

Evaluating the Impact of Mobile Devices Use on Home Care Visits: Issues and Considerations

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Introduction

- use of mobile devices and healthcare applications in home care settings is rapidly increasing
- There is currently an exponential rise in the use of mobile devices and use of mhealth applications in home care
 - older adults
 - older adult caregivers
 - health professionals working in home care

Background

- few researchers have explored and published on:
 - methodological issues and considerations encountered when conducting in-situ usability testing (i.e. usability testing conducted in the setting of use)
 - In environments where healthcare activities take place

Background

Smart phone users turn to mobile devices:

- 62% - look up information about a health condition
- 57% - do banking online
- 44% - view real estate listings or information about a place to live
- 43% - view job information
- 40% - view government services or information.
- 30% - take a class
- 18% - submit a job application
 - (Pew, 2015)

Purpose

- In this presentation I outline:
 - several practical approaches to evaluating the usability of mobile devices and software applications in home care
 - More specifically I examine the issues surrounding **obtrusiveness**
 - and the **Hawthorne Effect**
 - In conducting usability testing in situ and out experiences to date



Continuum of Obtrusiveness

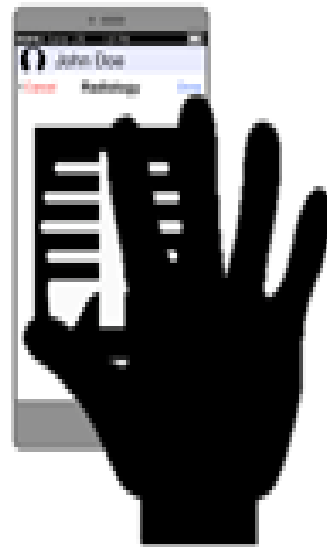


Least Obtrusive

Most Obtrusive

Least Obtrusive: Device as Screen and Audio Recorder

- least obtrusive of these approaches
- mobile device:
 - provides the user with access to the mobile eHealth applications
 - also used to collect verbal and screen recording data
- Strengths
 - least obtrusive
 - low cost (mobile device and recording application)
 - can study user interactions with the
 - mobile device
 - mobile software applications



Device as Screen and Audio Recorder

- Weaknesses:
 - cannot record physical user interaction with the user interface (i.e. finger touches and hand gestures)
 - Lowers the quality of recorded data
 - may have insufficient storage for audio and video recording data

More Obtrusiveness: Mirroring to a Computer

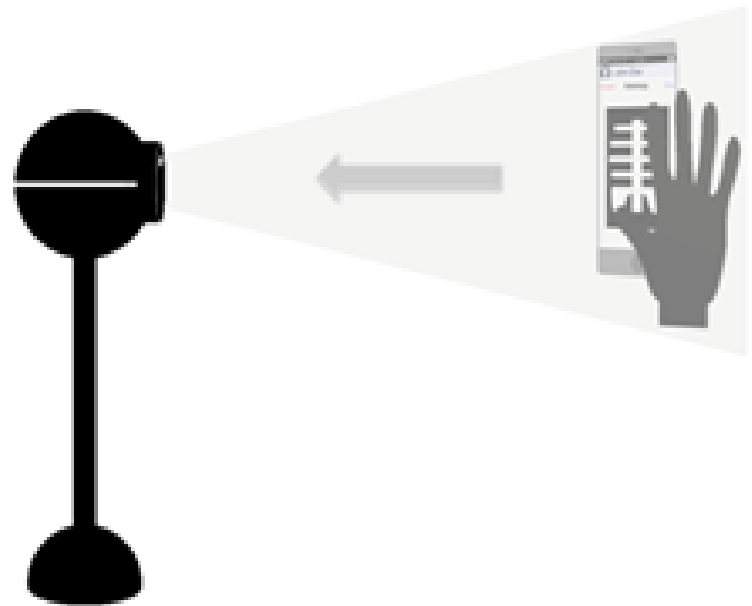
- Mobile device mirrored to a computer
- Strengths
 - high quality recordings as mobile device interface is mirrored to a computer with audio/video recording software
 - transmission of data from an iPhone® or Samsung Phone® screens to a computer
- Weaknesses
 - cannot record physical user interactions with the user interface (i.e. stylus movements, finger touches and/or hand gestures)
 - additional cost of laptop computer



Highly Obtrusive: Using a Document Camera

Strengths:

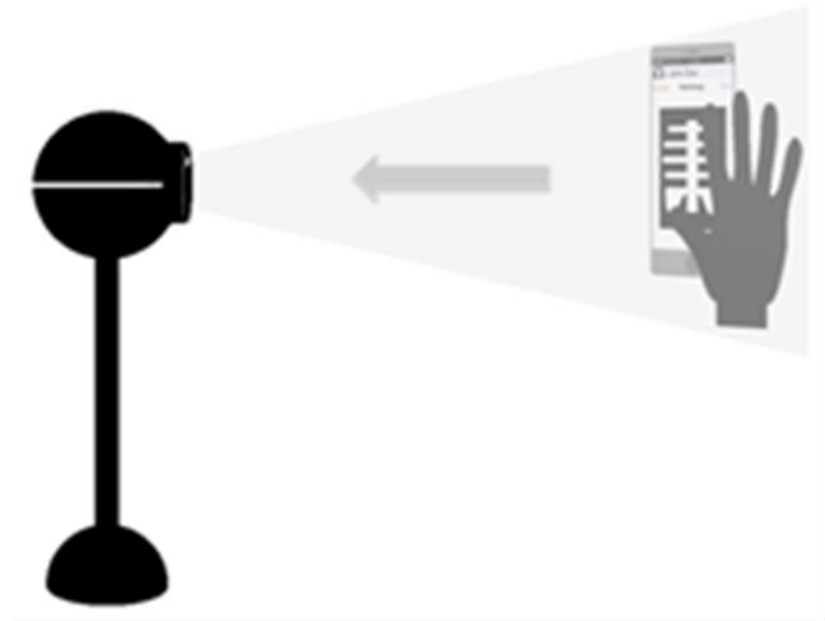
- can be easily be taken to an in-situ setting
- quality of document cameras has improved significantly
 - smaller in size (approximately 25 cm long and 10 cm wide)
 - have built in microphones
 - 10x the zoom function
 - can be adjusted to focus on any device
 - can be plugged into a computer where the images and audio can be recorded
- Can record stylus, finger and hand gestures



Using a Document Camera

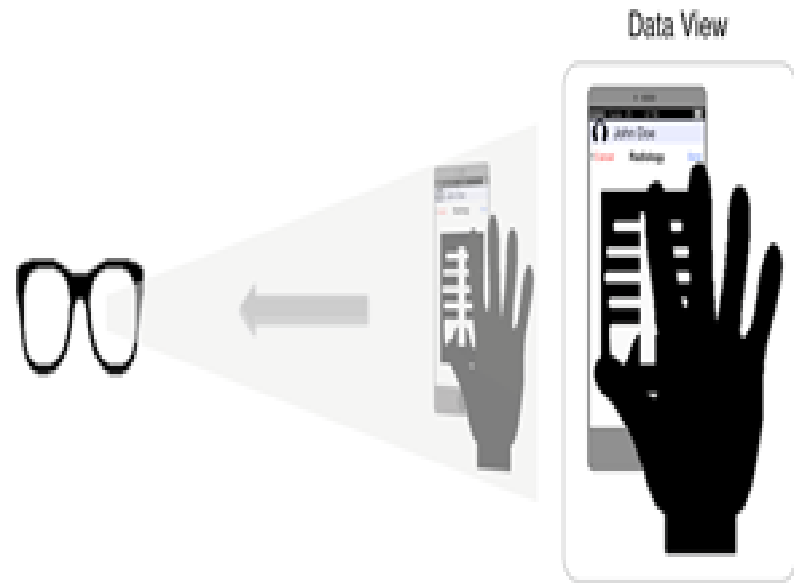
- Weaknesses

- mobile device to be located in a relatively fixed position
- screen can be recorded by the camera
- useful for laboratory style studies
- less useful for studies where the user is moving around in a real or realistic environment



More Obtrusive: Glasses as a Recording Device

- **Strengths:**
 - can be effectively used to collect information about what participants are viewing in addition to hand, finger or stylus movements
 - researcher can view the world as the participant views it, and the participant is able to physically move while wearing the glasses
 - glasses should be selected with the ability to record audio and video data (as not all glasses record audio data).
 - needs sufficient storage space to collect the data that is being sought
 - need to determine at what points downloading should take place



Glasses as a Recording Device

Weaknesses

- glasses themselves must also be considered in terms of their usability and ergonomics
- some eyewear is difficult to position on the nose to fully record activities.
- Some eyewear does not correct for changes with vision associated with aging
- some users find wearing glasses that can video and audio record are irritating to the nose.
- some glasses do not respond well to participants' head movements (i.e. the video may become choppy).



Conclusions

- Multiple methods to conducting mobile usability studies in healthcare
- Impacts on participant behaviour (i.e. obtrusiveness)
 - Hawthorne Effect
 - Implications for ecological validity
 - Has an effect what is recorded
 - User physical stylus, finger and hand gestures involving a mobile device
 - What the user are viewing
 - User activities in context

Factors to Consider

- availability of screen and audio recording software for a mobile device
- storage space for screen and audio recordings for mobile devices
- Evaluation of the range of devices
- Cost of the device and recording software/equipment

Conclusions and Lessons Learned

- Need for pilot testing:
 - mobile device and recording software/equipment
- Identify research questions
 - Focus is interface design and/or
 - Focus is workflow
- Develop study procedures
- Will influence the choice of audio and video recording methods involving mobile device and application in health care
- Currently analyzing data on mobile device use for community health care in Ontario