

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

Elizabeth M. Borycki RN PhD  
Associate Professor

Janessa Griffith MSc  
Helen Monkman MSc PhD(cand)  
Andre Kushniiruk MSc PhD

School of Health Information Science,  
University of Victoria, Victoria, BC, Canada



# 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

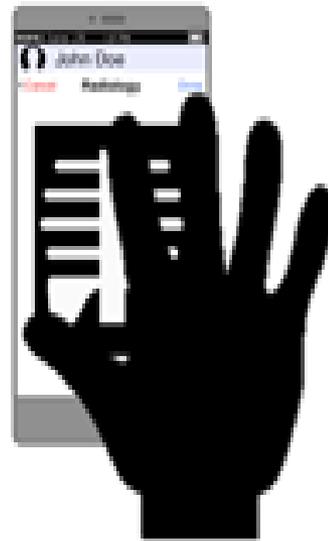


Least Obtrusive

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

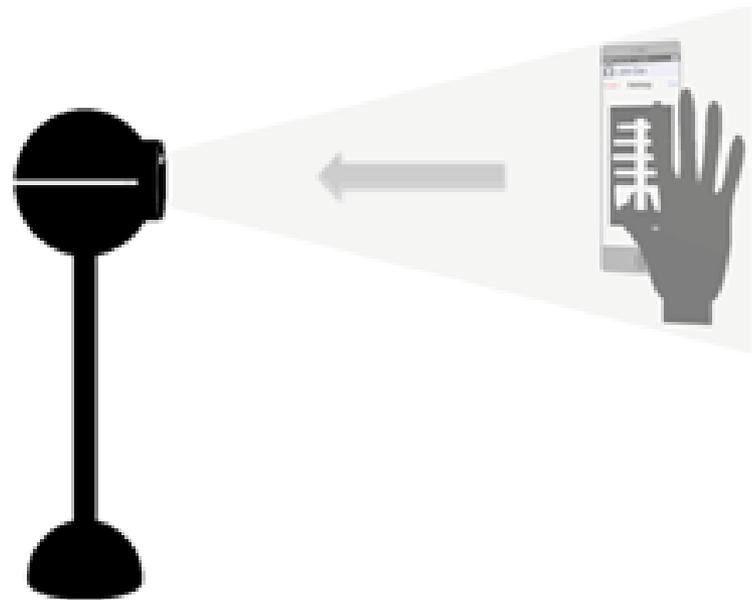
- Mobile device mirrored to a computer
- Strengths
  - high quality recordings as mobile device interface is mirrored to a computer with audio/video recording software
  - transmission of data from an iPhone® or Samsung Phone® screens to a computer
- Weaknesses
  - cannot record physical user interactions 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:

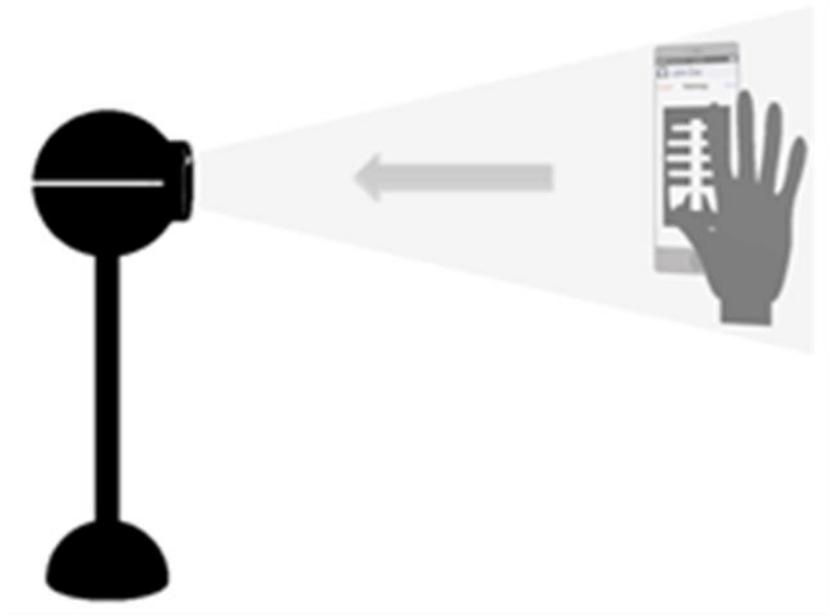
- can be easily be taken to an in-situ setting
- quality of document cameras has improved significantly
  - smaller in size (approximately 25 cm long and 10 cm wide)
  - have built in microphones
  - 10x the zoom function
  - can be adjusted to focus on any device
  - can be plugged into a computer where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



# Using a Document Camera

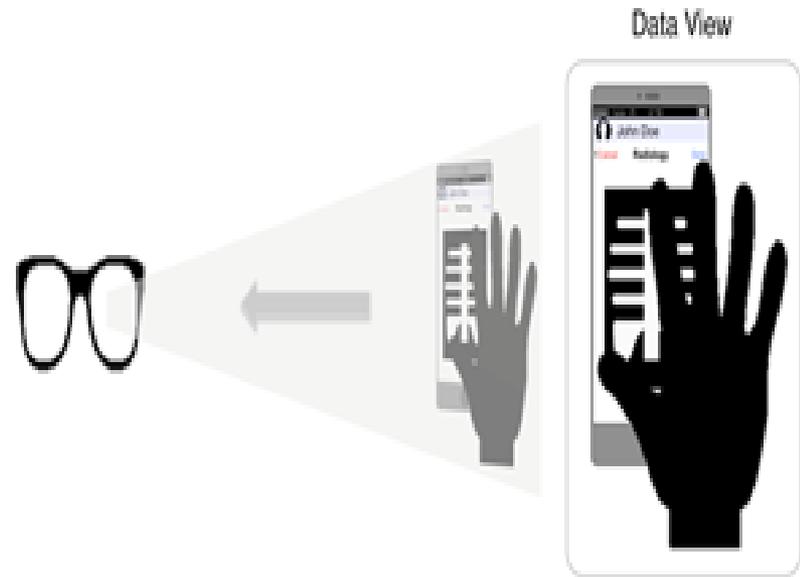
- Weaknesses

- 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