

Heuristic Usability Evaluation Design

We decided for a heuristic usability evaluation according to Forsell and Johansson [Forsell and Johansson, 2010], who presented a new set of 10 heuristics out of 63 heuristics (from 6 earlier published heuristic sets). This new set is especially tailored to the evaluation of common and important usability problems in Information Visualization techniques.

It is commonly assumed that three to five expert evaluators are sufficient for a heuristic usability evaluation [Holzinger, 2005]. Thus, we are going to conduct a study with four evaluators, who have considerable knowledge about usability principles.

To ensure unbiased evaluations, separate testing sessions will be performed with each evaluator, an observer being present at each testing session to answer questions about the domain and to give hints when the evaluator is clearly in trouble – but only after commenting the usability problem.

Each evaluator will go through the interface two times. The first round is aimed at getting a feeling for the flow and the general scope of the user interface. In the second round the evaluator is supposed to focus on visual and interactive interface elements with respect to a given list of usability principles [Forsell and Johansson, 2010]:

1. **B5: Information coding.** Perception of information is directly dependent on the mapping of data elements to visual objects. This should be enhanced by using realistic characteristics/techniques or the use of additional symbols.
2. **E7: Minimal actions.** Concerns workload with respect to the number of actions necessary to accomplish a goal or a task.
3. **E11: Flexibility.** Flexibility is reflected in the number of possible ways of achieving a given goal. It refers to the means available to customization in order to take into account working strategies, habits and task requirements.
4. **B7: Orientation and help.** Functions like support to control levels of details, redo/undo of actions and representing additional information.
5. **B3: Spatial organization.** Concerns users' orientation in the information space, the distribution of elements in the layout, precision and legibility, efficiency in space usage and distortion of visual elements.
6. **E16: Consistency.** Refers to the way design choices are maintained in similar contexts, and are different when applied to different contexts.
7. **C6: Recognition rather than recall.** The user should not have to memorize a lot of information to carry out tasks.
8. **E1: Prompting.** Refers to all means that help to know all alternatives when several actions are possible depending on the contexts
9. **D10: Remove the extraneous.** Concerns whether any extra information can be a distraction and take the eye away from seeing the data or making comparisons.
10. **B9: Data set reduction.** Concerns provided features for reducing a data set, their efficiency and ease of use

Each evaluator is asked to solve a given list of tasks by means of the CareCruiser prototype and to enter the found problems on a list with reference to the violated usability principles. Additionally, the evaluators are asked to rate the severity of the problem (1 representing the lowest severity and 5 the highest).

Tasks:

- 1) Find out how the patient's condition changes during the execution of the treatment plan.
- 2) Find out which clinical actions were applied to the patient in the context of treatment plan execution and when these actions were applied.
- 3) Find out which effects the clinical actions have on the patient's condition.
- 4) Identify critical parameter values (critical patient condition) in the course of treatment plan execution.

References:

- [Forsell and Johansson, 2010] Forsell, C. and Johansson, J. (2010) An Heuristic Set for Evaluation in Information Visualization, in: Proc. of the International Conference on Advanced Visual Interfaces (AVI '10). ACM, pp. 199–206.
- [Holzinger, 2005] Holzinger, A. (2005) Usability Engineering Methods for Software Developers, in: Communications of the ACM, 48(1):71–74.