A Multi-Faceted and Pragmatic Approach to Evaluating A Web-Based Patient Decision Aid

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Background

- Patient decision aid (PDA) - help patients make an informed decision about their health.
- Challenges: PDAs are often not utilized in clinical practice\(^1\)
  - unavailability
  - low distribution rate

Background

• Internet can be a solution to this problem.

• World Bank, 2013:¹
  - 38.1% of the world population have access to the internet
  - more developed countries, internet usage can be as high as 96.5% (Iceland)

• More PDAs are being delivered online.²

• Supported by dissemination and implementation theories.³

¹. The World Bank. 2015.
Background

• Web-based patient decision aids (wPDAs):¹
  - accessibility
  - interactivity
  - ease of maintenance

• Design of wPDA – tailored to a specific group (e.g., elderly)

• Importance of usability and utility testing

• Previous studies reported usability and utility; few look at the methods of evaluating the users’ experience in using the wPDA.

Objective

• To describe a multi-faceted and pragmatic approach to evaluating the usability and utility of the ‘Should I start insulin’ wPDA.
‘Should I start insulin’ wPDA Development Process

Need for a wPDA

wPDA development

- Content drafting
- Alpha testing
- Beta testing

Evaluation method: The multifaceted approach

Iterative revision

Usability

Utility

Finalised wPDA
‘Should I start insulin’ wPDA
Methods

• The multi-faceted approach: (mixed methods)
  - retrospective think aloud with probing
    > screen recording
    > facial recording
    > in-depth interview with playback
  - direct observation
  - questionnaire
Methods

• **Participants**
  - Type 2 diabetes patients
  - Advised to start insulin by the doctor
  - Have not started insulin
  - English literate
  - Familiar with using a computer and web browsing

• **Setting**
  - Primary Care Clinic, University of Malaya Medical Centre, Malaysia.
The Process

1. Sign consent form

Explain the study
The Process

1. Sign consent form

2. Pre-usage questionnaire

Demographic data
Stage of decision making/preferred treatment
Decisional Conflict Scale
The Process

1. Sign consent form
2. Pre-usage questionnaire
3. Start using the wPDA

Direct observation
Stand by to assist
Facial recording
Screen recording
No interruption
The Process

1. Sign consent form
2. Pre-usage questionnaire
3. Start using the wPDA
4. Post-usage questionnaire

Stage of decision making/preferred treatment
Decisional Conflict Scale
System Usability Scale (SUS)
The Process

1. Sign consent form
2. Pre-usage questionnaire
3. Start using the wPDA
4. Post-usage questionnaire
5. Retrospective think aloud and probing

- Watch playback (screen + facial)
- Think aloud
- Probe: semi-structured topic guide
- Audio-recorded
The Process

1. Sign consent form
2. Pre-usage questionnaire
3. Start using the wPDA
4. Post-usage questionnaire
5. Retrospective think aloud and probing
6. Data analysis and team discussion

Framework approach: 6 Sections (usability + utility)

- Audio and screen playback
- Notes from observation
- Discuss on the same day and reach a consensus
<table>
<thead>
<tr>
<th>Sections</th>
<th>Feedback from:</th>
<th>Usability/Format</th>
<th>Utility/Content</th>
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<tr>
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<td>Participant</td>
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<tr>
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The Process

1. Sign consent form
2. Pre-usage questionnaire
3. Start using the wPDA
4. Post-usage questionnaire
5. Retrospective think aloud and probing
6. Data analysis and team discussion
7. Revision by web developer

Feedback to web designer
The Process

1. Sign consent form
2. Pre-usage questionnaire
3. Start using the wPDA
4. Post-usage questionnaire
5. Retrospective think aloud and probing
6. Data analysis and team discussion
7. Revision by web developer

Iterative process
Results and Discussion

• We conducted three cycles of beta-testing with 13 participants (1\textsuperscript{st} wk=6; 2\textsuperscript{nd} wk=4; 3\textsuperscript{rd} wk=3).

• 10 males; 3 females

• Median age: 65 years

• Education level:
  - 9 secondary/diploma
  - 4 graduate/postgraduate degree

• Years with diabetes: 5 to 30 years
Results and Discussion

The retrospective think aloud and probing methods\(^1\)

- Capture the user’s thoughts when using the website, without having to interrupt them during the browsing session.
- Mimics the actual situation how users would use the website at home.
- In contrast to the Concurrent Think Aloud Method – may disrupt the decision making process.
- Probing - clarify whether and how the website helped to guide the user through the decision making process (utility).
- Limitation – takes a longer time.

Results and Discussion

Screen recording software and webcam

- Record the computer monitor *screen* movements and users’ *facial* expressions *simultaneously*.

- The playback allowed the users to *relive their experience* while providing feedback, which *reduced potential recall bias*.

- Track how the users used the website such as:
  - time taken on each page
  - screen movement
  - clicking of the mouse
  - browsing sequence
Six sections of Insulin web PDA

HbA1c Level

Based on your latest HbA1c of 7.7%, in 10 years' time, out of 100 people like you,

- 29 get complications
- 71 avoid complications

Complications: Blindness, heart attack, stroke, kidney failure, nerve damage and losing your feet or legs.

Legend:
- Red: HbA1c > 9%
- Yellow: HbA1c 6.5% - 9%
- Green: HbA1c < 6.5%

Timeline:
- 4 November 2013
- 7 March 2014
- 31 July 2014

Webcam recording of the user.

Mouse clicking captured as red halo.
Results and Discussion

Screen recording software and webcam

• Limitation:
  - Requires more sophisticated **technical** support.
  - The interviewers must be **familiar** with the website content and flow.
  - Required **skilful** interviewers - involved a third ‘party’ (video-recording) - requires the interviewer to guide the user to reflect and express their thoughts while watching the playback.
Results and Discussion

Screen recording software and webcam

• ensure screen recording **synchronises** with the webcam facial recording

• **light load** to avoid lagging
Results and Discussion

Screen recording software and webcam

• Other recording systems eg. eye tracking devices

Results and Discussion

Direct observations

• At hand to solve computer- or internet-related technical problems eg. internet connectivity issue and computer software update pop-ups.

• Clarify users’ queries about the website and guide them to navigate through the website.

• Take note of issues identified during the session for analysis.
Results and Discussion

Questionnaires

• Demographic data

• Utility (change in the stage of decision making and Decisional Conflict Scale) and usability (System Usability Scale)

• Used for triangulation – point of discussion in interview

• Limitation: did not report the mean score from 13 participants - three different iterations – limited number of samples
Results and Discussion

Framework analysis

• Using the analysis form – **systematic and quick**
• Recordings were not transcribed
• Acceptable - purpose of the beta testing: to capture the users’ **feedback on the website** rather than to provide an **in-depth understanding** of the users’ experience.
Results and Discussion

Framework analysis

• The *whole process* was conducted on the *same day*.
• Researchers *immersed* themselves in the data.
• This same-day analysis reduced turn-around time and made *weekly iteration* possible.
Results and Discussion

• Clear and detailed protocols are important

• Other limitations: Most of the participants - higher educational level; lived in urban areas (easy access to the internet)
Conclusion

• This study provided a new multi-faceted approach to evaluating a wPDA in a pragmatic manner.

• This approach should be further tested in future evaluation of wPDAs.
Acknowledgement

• This study was funded by a University of Malaya Research Grant (RP015B-13HTM).
References


