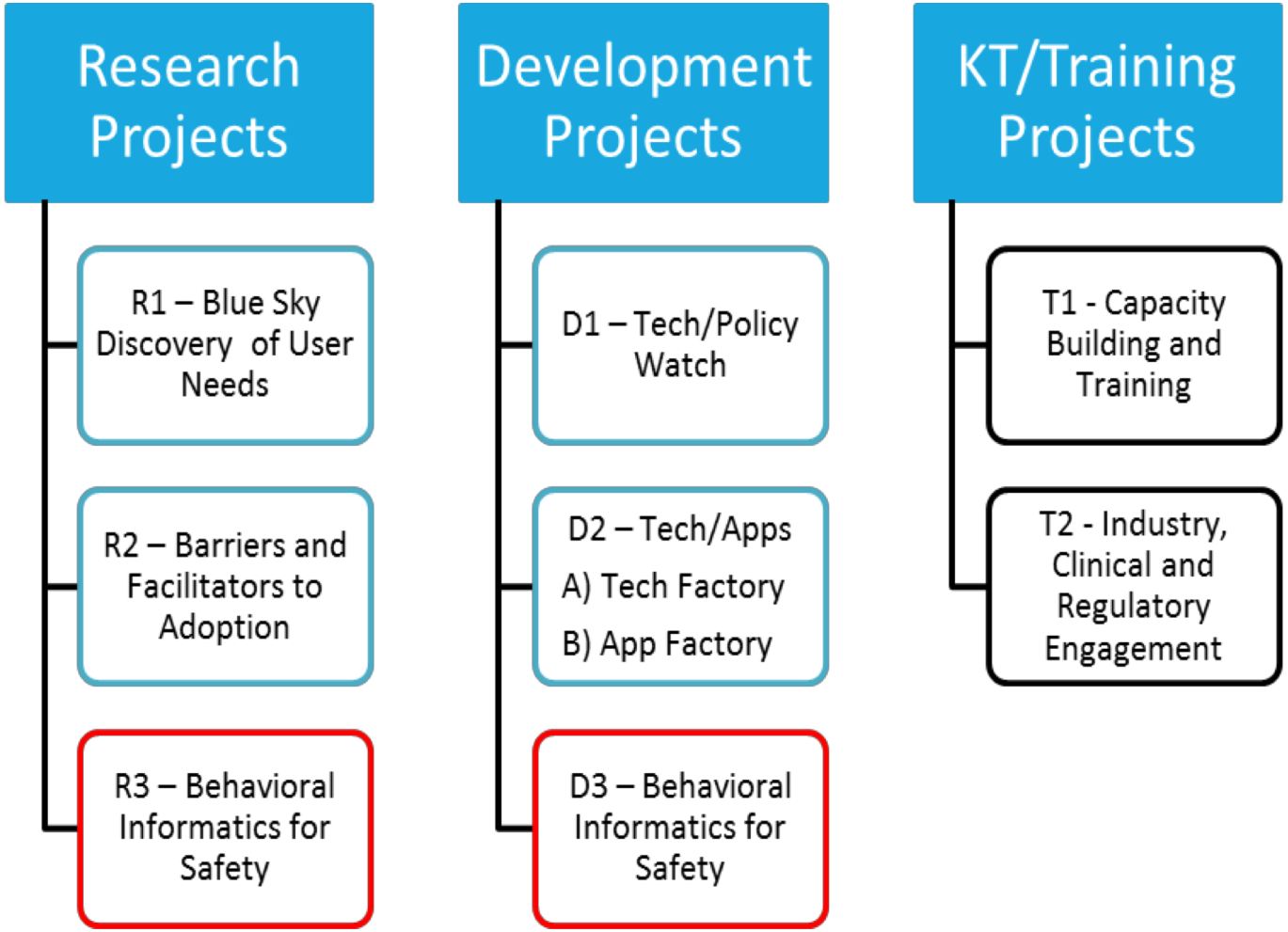
LiveWell RERC: Projects



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R1 Discovery of User Needs

Purpose

- Identify needs & preferences for community living of people with disabilities that may be addressed by ICT apps

Activities

- Surveys of user needs
- "Blue Sky" focus groups

Outputs

- Published survey results of user needs and preferences
- Use-case scenarios and evaluation of impact

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R1 Blue Sky Focus Groups

- Barriers and facilitators to technology use
- Mobility and community mobility needs
- Use of mHealth technologies

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R1 mHealth Technology Focus Groups

Use of mHealth Technologies by People with Visual Impairment

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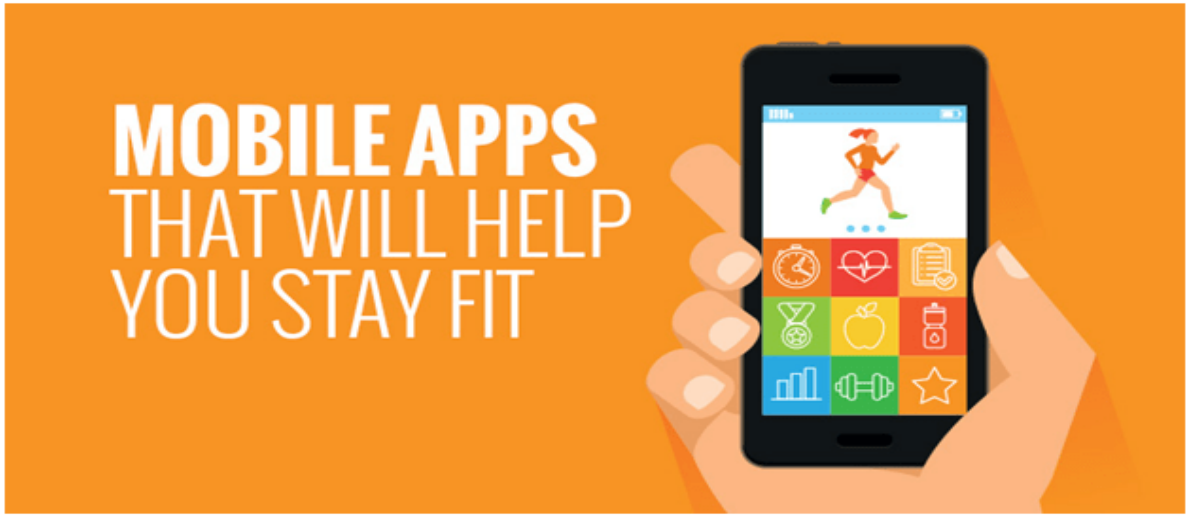
How do we define mHealth?

Definition - Mobile healthcare (mHealth)

Medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants, and other wireless devices

World Health Organization, 2011



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How do we define mHealth? (cont.)

Other terms:

- Telehealth
- Telerehabilitation
- eHealth
- mHealth
- mRehab
- Digital health
- Connected health

Terms often are used to refer to **overlapping health care services and practices**

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How do we define mHealth?

Definitions – Telehealth vs. mHealth

Telehealth - individualized healthcare services and practices delivered via voice or video calls, sometimes supplemented with other camera systems to view patients performing exercises or to perform other visual inspection.

mHealth - healthcare services and practices delivered via *mobile* devices such as cellphones, tablets and wearable devices.

How do we define mHealth?

Definition – Mobile healthcare (mHealth)

Digital health - US Food and Drug Administration (FDA) combines the various services, technologies and practices under the term *digital health*:

"The broad scope of digital health includes categories such as mobile health (mHealth), health information technology (IT), wearable devices, telehealth and telemedicine, and personalized medicine"

US Food and Drug Administration, 2017.

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Why is mHealth Technology important today?

mHealth Technology offers the potential to:

- facilitate interactions with healthcare professionals and
- support personal engagement and in health data collection, goal setting, and healthy lifestyles.

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Why is mHealth Technology important for people with disabilities?

- **Access** to healthcare professionals, health information, personal health data, etc.
- **Reduce health disparities** by facilitating interactions with healthcare professionals and supporting personal engagement and in health data collection, goal setting, and healthy lifestyles
- **Promote the health and fitness** of people with disabilities

However, little is known about the mHealth experiences of people with disabilities.

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Health Disparities among People with Disabilities

- Chronic conditions - people with disabilities are more affected
- High incidence of chronic conditions and co-morbidities among people with vision impairment
  - Hypertension
  - Diabetes
  - Cardiovascular disease
- These chronic conditions and health risks can be managed by mHealth technologies

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Health Disparities among People with Disabilities

Compared to nondisabled adults or US adults with disabilities, have higher prevalence of:

- physical inactivity is 120%
- obesity rates are 57%
- smoking rates 47%
- hypertension is 13%

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Health Disparities among People with Disabilities

Compared to nondisabled people in the US

- People with disabilities of all ages have more than twice the incidence of diabetes.
- Adults with disabilities have three times the rate of rates of cardiovascular disease—the leading cause of death in the US.

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Health Disparities for People with Vision Impairment

Americans 65 years of age with vision impairment (compared to those without) are more likely to have:

- weak/failing kidney (2.3 times more likely)
- have had a stroke (2.0)
- have arthritis (1.9)
- diabetes (1.6)
- heart disease (1.6)
- chronic obstructive pulmonary disease - COPD (1.6)
- asthma (1.6)
- depression (1.5)
- hypertension (1.4)
- high cholesterol (1.3) (CDC, 2018).

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Purpose

Use of mHealth Technologies by People with Vision Impairment

To identify and describe:

- Patterns of use
- Barriers and facilitators
- Attitudes
- Discovery of mHealth technologies and apps

… to using mHealth technologies by individuals with vision impairment.

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Methods

Use of mHealth Technologies by People with Vision Impairment

- Exploratory, qualitative study
- 2 focus groups, held in March 2018
- Convenience sample
  - 6 individuals with blindness
  - 8 individuals with very low vision
- Inclusion criteria
  - 18 years or older
  - English speaking
  - Self-identified as being blind or having very low vision

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Sample

Table 1. Demographic and technology profile (All participants)

Age range (years)	30-67
Age mean (years)	44
Gender (% Female)	36%
Education (% with bachelor's degree or higher)	50%
Income (% below $15,000 annual income)	50%
Household structure (% living alone)	36%
Assistive technology – use screen reader (%)	86%
Assistive technology – use screen magnifier (%)	57%
Consumer technology – use smartphone	93%
Consumer technology – use tablet	86%

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Sample

Table 2. Do you own or use any of the following technologies to support your health and wellness? (% of all participants)

Cellphone	86%
Laptop computer	64%
Tablet	64%
Patient portal	64%
Desktop computer	36%
Dedicated health monitors (glucose, BP)	29%
Wearable device	21%
Automated devices in the home	21%

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Methods

Use of mHealth Technologies by People with Vision Impairment

Data collection:
Two 60-90 minute discussions, moderated by 1 investigator.

Instrument:
Semi-structured moderator script with open-ended questions:

- What is mHealth technology?
- What types of mHealth technology do you use?
- What are your health interests and needs?
- What are some benefits to using mHealth technology?
- What prevents you from using mHealth technology?
- What assistance may you need to use mHealth technology?
- How do you discover new mHealth technologies & resources?

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Data Analysis

Use of mHealth Technologies by People with Vision Impairment

- Used a standard approach to qualitative analysis and grounded theory
- Constant comparative method (Strauss & Corbin, 1990)
  - Each researcher independently read the focus group transcripts to get an overall sense of the tone and content of the material, and identified major themes and patterns
  - Researchers then met to discuss their interpretations to ensure that there was consistency in identification of themes and patterns, clarify and derive consensus on discrepancies, and ensure saturation.

Data Analysis – mHealth Themes

Use of mHealth Technologies by People with Vision Impairment

- Most examples of mHealth technology mentioned coded as:
  - patient portals
  - mobile applications for health and fitness
  - medical and health-related devices
- Other examples of mHealth technologies identified coded as:
  - accessibility supports
  - mobile health trackers
  - online resources (e.g., healthcare websites, search engines for medical reference, instructional videos)
  - general platforms like smartphones and tablets
  - exercise machines with smart device connectivity

Data Analysis – mHealth Themes

Use of mHealth Technologies by People with Vision Impairment

- **Patient portals** – secure online website that may be used to: access patient health information, (e.g., medical records, lab results), schedule appointments; communicate with clinical staff and view health educational information
- **Mobile applications** - computer programs on mobile devices (phone/tablet/watches/trackers) used to support personal health and fitness goals
- **Medical devices** – to measure vital signs and other clinical indicators, such as blood pressure, heart rate, temperature, blood glucose (sugar) levels, and weight.
- **Accessibility supports** – to overcome inaccessibility of health information due level of vision; technology that simplifies the task of obtaining health information (i.e., reducing the number of devices used to get the health information)

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Table 3. mHealth technology solutions mentioned by participants

Patient Portals	Mobile Health Apps	Medical & Health Devices	Mobile Health Trackers	Accessibility Supports	Online Resources
WellStar Health Systems	Apple Health	Blood pressure monitor	Activity and fitness trackers	Screen readers	Medical reference websites
MyChart (Piedmont Hosp)	Samsung S-Health	Glucose monitor	Fitness watches	Magnifiers	Search engines
FollowMyHealth (Dekalb Med)	Couch-to-5k	Thermometer	Wearables	RUBY products	Instructional videos
KP app (Kaiser)	MyFitness Pal	Bluetooth scales		Barcode scanners	AppleVis
	FitBit app	ScriptTalk			VIA
	iFit app				
	BlindAlive				
	EyesFree Fitness				
	CARROT apps				
	SeeingAI				
	Magnifier				
	Alarm				
	Reminder				
	Calendar				

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Data Analysis – Health Needs and Interests

Use of mHealth Technologies by People with Vision Impairment

Health needs – pragmatic or instrumental needs/goals

- Maintaining good health
- Managing chronic conditions

"Either I can be healthy and use the technology. Or I cannot use it [and] I'm not going to be able to be healthy."

"Very important, especially if I'm getting my numbers over to my doctor, because my blood sugar numbers indicate what my A1C number is for a specific period of time.

"It helps me to be connected with my family, my doctor, because, you know, again, we live in a time doctors don't have time."

Data Analysis – Health Needs and Interests

Use of mHealth Technologies by People with Vision Impairment

Health interests – intrinsic values

- Living well
- Family and community sharing
- Entertainment
- Accountability
- Inevitability – “So you have no choice, really, but to do this because, again, it's the way of the world right now. … And I don't want to be left behind.”

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Table 4. Why participants use mHealth technology

Pragmatic Health Needs	Intrinsic Motivations
General health maintenance	Healthy living
Specific chronic health conditions/disease management	Communication - with others about personal health
Communication with providers for general health & chronic disease mgmt	Accountability – with self and others
	Efficiency – ease of tracking health data
	Satisfaction – affirming to see progress in goals
	Entertainment – fun to view information and compete against others
	Inevitability – use of technology is the way of the world

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Data Analysis- Decision Making Themes

Use of mHealth Technologies by People with Vision Impairment

Discovery – Learning about new technologies / mobile apps

- "I come here and I learn from other people that have blindness…"
- "I listen and take notes."

Acquisition – Can be hard to distinguish from discovery and abandonment

- "When I pick out an app, it's got 5 minutes to impress me."
- Barriers: "Directions and setup. Directions is the hardest thing. Even the stuff that's built for us, the directions are not built for us."

Abandonment – Either voluntary or involuntary

- "Once you get past the initial setup, it's not going to read anything to you."
- "Either when my phone or the app goes through an update" - does not function properly or functionality or accessibility is lost.

Table 5. Decision-making processes for mHealth technology use

Discovery	Acquisition	Abandonment
Personal networks & word-of-mouth	Accessibility	Becomes inaccessible (updates to OS or apps; level of vision worsens)
Online media	Functionality	Not enough storage/RAM available
Professionals (healthcare, advocates, assistive technology, research)	Design	Better choice becomes available (cost, design, or function)
	Complexity/Ease of Use	Not convenient to have multiple devices, cords, chargers, etc.
	Accuracy of data measurements	
	Financial cost	
	Perceived value	
	Perceived usefulness	

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Conclusions

Use of mHealth Technologies by People with Vision Impairment

- **Similar conceptualizations** between the blind and low vision groups regarding mHealth technology – portals, fitness and health monitoring.

- **Similar experiences** regarding the technologies used, perceived benefits and barriers, health needs and interests, and the process of choosing to use mHealth technology.

- **Somewhat different level of enthusiasm** – blind group seemed more enthusiastic and animated than low-vision group. More motivated by intrinsic values of interacting with mHealth technology.

Conclusions

Use of mHealth Technologies by People with Vision Impairment

Barriers to mHealth technology use focused mainly on

- Accessibility
- Cost
- Complexity/multiplicity of devices/technologies

Benefits of mHealth technology included:

- Better management of personal health data via electronic tracking
- Support of physical activity, nutrition, weight, sleep, and stress management goals
- Access to global health & medical information
- Opportunities for improved communication with clinicians involved in their healthcare
- Personal rewards – goal setting, accountability, sharing

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Thank you!

We wish to thank:

- Our focus group participants
- Center for the Visually Impaired in Atlanta
- NIDILRR
- CSUN Conference
- Editors and reviewers for the *Journal on Technology and Persons with Disabilities*

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Thank you!

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