Sustained Participatory Design and Implementation of ITHC

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Background

- Participatory Design
- Effects-driven IT development research program (2004- )
  - www.effektdrevetit.dk - www.effects-drivenit.dk
- Region Zealand; Region South Denmark; CSC Scandihealth; Imatis
- EPR systems in hospitals; Emergency Departments
- Morten Hertzum, Anders Barlach, Erling Havn, Jørgen Bansler
Participatory Design

“The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomenon before him, and on the prior understandings which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation” (Schön 1983, p. 68).

- Collective reflection-in-action
- Establishment of mutual learning situations
- Iterative approaches reflecting a hermeneutic circle
- Small-scale, research-driven, initial design and development
Learning from implementation

Crossing the chasm between development and implementation

Initiation  Development  Implementation  Operation

Formative evaluation
Learning from implementation

Crossing the chasm between development and implementation

A limited implementation of a pilot system [mature, robust prototype] in its intended environment and using real data. It is conducted as part of an ISD project to explore the value of the system, improve the system design accordingly, and thereby reduce implementation risk (Hertzum, Bansler, Havn and Simonsen, forthcoming).

Formative evaluation

Complete EPR
Workload ↓
Coordination ↑

Pilot Implementation

Operation

^ 24/7 in one week
^ No paper records
^ Wizard-of-Oz

Pilot Implementation
Learning from implementation

(Hertzum and Simonsen, 2008)

Team conferences

- Mental demand
- Physical demand
- Temporal demand
- Effort
- Performance
- Frustration

Ward rounds

- Mental demand
- Physical demand
- Temporal demand
- Effort
- Performance
- Frustration

Nursing handovers

- Mental demand
- Physical demand
- Temporal demand
- Effort
- Performance
- Frustration

Formative evaluation
Learning from implementation

Crossing the chasm between development and implementation

Initiation | Development | Pilot Implementation | Operation

Formative evaluation

Unanticipated change
- Emergent
- Opportunity-based
- 38% (183/482)
Learning from implementation

- Chief physician: “She must be highly prioritized. How do we record that?”
  EPR-unit manager: “We do that in the task-list that we don’t have”

- Collective investigations of patient records (emergent change)

- Nurses’ observations became part of the shared agenda during team conferences (opportunity-based change)
<table>
<thead>
<tr>
<th>Omskrivelse (3)</th>
<th>Ansvar</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ind og udgiftsmåling</td>
<td>NSA-R</td>
<td>Åben</td>
</tr>
<tr>
<td>Formodentlig nedsat kraft i hæ arm og</td>
<td>NSA-R</td>
<td>Åben</td>
</tr>
<tr>
<td>Unirretention, kateter</td>
<td>NSA-R</td>
<td>Åben</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resultat</th>
<th>Status</th>
<th>Indsamlet af</th>
</tr>
</thead>
<tbody>
<tr>
<td>Går til og fra toilette med rollator og 1 pers</td>
<td>Afsluttet</td>
<td>N61APO-RG</td>
</tr>
<tr>
<td>Har tolket for pt, det er dog svært at kommunikere med pt</td>
<td>Afsluttet</td>
<td>N61APO-RG</td>
</tr>
<tr>
<td>Afsluttet</td>
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<td>N61APO-RG</td>
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</tbody>
</table>

**Planlagte interventioner (20)**

- Indl-advis faxet /phj
- Afsluttet
- N61APO-RG
- N61APO-RG
- N61APO-RG
- N61APO-RG
- N61APO-RG
- N61APO-RG
<table>
<thead>
<tr>
<th>Interventions (I) by physicians recorded in the EPR</th>
<th>Issues and hypotheses (H) investigated by the nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-1: Sodium chloride was installed for slow infusion over night</td>
<td>Observe little urine out</td>
</tr>
<tr>
<td>I-2: Infusion increased because of increasing creatinine</td>
<td>Discuss catheter problems (H-1)</td>
</tr>
<tr>
<td>I-3: Attempts catheterization, but without success.</td>
<td>Discuss bladder dysfunction (H-2)</td>
</tr>
<tr>
<td>I-4: Catheterization made by physicians from the Gynaecological ward</td>
<td>Investigates stroke scores (challenges H-2)</td>
</tr>
<tr>
<td>I-5: More sodium chloride installed because of possible dehydration</td>
<td>Doubts H-1 and H-2 and suspect a new H-3 (kidney failure)</td>
</tr>
<tr>
<td></td>
<td>H-3 presented and confirmed at the following team conference</td>
</tr>
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</table>

(Simonsen and Hertzum, 2010)
Implications
Sustained Participatory Design through Pilot Implementations

- Development-implementation chasm (research scarcity)
- Identifying emergent effects and change (a new role for ethnography)
- Experimentation & learning meets production (a two-sided story)
IT development models

Figure 0. Traditional waterfall model components

Figure 1. ISD project with iterative prototyping.

Figure 2. ISD project with phased implementation.

Figure 3. Evolutionary development.

Figure 4. ISD project with pilot implementations.

Hertzum, Bansler, Havn and Simonsen, forthcoming
A new role for ethnography?

1. Ethnography informing design

Existing work practices (prior to system implementation)

New IT

2. Ethnography evaluating IT use after implementation

New work practices (after system implementation)

Pilot implementation Formative evaluation

Summative evaluation

Simonsen, 2009
## Resource consumption

<table>
<thead>
<tr>
<th>Activity</th>
<th>CSC (hours)</th>
<th>Region Zealand (hours)</th>
<th>Stroke unit (hours)</th>
<th>Researchers (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparations</td>
<td>1996</td>
<td>527.4</td>
<td>237.5</td>
<td>240</td>
</tr>
<tr>
<td>Training and paper-record measurements</td>
<td>64</td>
<td>0</td>
<td>65</td>
<td>71</td>
</tr>
<tr>
<td>Trial period</td>
<td>534</td>
<td>141.6</td>
<td>70</td>
<td>58</td>
</tr>
<tr>
<td>Other</td>
<td>197</td>
<td>0</td>
<td>0</td>
<td>48</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2791</strong></td>
<td><strong>669</strong></td>
<td><strong>372.5</strong></td>
<td><strong>417</strong></td>
</tr>
</tbody>
</table>

**Table 1.** Person hours spent by the four partners in the EPR evaluation.

Hertzum and Simonsen, 2008
References


