

Task Sequence in User Interface Design and Evaluation Sessions

Anita Komlodi

Department of Information Systems,
UMBC
1000 Hilltop Circle
Baltimore, MD 21250, USA
komlodi@umbc.edu

Liwei Dai

Department of Information Systems,
UMBC
1000 Hilltop Circle
Baltimore, MD 21250, USA
liweid1@umbc.edu

Dagobert Soergel

College of Information Studies,
University of Maryland
Room 4101 Hornbake Bldg
College Park, MD 20742-4345
dsoergel@umd.edu

ABSTRACT

User-evaluation and user-design are two common techniques in user-centered user interface design practice. These two methods yield different types of information from users. However, sometimes they need to be combined in one session with the same users, and the sequence with which design and evaluation are applied can influence the results. In this study, we compared two different sequences of user evaluation and design tasks. The results showed that participants behaved very differently in sessions with different sequences of steps. Users who critiqued interfaces first, then designed their own, were ready to borrow design ideas from existing systems. Participants who designed first then critiqued others and finally redesigned their original suggestions were much more reluctant to borrow ideas. They felt ownership over their designs, they felt threatened by “professional” designs, and they were more critical of those designs. The results of our study provide guidance to sequencing evaluation and design steps in cooperative design sessions.

Categories and Subject Descriptors

H5.2 Information Interfaces and Presentation: User interfaces - User-centered design

General Terms

Human Factors

Keywords

Participatory design, user design, user evaluation, order effect

1. INTRODUCTION

Involving end-users in user interface (UI) design practice can provide insight into user requirements and can result in interfaces that are more usable and more easily accepted by end-users than interfaces developed without user input. (Shneiderman & Plaisant, 2004) Design and evaluation are two ways to involve users in UI development. In collaborative design sessions (Madsen & Aiken, 1993), users participate in the design of the interfaces by suggesting their own solutions along with those of designers. In user evaluation (Nielsen, 1993), users are asked to use the system

and they are interviewed about their experiences afterwards. When users are required to evaluate some interfaces and design others in one session, the sequence of these tasks can influence the outcomes. While the impact of the sequence on behavior seems obvious, previous studies have not explored the nature of this impact. The purpose of this study is to explore user behavior in collaborative design and evaluation sessions with different sequences of design and critique steps.

2. METHODOLOGY

In this study, we asked users to evaluate and design search history (a record of everything a searcher does while looking for information) interfaces for legal information systems (Komlodi, 2004). To support the user interface design process, collaborative design methods (cooperative prototyping, low-tech prototyping, and brainstorming) were applied to encourage feedback from attorneys and law librarians. The sequence of interface critique and design steps were swapped to gain a wider variety of opinions and input from users:

- Critique-First: Introduction—Critique—Design
- Design-First: Introduction—Design—Critique—Redesign

Each design session was attended by two or three end-users and one investigator, which is the typical range of participants for low-tech collaborative design session. (Madsen & Aiken, 1993) In each session, the concept of search histories was introduced with demonstrations of several interface examples. Participants were then asked to either critique existing search history tools or design new ones. In the critique step, existing production and research system interfaces that support the use of search history information in information seeking were demonstrated in a static HTML prototype by the researcher. Participants could ask questions when the investigator was introducing the functions of each application and they were also encouraged to express their opinions about the interfaces.

In the design step, each participant was asked to design a search history interface he/she would like to use, with the help of printed UI elements (windows, buttons, etc.) and other low-tech tools (such as colored paper, colored pencils, scissors, Post-it notes etc.). Each participant had to design on his/her own, but could see and interact with others. At the end of the design session, they were asked to explain their designs to the whole group. The explanations included a description of how they would use the interface in their searching.

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The audiotapes of the sessions were transcribed and content analyzed. Major themes in design and critique were identified and described using the Grounded Theory approach (Strauss & Corbin, 1994). In this methodology, themes are identified in the data collected via a bottom-up approach. The designs that participants created were also captured using a digital camera and compared to designs from the same session and from other sessions. The goal of these comparisons was to identify the number of design features and assess their originality (difference from other designs).

3. RESULTS

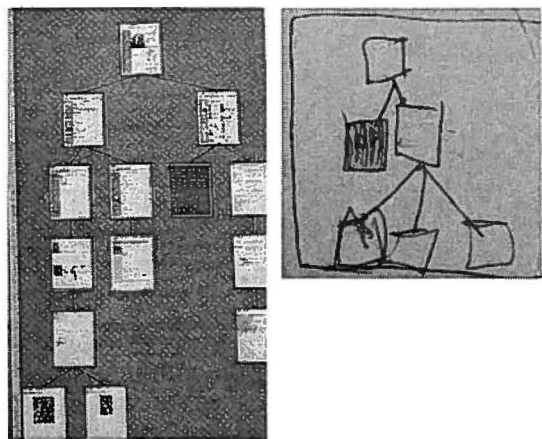
Several themes emerged in both sequences of steps; these are described next, followed by recommendations for design and evaluation sessions.

3.1 Borrowing design ideas: “Like you showed us”

In Critique-First sessions, a strong influence of the demonstrated interfaces was found in our study. Having critiqued several interfaces, end-users’ creativity was limited by the ideas presented to them. In one extreme case, the participants in a Critique-First session did not specifically design interfaces but described potential improvements to the user interfaces critiqued.

In other sessions, participants often included modified versions of the presented user interfaces, as in the case illustrated below in Figure 1. Here the resemblance between the critiqued user interface and the participant’s design is very clear. A Domain Tree Browser (Ghandi et al., 2000) interface created a hierarchical history representation of Web browsing. This interface was presented to the participants in the critique step. One of the participants in this session simply improved on the demonstrated UI and did not create her own design. Participants verbally described this experience of reproducing previously seen design. For example, in the explanation of his original designs, one participant mentioned that: “Here is a checkbox like you showed us”.

Figure 1. Domain Tree Browser interface as presented to participants in the critique (left) and as reflected in a later user design (right).



In the Design-First sessions, the participants designed some user interfaces on their own, then critiqued existing ones, and then had a chance to redesign their own original suggestions. In this case,

we could expect similar impact of the interfaces critiqued on the second round of participants’ own designs, but this did not occur. In general, the participants did not change the basic layout and functions of their designs after seeing the new solutions they had to critique, but they often added a few new features or incremental improvements. In fact, participants tended to be quite defensive about their own designs. When asked if they wanted to change anything on their designs, participants often explained that even though the ideas in the critiqued interfaces were good, they wanted to stay with their main idea except for smaller modifications usually borrowed from the critiqued UIs. This is best illustrated by an example.

In one Design-First session, a participant’s original design showed a list of searches the user did in a certain period of time (in two days, a week, a month, etc.), including queries entered, results returned, databases searched in. After the critique session, he made three changes to his original design, all inspired by the critiques, but not changing the basic layout of his original design. First, he added a “display thread” button to “give an option to show the context of whole thread”, which is an idea from one of the presented concepts. After adding this feature, he remarked that “the main idea will still be queries”. The second change was to combine all the buttons into one in this interface which opened a new window showing all these functions. This was an idea of another participant’s design, as he noted: “use Rose’s idea for single button for selecting operations”. The third revision was also an idea from the critiqued interfaces by adding an option to store results in folders. We can see from this example (one of many) that the participants used several ideas from critiqued interfaces and other participants to add some functions to his original, but the basic interface structure stayed the same.

3.2 Impact of own designs on interface critiques by end users

In the Design-First sessions, the design features participants suggested on their own strongly influenced the way they critiqued. The original designs were present during the critique of the interfaces and participants compared the interfaces seen to their own. For example, one participant included a search between a start and end date in his self-designed interface to limit the search on the history. In the critique of one interface presented, he asked: “Can you choose a time in between to search for? Instead of searching the entire thing, I’d like to search between days. Can it do this? Because I’ve got this feature in my interface.”

Similarly, another participant designed a search result window which can be hidden if the user prefers not to see it. In his critique of one of the presented interfaces, he suggested: “Swift changing, less detail or more detail according to what you like it. I would like to be able to change the look of the web page.”

In a third example, a participant included a text editor in her original design and expressed this need in critiquing: “What I am concerned about is that I don’t like search engines (which) show just the link only. I prefer a text editor, and then you can record your memory and why I am interested in it. Later on I can refer to my notes, also display what I have checked.”

Later on, during the critique step, she said: “I like the notes function” and showed her ‘notes’ function to others.

3.3 End-user pride in design: “It is cool, but it is not my idea!”

Participants expressed very strong attachment to their designs, as demonstrated by their unwillingness to change them in the Redesign step and the influence of their designs on critiques. They commented that some of the features in the demonstrated interfaces were “cool”, but most often decided not to add them into their designs, because it was not their authentic idea. The motivation for this may be attributed to pride in their own design, a sense of ownership, and attachment. Most participants expressed ownership and pride, one signed his design, while another one included a graphical mark to show ownership. Another participant described: “It is my authentic work including my meep (a little intelligent agent designed by her).”

This sense of ownership of designs made participants more aware of ownership issues in the user interfaces critiqued, and caused some of them to be reluctant to use ideas from those UIs. The following participant expressed this feeling while pointing to his design: “Actually, notes will be nice, but it is not really my idea”.

3.4 Level of user activity

Participants more actively involved in the critique discussion incorporated more features from the critique in their own design (either directly borrowed ideas from the demonstration interfaces or improvements of designs). While these participants still left the basic idea in their design unchanged, they added more features from the critiqued interfaces. In one session, the participant that was the most involved in the discussion created a design that incorporated most of the critiqued interfaces. She also included almost all the functions she thought “cool” in the critique process. In another session with two participants, the participant that made the most critique comments incorporated all of those in his design.

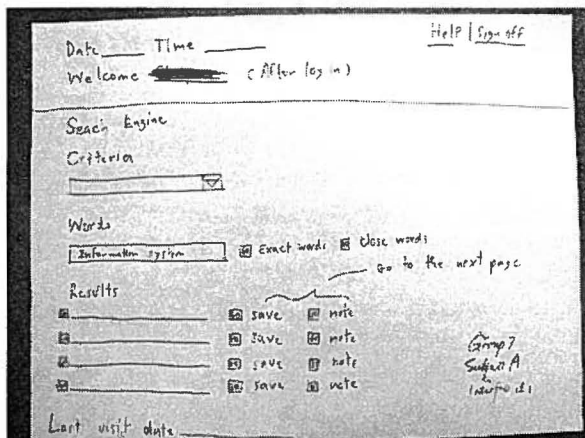


Figure 2A

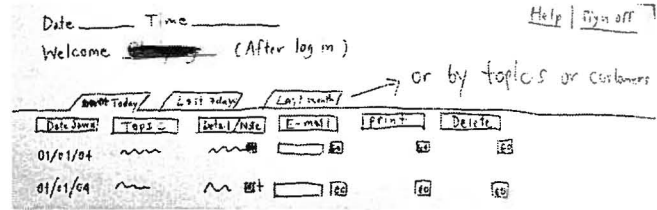


Figure 2B

Figure 2.A & B Quality difference from user involvement.

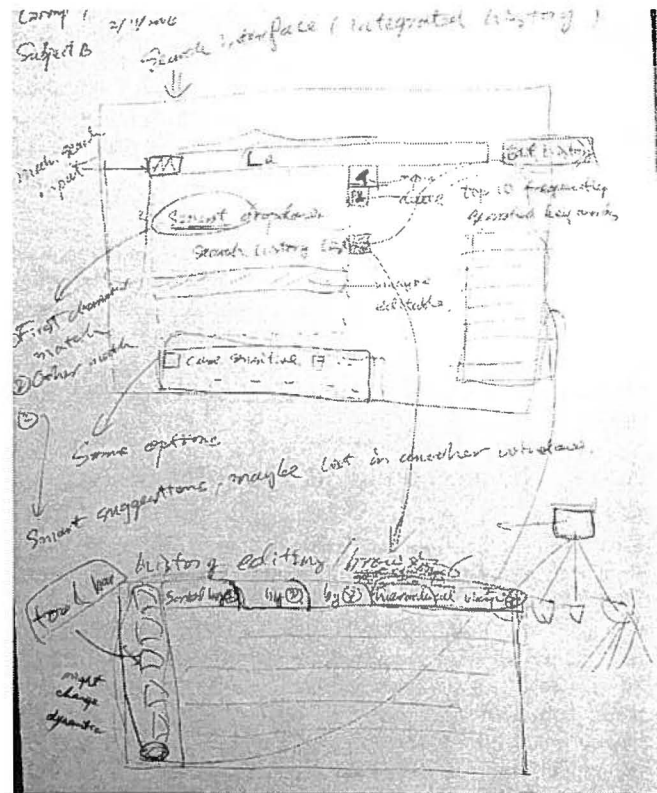


Figure 2.C Quality difference from user involvement.

Figure 2 shows three search history interfaces designed by two participants in a Critique-First session. Figures 2A&B are designed by a participant, whose interactions were limited in the interface critique step. His design is very simple: the upper UI includes a search engine and a list of search results, where the user can choose to take notes and to save the result/search. If a search is saved, the lower UI will be shown with a list of saved searches, which can be sorted by subject or client, and there are also several functions for each search, such as email, print, and delete. He explained later that his basic idea was to give the user options to save a search history or not. The bottom UI in Figure 2C was designed by another participant, who made the most comments in the critique discussion, and he incorporated all of his critique suggestions and some ideas from critiqued interfaces into his own design. His design includes two interfaces: a search history interface and a history browsing/editing interface. In the search interface, search history is integrated into three

components, which are either from his prior experience of search history or from the ideas he brought up in the critique step. First, the search query input box has a “smart dropdown” menu which automatically shows a list of previously entered queries. Second, there is a “top 10 frequently searched keywords” list based on the search history analysis on the right of the interface. Third is the “smart suggestion” for search queries. The dropdown menu (search history list) can be edited, which will lead to the history browsing/editing interface. This interface uses a trail concept from one of the demonstrated interfaces to show a list of search histories, and he added a sort function by time, name, or client ID. The search history can be visually viewed as a hierarchy: information seeker-client-cases, which is an improvement he brought up for another demonstrated interface (a visualized search history interface). There is a “Note” function in this interface, which is also an idea from a critiqued interface. The second participant’s design (Figure 2C) provides much more options and functions for the user to use search histories than the first participant’s (Figure 2A&B).

3.4.1 The impact of fatigue on user input

The Design-First sessions lasted about two hours and fatigue was an important problem for participants. The number of critique comments and extent of UI changes in the redesign step decreased significantly. This may have also influenced their willingness to change their original designs. The Critique-First session usually lasted one to one and a half hours and was less demanding of participants.

3.5 Participant opinions about the design sessions

We asked participants’ opinions of the participatory design session to see whether they thought they could express their ideas freely and clearly during the session and whether they liked the design method used. Generally, they all responded positively to this group discussion and design format. The comments included: “it is really good”, “wonderful”, and “interesting”. One participant from a Critique-First session mentioned that “after having this, I have a lot of ideas. They are all new to me”. One participant from a Design-First session said that “if I have done this individually, I wouldn’t have come up with some of the ideas.” The communication in the sessions helped participants learn from each other and generated more ideas. We also found that the sequence of critique and design steps did not seem to have significant effect on participants’ levels of satisfaction.

4. IMPLICATIONS AND CONCLUSIONS

The results of this study have implications for the design of end-user sessions where participants are asked both to design and evaluate UIs. The strong impact of previously seen UI designs on end-user creativity suggests that if UI professionals are expecting high levels of creativity and a unique view from end-users, it is best to schedule the critique task for a different session or after the design task. If the goal is to collect incremental feedback from participants on UIs in development, it will be very beneficial to

follow a direct critique session with a hands-on design task when users can channel their feedback into design improvements.

Because users develop a strong sense of ownership and pride in their own design, it is suggested that sessions that start with user design should not include other external UIs, as these can be interpreted by participants as threats to their own designs. Differences in the quality of the designs were difficult to detect between the design outcomes of the two different sequences, however some interesting findings suggest this is a good area for further study. As participants did not make many changes in the redesign task to their original designs, it can be argued that the Design-First sessions will result in simpler designs: without seeing existing examples, participants will have fewer ideas. However, the ideas can be more novel than the resulting designs in a Critique-First sequence, where participants can be influenced by the interfaces they critiqued. In order to better evaluate such differences, a more refined definition of “participant design quality” is needed.

While there is no clear winner in terms of design quality, the Critique-First sessions provided more user input in UI evaluation. In this sequence, there were no emotional preferences interfering with the evaluation resulting from the participants’ own designs. For this reason, if user input is important in the evaluation of UIs, this should be collected before participants design their own UIs or in a separate session. It has also been found in our study that higher levels of involvement in the discussions will potentially result in more elaborate design suggestions and higher levels of satisfaction.

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