QOC-E: A mediating representation to support the development of shared rationale and integration of Human Factors advice

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CHI+MED: Industry Engagement - Background
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How can the interactive properties of medical devices be designed so that they minimize the risk of human error and maximize patient benefit?

We have been working with the medical device industry to understand barriers to the design, development and deployment of safe and usable medical devices (infusion devices). Analysis revealed challenges relating to collaborative working practices.

"It’s not just another day in the life, the most complicated situation that I’ve ever seen in my entire career in pharmaceutical and medical equipment, because there are so many people, so many different players involved" – Why is communication between disciplines so difficult?

In an interview study [1],[2],[3] we found examples of impeded information flow due to the following factors (see above figure):

1) Conflicting priorities between HFE / UCD and marketing.
2) Harmonization of process.
3) Communication of design rationale to others (internal to the development team).
4) Communication of design rationale to others (external).
5) Balance of local and global requirements.
6) Collaborating with others in the industry.
7) Software revision control.
8) Shared responsibility for the interactive properties of a device.
9) Mapping user requirements to functional requirements.
10) Continued understanding of the context of use.

It is possible to show whether criteria support or challenge options by selecting between dashed (challenges) or solid (supports) lines. Lines can be weighted according to importance. See also [8].

Evidence: The output of any number of analytical or empirical techniques including those relating to Human Factors or Usability Engineering (for example [1]-[7]).

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Improve communication by using graphical representations to illustrate design rationale

Reconcile results of multiple approaches

Reveal the consequence of change

Integrate across team members

Questions: Key issues.

Options: Possible alternatives.

Criteria: Issues against which to assess the strengths & weaknesses of alternative options.

Why Vignette B?

- Checks can be made to quickly expose flaws in reasoning or to compartmentalize parts of the design.
- If a piece of evidence or assumption is found to be incorrect then the areas that are impacted can be identified.
- The evidence used to inform the design is made explicit.
- Articulates trade-offs, is flexible and adaptable.
- Can allow for weighting of evidence.
- Allows critiques by those without domain specific experience (for example how many independent lines of evidence are in support?)
- May act as a prompt or structure for risk analysis.
- Has been applied across multiple industries.

We need industrial support to validate the use of mediating representations. For more information please contact c.vincent@ucl.ac.uk This work forms part of the UK EPSRC funded CHI+MED project (EP/G059063).

REFERENCES