The Card Ranking Technique: Application and Added Value in Comparative Usability Testing

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Abstract. This paper describes the application and added value of using card ranking as part of comparative usability evaluations. In card ranking exercises, users rank design solutions they have tested by placing corresponding symbolic cards in order of preference. In addition to providing quantitative data on the users’ preferences, the technique helps users to remember the design solutions, encourages user reflection, and makes the facilitator’s work easier. The applicability of the method increases with the number of participants and design solutions tested. A key requirement is to design cards that effectively communicate and distinguish the different design solutions.

Keywords: Card sort, card ranking, comparative usability evaluation

1 Introduction

While most usability evaluation studies are performed on single systems, comparing and evaluating multiple design alternatives can be advantageous. Some of the earliest comparative evaluations in the HCI field were conducted during the development of the Star user interface [1] in the 1980’s. KVANTITAIVE DATA. The use of comparative evaluations is also recommended in Jacob Nielsen’s usability engineering lifecycle [2]: Explore the design space by developing several different design solutions, evaluate them, and choose the best designs or design elements as a basis for a further development. KVALITATIVE DATA.

One of the main challenges in formative usability evaluations is to get the users to reflect on the usage of systems. Potential usability problems are not always obvious and immediately recognized by the users. However, letting the users evaluate multiple design solutions can make it easier for them to identify and reflect over usability problems [3]. Testing multiple solutions during an evaluation, however, can place a cognitive burden onto the test subjects, who has to remember and distinguish between them. To reduce this problem and provide cognitive support for test subjects during concluding interviews performed post-testing, they have been given symbolic cards representing each design solution.

Card sort is a technique that is commonly used with in HCI, e.g. providing user input for web page information architecture [4]. The basic idea behind card sort is that
participants are asked to sort cards that represent things, concepts, or terms into groups [5]. We have used a variant of the card sort technique where users, after using and comparing different design solutions, rank cards representing the different solutions in preferred order. This paper aims to present the added value of card ranking in comparative usability evaluations.

2 The Card Ranking Technique

The card ranking technique we have used has been applied in, and evolved through a number of comparative usability evaluations [6-9]. In each of these studies we have compared and evaluated three to eight design solutions. The number of test subjects has ranged from five to fourteen.

**Card design:** For each study, we created cards representing the various design solution that were tested. Each card illustrated one specific solution. The cards were designed using screen shots, concept figures, or photos so that the users were able to easily recognize the different designs (see Fig. X).

![Fig. X. Examples from two sets of cards used in two different studies [7, 9]. Each card represents a design solution.](image)

**Procedure:** We performed a usability evaluation where each user evaluated all available design solution. A short interview was performed between each test to get the users immediate feedback on the solutions.

After the usability test, we performed a concluding interview where we presented the cards to the test participant one at a time in the same order they used the design solutions and asked about their comments.

After all the design solutions had been discussed, we placed the cards face up in random order on a table. We then asked the users to rank the cards in preferred order by stacking them in a pile, and to state the primary reasons for their decisions. The exercise was video recorded for subsequent analysis.
Fig. X. After testing a number of design solutions (left), the users are asked to discuss each solution and sort cards representing them in preferred order (middle). The ranked cards represented the users’ preference (right).

Quantitative data: For each usability test, the card order was coded from 1 (least preferred) to N (most preferred) and a total card score were calculated. This score provided a score of the users preference of the design solutions.

A Friedman test on the data set revealed if there were any significant rank differences between the design solutions. If this test were positive, we performed a Mann-Whitney test, which tested the rank difference significance of each pair of design solutions, giving a total of $\sum (n - 1)$ tests.

Qualitative data: The set of arguments used by the test participant to place a design solution in the card stack were analyzed to see if there were particular problems or benefits associated with the designs. These arguments were typically of the form “I didn’t like this [design solution] because…” or “This [design solution] was good because it…”.

3 The added value

The added value of the card ranking technique in comparative usability testing is summarized below.

Quantitative data on user preference: The sorting process gave concrete quantitative data on user preference that could be used as a statistical foundation for deciding which designs or design aspects that should be further developed. More test subjects gave more reliable ranking data.

User reflection: We found that the sorting process promoted users reflection – it provoked second thought, feedback, and ideas about the designs solutions. In addition the users found it easier to discuss specific cards rather than abstract concepts. The discussion was particularly reflective when we encouraged test subjects to collaborate with the card sort, as done in [9].

Reveal critical usability factors: The card ranking process revealed what users considered as important usability factors for the different solutions. These factors guided designers on what to prioritize in further design iterations.

Memory support: We observed that the cards supported the test participants’ memory by providing “knowledge in the world” – it helped them remember and distinguish between the various design solutions, often with subtle differences. The
cards let them literally recognize and “point” at problems or advantages instead of having to recall them from their memory. However, the usage of the card ranking technique required a carefully designed card figure that effectively communicated the design solution aspect. Moreover, an increasing number of design solutions tested increased the need for cards to support the participants’ memory.

A common reference point for participants: The cards were functioned as common reference points for the participants. Instead of calling the prototype by name, they pointed towards the card. Thus, the cards worked as a *lingua franca* between facilitator and test participant (or between test participants as in [9]) when users did not know the name of the solution, helping the participants understand what the other parties talked about.

Make life easier for the facilitator: The cards acted as a visual interview guideline and helped the facilitator focus the discussion. The cards also reduced the variance between various facilitators. In addition, by referring to the cards, the facilitator could bring the discussion back to the topic when the test participants were heading off-topic. This was particularly useful when testing with several test subjects simultaneously. Furthermore, the technique was easy to perform, took hardly any extra time and made the analysis effort easier.

4 Conclusion

The card ranking technique gives an added value in comparative usability evaluations. The technique promotes user reflection, provide qualitative data on user preference, and reveal critical usability factors. Furthermore, the cards support participants’ memory and act as a common reference point for the participants. At last it makes the facilitator’s work easier. The usefulness of the method increases with the number of design solutions tested and number of users in each test. The challenge is to design cards that effectively communicates and distinguish the core concepts of each design solution.

References

3. Alsos, O., Dahl, Y.: Toward a Best Practice for Laboratory-Based Usability Evaluations of Mobile ICT for Hospitals. Accepted for publication, NordiCHI 08 (2008)