Swiss Ehealth Summit

Smartphones: Evidence-based User-Interface Design

Frederic Ehrler, PhD
Magali Walesa
Evelyn Sarrey
Prof. Christian Lovis, MD MPH
Introduction

- Increasing popularity of Handheld devices in healthcare
  - Increasing pressure from stakeholders and clinicians to integrate handheld devices in the care process
- Promises
  - More time spent at patient bedside
  - Simplified caregivers’ workflow
  - Improved quality of care
Problems

- How to insure the quality of the recorded data
  - Studies have shown that errors rate increases on handheld devices
    - Smaller screen
    - Disruptive interaction paradigm
  - User acceptance must be insured
Interrogation

- Does the interface influences users performance while manipulating data on handheld device
- We want to bring evidences based answers to this issues
Approach

- Looking for evidences
  - Adoption of a rigorous approach to acquire evidences
  - Set up of a field study to compare several input interfaces
field study

- Participants have to record vital signs
- Well suited task for our needs
  - Accomplished many times during caregivers shift at bedside
  - Must be accurate
  - Requires entering simple numbers
- Three different signs
  - Pulse
  - Temperature
  - Respiratory rate
The interfaces

**Numeric keypad**
- Most popular interface to enter digits
- Most users are already accustomed to the model

**Wheeler**
- Popular on some smartphones to enter dates

**Numeric stepper**
- Popular on some smartphones to enter dates

**Character recognition**
- The model doesn’t adapt itself to the users but, on the contrary, users have to learn to draw the number as required

**Column**
- Model initially developed to manipulate data directly on a graph

**Circle Model**
- Innovative interface that aimed to minimize the number of clicks by the user
Workflow

- 3 measures to enter in a row
- 3 different vital signs
- 9 different interfaces
- 81 measures in total
- 9 for each interface
Interfaces’ influences

- Users’ performances
- Quality of data
- Learning curve
Population

- In total 93 nurses have participated to the test and 87 remained after cleaning the data.
- 4 age groups equally distributed
- A larger proportion of younger users possess a smartphone
Efficiency and accuracy

- Performing the task on numeric keyboard takes significantly less time than the other models
- Accuracy remains above 95% for the traditional models
User ranking

- Participants are requested to share their feelings regarding their difficulty to master a given model
- They rank each interface on six levels representing their level of satisfaction
- Numeric keyboard is the preferred interface for 2/3 of the participant
Discussion

- Dealing with missing values
  - No simple solution to deal with missing value
- The failure of the digital character recognition model
  - Significantly lower performance
- Younger users are more familiar with smartphones
  - Familiarity with handheld device influences the performances
- Users’ preferences reflect their real performance on the model
  - Users have a good idea of their performance
Conclusion

- Stakeholders must be aware that users prefer efficient solutions over fancy ones.

SIMPLE IS SMART
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Magali Walesa
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Frederic.ehrler@hcuge.ch