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Essays

The future of accessibility in disaster conditions: How wireless technologies will transform the life cycle of emergency management☆

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ABSTRACT

By describing a transformed life cycle of emergency management, this paper re-envisions how emergency managers may prepare for, respond to, recover from, and mitigate against disaster impacts in the future. Additionally, this paper also reveals how the broader social, political, economic, and cultural levels must change to foment a culture of safety with and for people with disabilities. The authors use the framework to identify how future wireless technologies can empower people with disabilities with regards to individual (or household) emergency preparedness and in coping with the drastic life changes following a disaster.

1. Introduction

This paper examines a "flash-forward" approach to how emergency managers can pro-actively integrate and empower people with disabilities and disability organizations to reduce risks in disaster contexts. To manage the discussion, a "life cycle" of emergency management will include, but not be limited to, examples of real technology trends (particularly wireless technologies) in emergency management. Worldwide, most emergency management professionals rely on phases to organize activities. While they are called different names, they all tend to encompass common activities and goals. To illustrate the phases and related technologies, this paper will consider questions within the life cycle of emergency management such as phases that include:

- *Preparedness*. How have wireless technologies enhanced preparedness efforts, particularly outreach to and education of people with disabilities and their community networks? How has it helped individuals take steps to prepare themselves, such as by using wireless technologies to acquire information, training, or ideas?
- *Response*. How have wireless technologies changed the warning process, sped the rescue process, reduced reaction and evacuation times, and reduced the need for shelters and/or extended sheltering times? What innovative practices are not

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only helping those experiencing survival challenges during response but also serving the first responders who seek to help?

- *Recovery*. How do wireless technologies enable location of accessible shelters and housing? Given the integration of accessible design elements, how have shelters and post-disaster housing become both physically and technologically accessible? How does it help improve the pace of re-entry back into the community by providing the information to make decisions and help strengthen health and social support systems?
- *Mitigation*. In what ways have new codes and standards for use of elevators (e.g., "smart cabs"), and wireless technologies (among other features) become integrated into post-disaster reconstruction as a means to mitigate future risks for people with disabilities? Does such mitigation effort encourage resilience, or the ability to bounce back after disaster strikes?

By using several real examples of trends and practices emerging in 2015 and carrying them through to 2050, we will illustrate the potential outcomes if supported today. The paper will also review the transformative agents and conditions required for movement toward a newly-envisioned 2050. We rely on an eco-systems framework to reveal the agents of such transformative change, drawing from the questions used in the previous section.

There are other factors to keep in mind as we work through this paper. It is acknowledged that many other conditions can be overlaid with disability, thereby compounding the potential impact. These may include age, gender, cultural identity, historic patterns of racism and discrimination and literacy level, to list a few. But, in particular, income has a significant impact on the ability to obtain much of the technology discussed here on an individual level assuming, it is readily available. Carried through, that factor needs to be presumed by the organizational and governmental levels and budgeted into all phases of the emergency life cycle. This example is true very broadly across the whole community but very relevant when crossed with disability. Consider that nearly half those with an annual household income under $15,000 have a disability or that 1 in 3 unemployed adults who are able to work have a disability.[1] For further examination of this, see Table 1. Further, we recognize that disability is a spectrum. Disability can be chronic or episodic; visible or invisible; life-long or sudden onset; and an individual may have one defined disability or several at any given time. Within this paper we have selected but a few disabilities as examples to illustrate how technology might be applied but there are many more in real-time. While we focus on sensory and mobility disabilities, these represent the largest percentage of people with disabilities. According to the findings reported in the 2010 U.S. Census 7.6 million people 15 and older have a hearing impairment; 8.1 million people 15 and older have a vision impairment; and 30.6 million people 15 and older have a form of movement impairment affecting walking or climbing stairs. In 2010, this represented nearly 80% of people with disability (total 56.7 Million), which was also the last time the U.S. Census collected such specific data on people with disabilities. For further examination of this, see Table 2.

This paper is designed to envision a transformed, mid-century view of emergency management and accessibility. Rather than presenting just an optimistic future view, the paper will lay out the route most likely to lead toward such an outcome. As such, the paper will reveal a groundbreaking vision coupled with a guide that compels forward movement.

2. The life cycle of emergency management

In this section, each phase of the disaster life cycle (commonly referred to globally as preparedness/readiness, response, recovery, and mitigation/reduction/prevention) is defined and illustrated. Following each definition, typical activities are presented to re-imagine a future in which wireless technologies dramatically lessen the impacts of disaster for people with disabilities. Some of the technology ideas presented here are already underway as prototypes or working theories that have been presented in trade publications, academic journals, or at conferences. Other ideas are pre-concept imaginations based on current technology abilities and the overwhelming disaster-related needs of people with disabilities. The goal of the

Table 1
Snapshot of earnings and poverty in the U.S.

	People with disabilities	People without disabilities	Source
Median Earnings (12 month period)	20,184	30,660	*Source: 2012 American Community Survey, Table B18140* http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtmlpid=ACS_12_1YR_B18140&prodType=table
People employed earning 100,000 or more	4%	8%	*Source: Disability Employment Tabulation, from 2008-2010 American Community Survey, Table Set 7A* http://www.census.gov/people/disabilityemptab/data/
Percent in poverty	23%	15%	*Source: 2012 American Community Survey, Table B18130* http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtmlpid=ACS_12_1YR_B18130&prodType=table

[1] http://www.cdc.gov/ncbddd/disabilityandhealth/infographic-disability-impacts-all.html Accessed 13.05.16.