Opportunistically discovering usability requirements for a clinical handover system

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Agenda

• Usability and clinical handover
• The clinical handover improvement project
• Usability study
• Usability requirements
Clinical handover

• “Clinical Handover is the transfer of professional responsibility and accountability for some or all aspects of care for a patient or group of patients, to another person or professional group on a temporary or permanent basis”

• 72/73 Clinicians identified problems (McCann, McHardy & Child (2007))

• Is a socio-technical problem
Usability in clinical handover

• Usability is not simply concerned with ease of use and user interaction with software
• Usability includes questions of workflow and “working surfaces”.
  – What "work" is required to be done on what kind of "surface" by "who"?
  – What social interactions are required in order to do the “work”?
  – What are the tasks and goals of the user?
Clinical Handover Improvement Project (CHIP)
Invitation to all healthcare professionals to become members of a multidisciplinary team (obstetricians, midwives, anaesthetists, theatre staff, risk management team, IT support staff)

OSSIE model was used for guidance

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Change of location</td>
</tr>
<tr>
<td>Lack of structure</td>
<td>Pro formas – SHARING, IBAAAR</td>
</tr>
<tr>
<td>Inappropriate use of IT support</td>
<td>Larger whiteboard display, modified data input</td>
</tr>
</tbody>
</table>
Study design
Before intervention
Usability evaluation

Method 1 – User Observation
10 pre and 10 post intervention Observations of handovers – including video
Created usability observation logs

Method 2 – Stakeholder Interviews
4 Stakeholders interviewed in-depth

Method 3 – Heuristic evaluation
Based on Nielsen’s & Mack (1994)

Method 4 – Survey
Usability observation log

09/07:14 VO  Person writes some information into the printout of the handover system.
09/07:42 VO  Person takes a device out of her pocket and checks the screen.
09/07:50 VO  Person turns. Her back is now towards the screen of the handover system.
09/08:31 VO  Person checks watch.
09/08:39 VO  Split of handover into two. None of the handovers uses the handover system.
09/09:32 VO  Person hands over patients by reading the information from the screen of the handover system.
09/09:57 VO  Two people taking notes during the handover.
09/10:54 VO  Person verbally confirms and then writes down the BMI of a patient.
09/12:39 VO  Person is working on an computer other than the handover system.
09/13:21 VO  Person is entering some information into the handover system computer.
[User 1] The system should display current patients and patients in the HDU on the same screen.

[User 1] The column "Nutrition" is regarded as superfluous as it is nearly never populated.

[User 1] The column "Nutrition" is regarded as a duplicate of the column "Diet".

[User 2] The system should have another tab which shows potential patients which are currently in other units.

[User 2] The entries in the "Comments" column can be changed. It is felt that these comments should be shown in a historical view, without the possibility to change comments.
## Heuristics

Heuristics were applied to observations and stakeholder comments – examples below

<table>
<thead>
<tr>
<th>Heuristic</th>
<th>Observation</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error prevention</td>
<td>The handover system allows certain data fields (e.g. 'Anaesthetic' or 'Medical Hx') to be populated, even though there is no patient assigned to this row. Error message is displayed ('Please select patient first'), however data remains in data field.</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>The updated handover system has two columns with the header 'Warning'.</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>The handover system does not allow the user to edit standardised information such as 'Patient Name', 'NHI' or 'Age'.</td>
<td>Positive</td>
</tr>
<tr>
<td>Recognition rather than recall.</td>
<td>At no stage during use of the handover system, the evaluator had to remember information from one screen that had to serve as an input into another screen.</td>
<td>Positive</td>
</tr>
</tbody>
</table>

*Heuristics adapted from Nielson*
There was a significant improvement in scores post implementation for all questions.

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Pre Mean</th>
<th>Post Mean</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are delivery unit handovers run effectively?</td>
<td>5.1</td>
<td>7.9</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Is all essential information handed over?</td>
<td>6.07</td>
<td>7.76</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Is patient safety compromised by the handover process?</td>
<td>3.87</td>
<td>1.58</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
After Intervention
Usability Requirements

• Administrators and users of handover systems must be able to customise the amount of data recorded in the handover system and displayed on its screen.

• The handover system must provide display capabilities that enable users to present and communicate information to a large audience.

• All information required at the handover needs to be accessible through the handover system.

• The handover system must be built in a way that allows for accessibility of the information 24x7 without planned or unplanned system downtime.

• The handover system must allow to be adjusted in a way that allows the organisation to incorporate and protocol their handover process into the system.

• The handover system must allow for traceability of the information back to it’s source (e.g. author).
Conceptual design
Discussion

• Usability evaluation is a pragmatic approach to system improvement, which can occur during process change

• Techniques commonly used in Usability evaluation are applicable in many circumstances

• Usability requirements are a concise and comprehensible way to represent the findings of investigations.
The authors would like to thank the staff of the Women’s Health Department, Auckland City Hospital.